

ರೈಲು ಮೂಲಸೌಲಭ್ಯ ಅಭಿವೃದ್ಧಿ ಕಂಪನಿ (ಕರ್ನಾಟಕ) ನಿಯಮಿತ

ರೇಲ ಇನ್‌ಫ್ರಾಸ್ಟ್ರಕ್ಚರ್ ಡೆವಲಪ್‌ಮೆಂಟ್ ಕಂಪನಿ (ಕರ್ನಾಟಕ) ಲಿಮಿಟೆಡ್

**Rail Infrastructure Development Company (Karnataka) Limited  
(K-RIDE)**

(A Joint Venture of Govt. of Karnataka and Ministry of Railways)



## **TENDER DOCUMENT FOR THE WORK OF**

**NAME OF WORK:** "Design, Supply, Erection, Testing & Commissioning of 25kV, AC, 50Hz, Single phase, Traction Over Head Equipment for doubling of 1. Banaswadi (Incl) (211/090) - Baiyyappanahalli A Cabin (Excl) (205/378 in BAND-BYPL line) Section (10 TKM approx.)  
2.a) Baiyyappanahalli A Cabin(incl) (205/378 in BAND-BYPL line & 205/650 in BYPL-SBC line) - Bellandur Road (Excl.) (197/600) Section  
2.b) Anekal Road (Excl.) (171/600)- Hosur (Excl.) (159/750) Section (25.5 TKM approx.) Overall TKM of 35.5 approximately and including any modification in existing OHE/PSI if required in Bangalore division of South Western Railway."

**TENDER NO. KRIDE/2023-24/EL/WORK\_INDENT14, DATED:04/11/2023**

### ***RAIL INFRASTRUCTURE DEVELOPMENT COMPANY (KARNATAKA) LIMITED***

Samparka Soudha, 1<sup>st</sup> Floor,  
Dr. Rajkumar Road,  
Opposite Orion Mall,  
Rajajinagar 1<sup>st</sup> Block, Bengaluru-560010  
Tel +91-6364523814,  
Email: [jgmelec@kride.in](mailto:jgmelec@kride.in)/ [electrical.kride@gmail.com](mailto:electrical.kride@gmail.com)

# TENDER DOCUMENT

( Through e-Tendering Mode)

## Tender for the work of :

“Design, Supply, Erection, Testing & Commissioning of 25kV, AC, 50Hz, Single phase, Traction Over Head Equipment for doubling of 1. Banaswadi (Incl) (211/090) - Baiyyappanahalli A Cabin (Excl) (205/378 in BAND-BYPL line) Section (10 TKM approx.) 2.a) Baiyyappanahalli A Cabin (incl) (205/378 in BAND-BYPL line & 205/650 in BYPL-SBC line) - Bellandur Road (Excl.) (197/600) Section 2.b) Anekal Road (Excl.) (171/600)- Hosur (Excl.) (159/750) Section (25.5 TKM approx.) Overall TKM of 35.5 approximately and including any modification in existing OHE/PSI if required in Bangalore division of South Western Railway”.

TENDER NO:	<b>KRIDE/2023-24/EL/WORK_INDENT14</b> Date: 04.11.2023
TENDER DOCUMENT CAN BE DOWNLOADED FROM	Date: 04/11/2023
PERIOD OF SALE OF TENDER DOCUMENT	NA
LAST DATE FOR SALE OF TENDER DOCUMENT	NA
LAST DATE AND TIME FOR RECEIPT OF BIDS	Date: 05/12/2023, IST 15:00 Hrs (Only electronic tender permitted.)
DATE AND TIME OF OPENING OF COVER ONE OF TENDER (TECHNICAL BID)	Date: 06/12/2023, IST 15:30 Hrs
PLACE OF OPENING OF COVER ONE OF TENDER (TECHNICAL BID)	The opening of the Technical Bid shall take place at <b>e- procurement portal of K-RIDE</b> i.e., <a href="http://www.kppp.karnataka.gov.in">www.kppp.karnataka.gov.in</a> .
PLACE OF OPENING OF COVER TWO OF TENDERS (FINANCIAL BID)	The opening of the Financial Bid shall take place at <b>e- procurement portal of K-RIDE</b> i.e., <a href="http://www.kppp.karnataka.gov.in">www.kppp.karnataka.gov.in</a> .
DATE AND TIME OF OPENING OF COVER TWO OF TENDERS	Will be intimated to the Qualified Tenderers through Karnataka Public Procurement Portal.
ADDRESS FOR COMMUNICATION	<b>AGM/Electrical</b> K-RIDE (Rail Infrastructure Development Company (Karnataka) Limited) #8, 1 <sup>st</sup> Floor, Samparka Soudha, Dr. Rajkumar Road, Opposite Orion Mall Rajajinagar 1 <sup>st</sup> Block, BENGALURU Tel – 91-6364523814 E Mail – <a href="mailto:jgmelec@kride.in">jgmelec@kride.in</a> / <a href="mailto:electrical.kride@gmail.com">electrical.kride@gmail.com</a>

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# **SECTION: 1**

## **NOTICE FOR INVITATION FOR TENDERS (IFT)**



<b>Rail Infrastructure Development Company (Karnataka) Limited</b>
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**INVITATION FOR BIDS**  
(Through e-tendering mode)

Tender Notice No. **KRIDE/2023-24/EL/WORK\_INDENT14**Date: **04.11.2023**

**THE RAIL INFRASTRUCTURE DEVELOPMENT COMPANY (KARNATAKA) LIMITED (K-RIDE)**, having its Corporate office, at #8, 1<sup>st</sup> Floor, Samparka Soudha, Dr. Rajkumar Road, Opposite Orion Mall, Rajajinagar 1<sup>st</sup> Block, Bengaluru-560010, India, which is a Joint Venture of Government of Karnataka and Ministry of Railways invites Bids from eligible Bids, for the construction of works detailed in the table below under **Single stage: Two tender document system (Technical Bid and Financial Bid)**.

SL. NO.	NAME OF WORK	APPROX. VALUE OF WORK (IN ₹ CRS)	TENDER SECURITY/EMD	PERIOD OF COMPLETION
1	2	3	4	5
1	"Design, Supply, Erection, Testing & Commissioning of 25kV, AC, 50Hz, Single phase, Traction Over Head Equipment for doubling of 1. Banaswadi (Incl) (211/090) - Baiyyappanahalli A Cabin (Excl) (205/378 in BAND-BYPL line) Section (10 TKM approx.) 2.a) Baiyyappanahalli A Cabin (incl) (205/378 in BAND-BYPL line & 205/650 in BYPL-SBC line) - Bellandur Road (Excl.) (197/600) Section 2.b) Anekal Road (Excl.) (171/600) - Hosur (Excl.) (159/750) Section (25.5 TKM approx.) Overall TKM of 35.5 approximately and including any modification in existing OHE/PSI if required in Bangalore division of South Western Railway"	33.28	Rs.33,28,903/-	15 months

**NOTE:**

- The Tenderers shall submit the tender through e - procurement portal. Tenderers should scan the registration copy; work done certificate and any other document and submit through online. More information can be had from website [www.kppp.karnataka.gov.in](http://www.kppp.karnataka.gov.in).
- The detailed terms and conditions of the Project, including the scope of the works, services and obligations are in Employer's requirement and scope of work and conditions of contract (GCC, SCC, PCC and contract data)

3. The Tenderers are advised to examine the Project in greater detail, and to carry out, at their cost, such studies as may be required for submitting their respective Bids for award of the contract
4. The Tenderers shall submit the tender through e - procurement portal. Tenderers should scan the registration copy; work done certificate and any other document and submit through online. More information can be had from website [www.kppp.karnataka.gov.in](http://www.kppp.karnataka.gov.in).
5. On the stipulated date of opening of Tenders, initially, only the Technical Bids are opened through Karnataka Public Procurement Portal. The Technical Bids shall be evaluated by the Employer in accordance with the stipulated Qualification and Evaluation criteria. No amendments or changes to the Technical Bids would be permitted after the opening of Technical Bids.
6. Tenderers who are qualified in the Technical Evaluation, their Price Bid shall be opened at a date and time advised by the Employer (K-RIDE) through e-tendering portal. The Price Bids are evaluated and the Contract is awarded to the Tenderer whose Tender has been determined to be the lowest evaluated substantially responsive tender.
7. Tenderers are advised to note the eligibility and minimum qualifying criteria specified in the Section 2: Instruction to Tenderers of the tender document.
8. Tenders must be accompanied by a Bid Security as per ITT 13.7 and Section 3: Qualification Information/Bidding Forms in any one of the forms as specified in the tender documents and shall have to be valid for 45 days beyond the validity of the tender. Any Tenders received without bid security, shall be summarily rejected.
9. Incomplete Tender submission will be considered non-responsive and such Tenders shall not be considered for further evaluation.
10. Tender Documents can be downloaded free of cost from Karnataka Public Procurement Portal i.e., [www.kppp.karnataka.gov.in](http://www.kppp.karnataka.gov.in) from 04/11/2023 and the Tenders must be submitted online via Karnataka Public Procurement Portal only.

Please note that drawings, if any, referred in the tender document, but not uploaded with the tender document, can be viewed in this office on any working day. The Tenderer can also have a copy of the same on payment of non-refundable cost of Rs. 5,000/- (Rupees Five Thousand only) by a e-Payment mode (credit card/debit card/net banking/UPI) in favor of **Rail Infrastructure Development Company (Karnataka) Limited, Bangalore.**

It will be the responsibility of the Tenderer who is submitting the Tender on downloaded Tender documents to check and see any Addendum/Corrigendum issued in this regard from the website from time to time and ensure submission of bid along with all Addendum/Corrigendum.

In case of any clarification the Tenderer can visit the Rail Infrastructure Development Company (Karnataka) limited Corporate Office Bengaluru at #8, 1<sup>st</sup> Floor, Samparka Soudha, Dr. Rajkumar Road, Opposite Orion Mall, Rajajinagar 1<sup>st</sup> Block, Bengaluru-560010. Tel. No.+91-6364523814.

11. Validity of Tender: Tenders shall remain valid for a period of **180 days** after the Tender submission deadline date prescribed by the employer. A Tender valid for a shorter period shall be rejected by the employer as non-responsive.

12. In exceptional circumstances, the Employer may request Tenderers to extend the period of validity of their Tenders. The request and the responses shall be made in writing. If a Tender security is requested in accordance with ITT 13, it shall also be extended up to the date mentioned in the letter of request for extension. A Tenderer may refuse the request without forfeiting its Tender security. A Tenderer granting the request shall not be required or permitted to modify its Tender.
13. If, the office happens to be closed on the date of opening of Tender, the Tenders will be opened on next working day at the same time and venue.
14. A Pre- Bid meeting will be held on 20/11/2023 at 11:30 Hrs. IST at the office of K-RIDE, Bangalore to clarify the issues if any and to answer questions on any matter that may be raised at that stage as stated in Clause - 8 of ITT of the Tender document.
15. Other details can be seen in Tender documents.

**16. REGISTRATION:**

- a. Tenderers are required to enroll on the e-tendering Portal ([www.kppp.karnataka.gov.in](http://www.kppp.karnataka.gov.in)) with clicking on the link "Tenderers Registration" on the e-tender Portal by paying requisite registration fee as applicable.
- b. As part of the enrolment process, the Tenderers will be required to choose a unique user name and assign a password for their accounts.
- c. Tenderers are advised to register their valid email address and mobile numbers as part of the registration process. These would be used for any communication with the Tenderer.
- d. Upon enrolment, the Tenderers will be required to register their valid Digital Signature Certificate (Only Class III Certificates with signing + encryption key usage) issued by any Certifying Authority recognized by CCA India with their profile.
- e. Only one valid DSC should be registered by a Tenderer. Please note that the Tenderers are responsible to ensure that they do not lend their DSC"s to others which may lead to misuse.
- f. Tenderers then logs in to the site through the secured log-in by entering their user ID/password and the password of the DSC / e-Token.
- g. The scanned copies of all original documents should be uploaded on portal.
- h. For any query regarding e-procurement on the Karnataka Public Procurement Portal, contact helpdesk number **+91-8046010000, +91-8068948777, [support@epochelpdesk.com](mailto:support@epochelpdesk.com)**

**17. SEARCHING FOR PROPOSAL DOCUMENTS**

Once the Tenderers have selected the proposals they are interested in, the Tenderers can pay nonrefundable processing fee as per the Karnataka Public Procurement Portal.

**18. PRECAUTIONS FOR SUBMITTING / PREPARATION OF PROPOSALS THROUGH E TENDERING PORTAL**

- a. Tenderer, in advance, should get ready the proposal documents to be submitted as indicated in the proposal document / schedule and generally, they can be in PDF /JPEG formats.
  - b. Tenderer should log into the website well in advance for the submission of the proposal so that it gets uploaded well in time i.e., on or before the proposal submission time. Bidder will be responsible for any delay due to other issues.
  - c. The Tenderer has to digitally sign and upload the required proposal documents one by one as indicated in the tendering document.
  - d. The server time (which is displayed on the consultant's dashboard) will be considered as the standard time for referencing the deadlines for submission of the proposals by the consultants, opening of proposals etc. The consultants should follow this time during proposal submission.
19. The Tenderer should furnish the Name of the individual / firm / Company / Joint venture with address and telephone number with place of registration, year of incorporation etc.,
20. Tender by a joint venture of contractors is permitted subject to conditions indicated in tender document.

Note: Wherever the word JV/Consortium is mentioned there, it should be read as JV.

21. The application made by the firm / company / Joint Venture shall be signed by a person holding the power of attorney, in which case the Tenderer shall furnish a copy of power of attorney.
22. Bid through any other mode shall not be entertained. However, power of attorney and JV agreement etc., shall be submitted by the bidder on or before submission date and time.

23. **Employees Provident Fund Registration Certificate**

The Contractor shall furnish EPF Registration Certificate before entering into agreement in the event of award of work to them after tender, subject to compliance with the following conditions:

- a) If the contractor is registered already with the EPF authorities, they should produce a copy of the EPF Registration Certificate.
- b) If not registered with the EPF authorities, the Tenderer should produce an undertaking at the time of participating in the tender that he shall within 7 days of the close of every month submit a Statement to Engineer showing the recoveries of contribution in respect of Employees by or through him and shall also furnish such information as the Engineer is required to furnish under the provisions of the Scheme to the Commissioner EPF.
- c) However, having given an undertaking to this effect if the Contractor does not furnish the information, the Employer will deduct the necessary amount from the amount due to the Contractor. Notwithstanding the above, the Contractor will be liable for any consequential penalty /damages levied by the EPF authorities.

24. The necessary certificates / documents in support fulfilling qualifying criteria stipulated separately shall be scanned and attached to e-procurement document. The original documents if required by the Employer shall be produced whenever asked by Employer on Technical Bid/ Financial Bid.
25. The intending Tenderers are advised to visit the site of work before attending the Pre- Bid meeting and also before submitting the Tenders.
- 26. Site visit and verification of information.**
- 27.1 Tenderer are encouraged to submit their respective Bids after visiting the Project site and ascertaining for themselves the site conditions, traffic, location, surroundings, climate, availability of power, water & other utilities for construction, access to site, handling and storage of materials, weather data, applicable laws and regulations, and any other matter considered relevant by them. Tenderers are advised to visit the site and familiarize themselves with the Project within the stipulated time of submission of the Bid. No extension of time is likely to be considered for submission of Bids.
- 27.2 It shall be deemed that by submitting a Bid, the Tenderer has:
- (a) made a complete and careful examination of the Bidding Documents, Schedules annexed to the Tender document.
  - (b) received all relevant information requested from the Authority;
  - (c) accepted the risk of inadequacy, error or mistake in the information provided in the Bidding Documents or furnished by or on behalf of the Authority relating to any of the matters referred to in Clause 27.1 above. No claim shall be admissible at any stage on this account.
  - (d) satisfied itself about all matters, things and information including matters referred to in Clause 27.1 here in above necessary and required for submitting an informed Bid, execution of the Project in accordance with the Bidding Documents and performance of all of its obligations there under.
  - (e) acknowledged and agreed that inadequacy, lack of completeness or incorrectness of information provided in the Bidding Documents or ignorance of any of the matters referred to in Clause 27.1 here in above shall not be a basis for any claim for compensation, damages, extension of time for performance of its obligations, loss of profits etc. from the Authority, or a ground for termination of the Agreement by the Contractor.
  - (f) acknowledged that it does not have a Conflict of Interest;and
  - (g) agreed to be bound by the undertakings provided by it under and in terms hereof.
- 27.3 The Authority shall not be liable for any omission, mistake or error in respect of any of the above or on account of any matter or thing arising out of or concerning or relating to the Tender document, including any error or mistake therein or in any information or data given by the Authority.
27. The qualification criteria as indicated in bid document should be met by the intending Tenderers.

28. Tenderers shall not be under a declaration of ineligibility for corrupt and fraudulent practices issued by the Govt. of Karnataka, Govt of India and any PSUs thereof.
29. Pre-bid meeting will be held on **20/11/2023 at 11.30AM** in the office of K-RIDE Bangalore.
30. The conditional Tenders will not be accepted.
31. The Employer is not responsible for any delay in accessing Karnataka Public Procurement Portal.
32. The approximate value of the work is inclusive of all taxes, duties, etc., The rates quoted by the Tenderer must be inclusive of all Taxes, Duties etc.,
33. The Employer reserves the right to either postpone or to cancel the entire process of tender.
34. If Employer wishes to engage third party consultants for quality control assessment, apart from the Employer quality control and field tests, the Tenderer should co-operate with both Quality control authorities and the third party.
35. Building and other construction workers welfare: The Tenderer shall subscribe 1% of gross amount of each bill payable to him in respect of contract to the building and other construction workers welfare cess as per GO No: LD 300 LET 2006, Bangalore, dated: 18-01-2007. The amount of subscription will be recovered out of payable amount to him in each bill. This component is deemed to have been included in the quoted rate.
36. **Last Date of Receipt and opening of Bids:** The completed Tenders must be submitted through Karnataka Public Procurement Portal [www.kppp.karnataka.gov.in](http://www.kppp.karnataka.gov.in) not later than **15.00 Hrs on 05/12/2023** and shall be opened on **06/12/2023 at 15.30 hrs**. K-RIDE will not be responsible for any delays in the receipt of Tender by K-RIDE. Late Tenders (received after stipulated date and time of submission of Tenders) shall not be accepted under any circumstances. K-RIDE reserves the right to accept/reject any or all proposals without assigning any reason thereof.
37. Any suit or application, arising out of any dispute or differences on account of this tender shall be filed in a competent court at Bengaluru, Karnataka only and no other court or any other district of the country shall have any jurisdiction in the matter.
38. **Address for Communication:** Interested eligible Tenderers may obtain further information from the following address:

**AGM/Electrical,**  
**Rail Infrastructure Development Company (Karnataka) Limited,**  
**#8, 1<sup>st</sup> Floor, Samparka Soudha, Dr. Rajkumar Road, Opposite Orion Mall**  
**Rajajinagar 1<sup>st</sup> Block, Bengaluru-560010**  
**Tel +91-6364523814**  
**E-mail: [jgmelec@kride.in](mailto:jgmelec@kride.in) / [electrical.kride@gmail.com](mailto:electrical.kride@gmail.com)**

**For any Query regarding e tendering portal/ Tender submission please contact**  
**helpdesk Number [+91-8046010000](tel:+91-8046010000), [+91-8068948777](tel:+91-8068948777)**  
**Email: [support@epochhelpdesk.com](mailto:support@epochhelpdesk.com)**

# **SECTION – 2**

## **INSTRUCTIONS TO TENDERERS (ITT)**

**SECTION 2: INSTRUCTIONS TO TENDERERS (ITT)**

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### A. GENERAL

#### 1. SCOPE OF THE TENDER:

**1.1 THE RAIL INFRASTRUCTURE DEVELOPMENT COMPANY (KARNATAKA) LIMITED (K-RIDE),** Having its Corporate office, at #8, 1<sup>st</sup> Floor, Samparka Soudha, Dr. Rajkumar Road, Opposite Orion Mall, Rajajinagar 1<sup>st</sup> Block, Bengaluru-560010, India, which is a Joint Venture of Government of Karnataka and Ministry of Railways invites Tenders from Eligible Tenderers, for the construction of works details as given in the invitation for the Tenders (IFT). The tenderers may submit the tenders for the works detailed in the IFT.

#### 2. ELIGIBLE TENDERERS:

**2.1** The Tenderers shall not be under a declaration of ineligibility for corrupt and fraudulent practices issued by Govt. of Karnataka, Govt of India and PSUs.

#### 2.2 JOINT VENTURES:

Tendering by a joint venture of Contractors is permissible subject to following conditions:

- a. If the Applicant comprises a number of firms combining their resources in a joint venture, the legal entity constituting the joint venture and the individual partners in the joint venture shall be registered after award of work and shall not be under a declaration of ineligibility for corrupt and fraudulent practices issued by GOK.

Note: The Joint Venture agreement needs to be registered under "The Registration Act 1908" after the issue of LOA. Incorporation of the JV is not expected.

- b. The joint venture must satisfy collectively the Qualification criteria. For this purpose, the following data of each member of the joint venture may be added together to meet the collective qualifying criteria:
- i. Average annual turnover (sub clause 3.2a).
  - ii. Particular experience including key production rates. (Sub clause 3.2b & c).
  - iii. Financial means (sub clause 3.3b liquid assets, 3.6 assessed available Tender capacity & the audited balance sheets or other financial statements acceptable to the employer, for the last five years shall be submitted and must demonstrate current soundness of the applicant's financial position and indicates its prospective long-term profitability.
  - iv. Personnel capabilities (sub clause 3.3c: List of minimum key staff/position required during the contract implementation).
  - v. Equipment capabilities (sub clause 3.3a: own/lease equipment's).
- c. Each partner must satisfy the following criteria individually:

- 
- i. General construction experience for the period of years stated in Tender document (Instructions to Tenderers: The intending Tenderer/firm/company/ joint venture shall provide evidence that it has been actively engaged in work of “Design, Supply, Erection, Testing & Commissioning of 25 KV, AC, 50 HZ, Single Phase, Traction Overhead Equipment for Railway Electrification” work for at least for a period of 5 years prior to the of submission of application. (From FY: 18-19 to FY: 22-23)
  - ii. Adequate sources to meet financial commitments on the other contracts (Sub clause 3.5: Accessed availed Tender capacity).
  - iii. **Financial Soundness (Instructions to Tenderers:** The intending Tenderer/firm/company shall provide the audited balance sheets or other financial statements acceptable to the employer for the last five years and must demonstrate the current soundness of the applicant’s financial position and indicate its prospective long-term profitability. If deemed necessary, the employer shall have the authority to make enquiries with the applicants’ bankers).
  - iv. **Litigation History (Instructions to Tenderers:** The intending Tenderer/firm/company/ joint venture shall provide accurate information on the related application form about any litigation or Arbitration resulting from contracts completed or on going under its execution over the last five years. The consisting history of awards against the tenderer or any partner of a joint venture may result in failure of the application).
  - v. In accordance with the above, the Application shall include all related information required for individual partners in the joint venture
- d. **Joint venture is restricted to 3 (Three) number of partners.** One of the partners, who is responsible for performing a key function in contract management or is executing a major component of the proposed contract, shall be nominated as being in charge during the tendering periods and, in the event of a successful tender, during contract execution. The partner in charge shall be authorized to incur liabilities and receive instructions for and on behalf of any and all partners of the joint venture; this authorization shall be evidenced by submitting a power of attorney signed by legally authorized signatories of all the partners.
- e. All partners of the joint venture shall be legally liable, jointly and severally, during the tendering process and for the execution of the contract in accordance with the contract terms, and a statement to this effect shall be included in the authorization mentioned under Sub-Clause 2.2(d) above. **To enable the above, each of the partners of the joint venture shall meet not less than 25% of the qualifying criteria specified for Average annual turnover and Line of credit / liquid assets. All members of the joint venture must have experience in execution of similar work.**
- f. A copy of the Joint Venture Agreement (JVA) entered into by the partners shall be submitted with the Application. Pursuant to Sub-Clauses 2.2(c) to 2.2(f) above, the JVA shall include among other things: the JV’s objectives; the proposed management structure; the contribution of each partner to the joint venture operations; the commitment of the partners to joint and several liability for due performance; recourse/sanctions within the JV in the event of default or withdrawal of any partner; and arrangements for providing the required indemnities.

The lead partner shall enter into a Joint Venture agreement of Rs. 200.00 stamp paper in the prescribed format which shall be concluded prior to Tender and enclosed to the Tender

document J.V. Partner shall not enter in to multiple J.V' s with different Tenderers of the same work.

- g. The qualification of a joint venture does not necessarily qualify any of its partners to tender individually or as a partner in any other joint venture or association. In case of dissolution of a joint venture prior to the submission of tenders, any of the constituent firms may qualify if they meet all of the qualification requirements, subject to the return approval of the employer. Individual members of a dissolved joint venture may participate as sub-contractor to qualified applicants, subject to the provisions mentioned below:
- “No firm can be a sub-contractor while submitting a tender individually or as a partner of a joint venture in the same tendering process. A firm, if acting in the capacity of sub-contractor in any tender, may participate in more than one tender, but only in that capacity. A tenderer who submits, or participates in, more than one tender will cause all the proposals in which the tender has participated to be disqualified.”
  - A firm shall submit only one Tender in the same Tendering process, either individually as a Tenderer or as partner of Joint Venture.
  - The necessary certificates/documents in support of pre-qualification criteria fulfilled as stipulated shall be scanned and attached to e-tender document. Scanned signature of the Tenderer/authorized representatives of the Tenderer shall be attached while uploading the Tender document.  
Any Tenderer who is otherwise technically qualified withdraws from the Tender process at any stage before a final decision is taken on the tender, the EMD of such Tenderer shall be forfeited, the name of such Tenderer shall be removed from the category list of contractors at least for a minimum period of one year in K-RIDE beside making such Tenderer liable for blacklisting.
  - Tenders submitted by all Tenderers in the process of Tender evaluation will be opened even if the Tenderer withdraws from the Tender process by not submitting the original documents for verification or for any other reasons and the prices quoted by them will be looked into, to ascertain if there is collision amongst the Tenderers to determine the competitiveness of the L1 price quoted by other Tenderers, as per the decision by the K-RIDE.
  - Prior to awarding of the work, the Lowest (L-1) Tenderer should produce the original documents in support of the uploaded documents to enter in to the agreement. If the lowest Tenderer (L-1) does not produce the original documents for entering into the agreement then his Tender can be treated as non-responsive Tender as per clause 26(4) of the KPPP Rules. The name of the Tenderers who do not produce the original documents shall be removed/debarred from the select list of K-RIDE enrollment and barred from participation in any of the tenders to be invited by K-RIDE a part from forfeiting the EMD paid through e-cash.
  - The bidder, JV Partner shall not be under Corporate Debt Restructuring (CDE)/ Strategic Debt Restructuring (SDR) or Bureau of Industrial & financial reconstruction (BIFR) in last 5 years to bid submission date. In this regard, the bidder shall submit along with bid, a certificate with a declaration that, the bidder is not under CFR/SDR or BIFR.

- Further information about e-tendering can be had from Karnataka Public Procurement Portal <http://leproc.karnataka.gov.in>

### 3. QUALIFICATION OF THE TENDERER.

#### 3.1 All the tenderers shall provide the requested information accurately and sufficient details in section 3: Qualification information. The Joint Venture to be formed prior to the Bidding.

Pre-qualification will be based on Applicants meeting all the following minimum pass-fail criteria regarding their general and particular construction experience, financial position, personnel and equipment capabilities, and other relevant information as demonstrated by the Applicant's responses in the Information Forms attached to the Letter of Application. Additional requirements for joint ventures are given in para 2.2

#### 3.2 The following qualification criteria should be met by the intending Tenderers.

- a) Required average annual turnover (In all contractual works): **The intending Tenderer/firm/ company / Joint Venture should have achieved a MINIMUM AVERAGE ANNUAL CONSTRUCTION TURNOVER of Rs.53.248 Cr. in last five Financial Years from 2018-19 to 2022-23.**

**NOTE:** The Tenderers shall submit certificates to this effect which may be **attested certificates** from the concern **departments/ Client or Audited balance sheet** duly certified by the statutory Auditor/ certificate from Chartered Accountant duly supported by audited balance sheet. The Turnover certificate duly certified by statutory Auditor should be uploaded. Financial turnover of previous years will be given a weightage of 10% per year or part thereof up to the month previous to the Bid submission month as indicated in qualification information (Tender Forms) Form FIN-2 based on the rupee value to bring them to current FY: 2023-24 price value.

- b) **The Tenderer/Firm/Company/JV should have satisfactorily completed at least one similar work such as "Work of Design, Supply, Erection, Testing & Commissioning of 25 KV, AC, 50 HZ, Single Phase, Traction Overhead Equipment for Railway Electrification" of value not less than Rs.16.64 Cr. at current FY: 2023-24 price level in the preceding five financial years. (FY 2018-19 to FY 2022-23)**

**NOTE:**

1. The criteria above applies to the Individual Tenderer/Firm/company/Joint venture also. Certificate regarding the same duly signed by an officer not below the rank of the Executive Engineer to be submitted along with the technical Tender.
2. Similar work is defined as below:  
Design, Supply, Erection, Testing & Commissioning of 25 KV, AC, 50 HZ, Single Phase, Traction Overhead Equipment for Railway Electrification.
3. The contract is considered as satisfactorily completed if 90% or more of the work is physically completed which is to be substantiated by a certificate from the Employer who has awarded the contract to the Bidder and the contract amount so received should be equal to or more than the minimum value as per eligibility criteria 3.2 (b).

4. For completed works, the value of work done shall be updated to current FY 2023-24 price level assuming 10% inflation for Indian rupees every year or part thereof up to the month previous to the Bid submission month. Credentials if submitted in foreign currency shall be converted into Indian currency i.e., Indian Rupee as under: Bids will be compared in Indian Rupees only. The exchange rate of foreign currency shall be applicable 28 days before the tender submission date. For conversion of foreign currency to Indian Rupee exchange rates published by Financial Benchmarks Private limited ([www.fbil.org.in](http://www.fbil.org.in)) 28 days before the date of bid submittal will be considered. In case the particular day happens to be a holiday the exchange rate published on the next working day will be considered. In case of works in foreign currency the effect of inflation is considered as included, as the exchange rate prevailing 28 days before tender submission is being considered for conversion to Indian Rupees.
5. In case of JV, full value of the work, if done by the same JV shall be considered. However, if qualifying work (s) done by them in JV having different constituents, then the value of work as per their percentage participation in such JV shall be considered.

**c) The intending Tenderer / firm / company / Joint Venture should have executed the components within last five financial years and Each component should have been executed in any one year (Any continuous 12 months).**

Component No.	Nature of Work	Minimum component of work
1	Design, Supply, Erection, Testing & Commissioning of 25 KV, AC, 50 HZ, Single Phase, Traction Overhead Equipment for Railway Electrification <b>(In maximum up to Three contracts)(Section should be commissioned)</b>	12 TKM

**NOTE:-**

1. The criteria above applies to the Individual Tenderer/Firm/ Company / Joint Venture also. Certificate regarding the same duly signed by an officer not below the rank of the Executive Engineer should be submitted along with the technical Tender.
2. The qualifications, capacity, and resources of proposed subcontractors will not be taken into account in assessing those of individual or joint venture Applicants, unless they are named specialist subcontractors.
3. For para 3.2 (c) 2, 3 and 3.2 (d): The prior consent of the Employer shall be obtained for replacement of proposed identified Subcontractors if any and for which the same qualification criteria as indicated in paras above are required.
  - Replace CA audit with Statutory Auditor wherever applicable, except in qualification of experts.

**3.3 Each Tenderer should further demonstrate:**

- 3.3 a) KEY PLANT AND EQUIPMENT: Availability by owning at least 50% of the required following key and critical equipment's for this work and the remaining 50 % can be deployed on lease/hire for all works provided, the relevant documents (Commitment agreements etc.,) for availability for this work are to be furnished:**

The intending Tenderer/firm/company/Joint venture should furnish details of ownership / lease certificates of the following minimum requirement of machineries:

**PLANT AND EQUIPMENT****(I) KEY AND CRITICAL EQUIPMENTS**

<b>Si No.</b>	<b>Type of Equipment required for the work</b>	<b>Proposed to be Deployed (Minimum)</b>
1.	Tirfor 3/1.5 T Cap	6 Nos
2.	Pull lift 3/1.5 T Cap	6 Nos
3.	Come along clamp	8 Nos
4.	Chain Pulley Block	8 Nos
5.	"D" Shackle	15 No.
6.	Derrick	4 No.
7.	Mandril (50cm dia.)	2 No.
8.	Ladder Extension Type (20' x 36')	10 No.
9.	Ladder trolley P/F type	4 No.
10.	Drum lifting jacks	4 Sets
11.	Gas cutter	4 No.
12.	Grinder	2 No.
13.	Power Hacksaw	4 No.
14.	Dropper making jig & Fixture	2 No.
15.	Megger 2.5 KV	2 No.
16.	Megger 5 KV	2 No.
17.	Earth Tester	2 No.
18.	Bonding Jig	2 No.
19.	Vibrator for foundations	3 No.
20.	Emergency lighting arrangement for night work.	2 Set

21.	Manila rope	10 m x 10 Nos.
22.	Hammers 1.5 Lbs.	4 No.
23.	Hammers 3.0 Lbs	2 No.
24.	Discharge rod	10 No.
25.	D O operating rod	3 No.
26.	Rail Jumper	20 No.
27.	Mixer machine	3 nos
28.	Drilling machine	3 Nos

**(II) Other Plant and equipment to be deployed (The Tenderer has to furnish the details of Own basis and Lease/Hire basis for the following equipment**

SI No.	Type of Equipment required for the work	Proposed to be Deployed (Minimum)
1.	Ajax (Capacity-3 m3)	2 Nos
2.	Crane/2.5T	2 Nos
3.	Concrete Breaker	3 Nos
4.	JCB	1 No
5.	Trailer	1 No
6.	Multi utility vehicle (Bolero)	2 Nos.

**3.3 b) LIQUID ASSETS: The Tenderer / firm/company / Joint Venture should furnish details of liquid assets and / or availability of credit facilities of Rs. 8.87 Cr. for the work mentioned above for meeting the required funds in the form of own funds /credit lines / certificate from scheduled Nationalized Bank.**

The Bidder should have access to or has available liquid assets, lines of credit and other financial means to meet cash flow. The audited balance sheet and/or banking reference certified by Chartered Accountant with their stamp, signature and membership number shall be submitted by the Tenderer along with the Tender.

Banking reference should contain in clear terms the amount that bank will be in position to lend for this work to the applicant/member of the Joint venture. In case the Net Current Assets (as seen from the balance sheet) are negative, only the banking references will be considered. Otherwise, the aggregate of Net Current Assets and submitted banking references will be considered for working out the Liquidity.

The banking reference should be, from a scheduled Bank in India it should not be more than three months old as on date of submission of Bids.

In case of JV firm's overall liquidity of JV firm shall be assessed by arithmetic sum of liquidity of all members of JV as specified in JV matrix.

- 3.3 c) LIST OF MINIMUM KEY TECHNICAL PERSONNEL:** List of Minimum Key Technical personnel required for the work are as under and should be enrolled in company/firm/Company/Joint Venture under Employment register and document should be uploaded. The Contractor shall have a competent team of Managers, Engineers, Technical staff etc. so as to complete the work satisfactorily as per various requirements of the contract. The Key Positions not limited to (and in addition to other manpower requirement as given in the Tender document) and corresponding qualification and experience are as under:

Sl. No.	Designation	Qualification	Experience level (For similar works)	Min. No. Required
1	Project Manager (Team Leader)	Bachelor's Degree/Post Graduate Degree in Electrical Engineering	Minimum 10 years total experience and 5-year experience in the role of Project Manager in the execution of similar type of work	1
2	Design manager	Post Graduate Degree/ Bachelor's Degree in Electrical Engineering	Minimum 10 years total experience and 07-year experience in the role of Design Manager in the execution of similar type of work	As reqd.
3	QA & QC Supervisor	Bachelor's Degree in Civil Engineering	Minimum 5 years total experience and 2-year experience in the role of QA & QC Supervisor in the execution of similar type of work	1
4	Chief Safety and Health officer	Bachelor's Degree / Diploma in Safety Course.	Minimum 5 years total experience and 3-year experience in the role of Chief Safety and Health Officer in the execution of similar type of work.	As reqd.
5	Traffic Coordinator	Diploma in Electrical /Transportation Engineering or Retired Railway personnel with high school graduation	Minimum 5 years total experience and 3-year experience in the role of Traffic Coordinator in the execution of similar type of work.	2
6	OHE Engineer	Bachelor's Degree/Diploma in Electrical Engineering	Minimum 3 Years for graduate & 5 years for Diploma in relevant field.	4



**Note:** The CV's to be given for Serial No. 1 to 5 as per Form-6 of section-3 and Serial No. 6 the details to be given as per Form-5 of section-3 (Qualification information /Bidding Forms).

**3.4 To qualify for a package of contracts made up of this and other contracts for which tenders are invited in this IFT, the Tenderer must demonstrate having experience and resources to meet the aggregate of the qualifying criteria for the individual contracts.**

**3.5 Sub-contractors' experience and resources shall not be taken into account in determining the Tenderer's compliance with the Qualifying Criteria**

**3.6 BID CAPACITY: Tenderers who meet the above specified minimum qualifying criteria, will only be qualified, if their available tender capacity is more than Tender Value (Rs. 33.28 Cr.) The available tender capacity will be calculated as under:**

**Assessed available tender capacity = (A\*N\*1.5 - B) Where**

A = Maximum value of works executed in any one year during the last five financial years updated to the current price level @10% per year

N = Number of years prescribed for completion of the works for which tenders are invited.

B = Value of existing commitments and on-going works to be completed during the period of completion of the work for which tenders are invited

The statements showing the value of existing commitments and on-going works as well as the stipulated period of completion remaining for each of the works listed should be countersigned by the Employer in charge, not below the rank of an Executive Engineer or equivalent.

**Note:** Enclose Certificate(s) from Engineer(s) In charge (not below the rank of Executive Engineer) for Value of outstanding work. In case it is not feasible to furnish certificate from all the units the bidder should record the following certificate on Fin 3:

*"Certified that current commitments on all the contracts that have been awarded or for which a letter of intent or acceptance has been received or for the works in progress or the works approaching completion, value of outstanding work has been indicated in the above table correctly. It is further certified that if later on the employer discovers that information provided in the table is incorrect then the employer will treat our bid invalid and it will be liable for rejection"*

**3.7 NETWORTH:** The Bidder's net worth for the last Financial Year **should be Positive.**

**3.8 Even though the Tenderers meet the above criteria, they are subject to be disqualified if they have:**

- made misleading or false representations in the forms, statements and attachments submitted in proof of the qualification requirements; and/or
- record of poor performance such as abandoning the works, not properly completing the contract, inordinate delays in completion, litigation history, or financial failures etc.; and/or

- participated in the previous Tender for the same work and had quoted unreasonably high tender prices and could not furnish rational justification.

### 3.9 ELIGIBILITY CRITERIA TABLE/MATRIX:

Requirement	Single Entity	Joint Venture			Submission Requirements
		Lead Partner	Other Partners	All partners combined	
<b>Clause: 3.2.(a)</b> (Minimum Average Annual Construction turnover)	Must meet the requirement	Must meet 50% of the requirement	Must meet 25% of the requirement	Must meet the requirement	Form FIN-2
<b>Clause: 3.2 (b)</b> One Similar work	Must meet the requirement	Must meet the requirement	Must have experience in similar work.	Must meet the requirement	Form at para 1.3/section:3
<b>Clause: 3.2 (c) 1</b> Railway Electrification works - Design, Supply, Erection, Testing & Commissioning of 25 KV, AC, 50 HZ, Single Phase, Traction Overhead Equipment (In maximum up to 03 no Contracts	Must meet the requirement	All Partners Combined Must Meet requirement			Form at para 1.4/section:3
<b>Clause: 3.3 (I)</b> Key and Critical Equipments	Must meet the requirement	All Partners Combined Must Meet requirement.			Form at para 1.6/section:3
<b>Clause: 3.3 (II)</b> Other plant and Equipments	Must meet the requirement	All Partners Combined Must Meet requirement			Form at para 1.6/section:3
<b>Clause: 3.3(b)</b> Liquid Asset	Must meet the requirement	Must meet 50% of the requirement	Must meet 25% of the requirement	Must meet the requirement	Form at para 1.10/section:3
<b>Clause: 3.3(c)</b> Minimum Key Technical Staff	Must meet the requirement	All Partners Combined Must Meet requirement			Form No.5 & 6 of Section 3

SECTION:2: - INSTRUCTIONS TO TENDERERS (ITT)

<b>Clause: 3.6</b> Bid capacity	Must meet the requirement	All Partners Combined Must Meet requirement			Form at para 1.5/section:3 and Form FIN-3/ section:3
<b>Clause: 3.7</b> Net worth	Must meet the requirement	Must meet the requirement	Must meet the requirement	Must meet the requirement	Form FIN-1/ section:3

3.10 The applicant must attach with their application, a note giving a general description on the approach to the construction methods, technologies, quality assurance schemes proposed, deployment schedule of equipment proposed to be used, etc., for ensuring completion of the work as per specifications within the desired time-frame.

**4. ONE TENDER PER TENDERER:**

4.1 Each tenderer shall submit only one tender for one package. A tenderer who submits or participates in more than one Tender (other than as a sub-contractor or in cases of alternatives that have been permitted or requested) will cause all the proposals with the Tenderer's participation to be disqualified.

**5. COST OF TENDERING:**

5.1 The tenderer shall bear all costs associated with the preparation and submission of his tender, and the Employer will in no case be responsible and liable for those costs.

**6. SITE VISIT:**

6.1 The Tenderer at his own responsibility and risk is encouraged to visit and examine the Site of Works and its surroundings and obtain all information that may be necessary for preparing the Tender and entering into a contract for construction of the Works. The cost of visiting the Site shall be at the Tenderer's own expense.

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## B -TENDER DOCUMENTS

### 7. CONTENT OF TENDER DOCUMENTS

7.1 The set of tender documents shall have all the Sections given in content page.

### 8. CLARIFICATION OF TENDER DOCUMENTS

8.1 A prospective tenderer requiring any clarification of the tender documents may notify the Employer in writing or by cable (hereinafter "cable" includes telex, E-Mail and facsimile) at the Employer's address indicated in the invitation to tender. The Employer will respond to any request for clarification which he receives earlier than the date mentioned in the e-procurement portal of Karnataka for queries. Copies of the Employer's response will be forwarded to all purchasers of the tender documents, including a description of the enquiry but without identifying its source.

#### 8.2 Pre-tender meeting:

8.2.1 The tenderer or his authorized representative is invited to attend a pre-tender meeting which will take place at office of **K-RIDE Bangalore.**

**Venue:** #8, 1<sup>st</sup> Floor, Samparka Soudha, Dr. Rajkumar Road,  
Opposite Orion Mall, Rajajinagar 1<sup>st</sup> Block,  
Bengaluru-560010  
Tel +91-6364523814

**Date:** 20/11/2023, **Time:** IST 11.30 Hrs.

8.2.2 The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage.

8.2.3 The tenderer is requested to submit any pre bid queries in writing or by cable to reach the Employer not later than one day before the meeting.

8.2.4 Minutes of the meeting, including the text of the questions raised (without identifying the source of enquiry) and the responses given will be published without delay to all purchasers of the tender documents. Any modification of the tender documents listed in Sub-Clause 7.1 which may become necessary as a result of the pre-tender meeting shall be made by the Employer exclusively through the issue of an Addendum pursuant to Clause 9 and not through the minutes of the pre-tender meeting.

8.2.5 Non-attendance at the Pre-Tender meeting will not be a cause for disqualification of a Tenderer.

### 9. AMENDMENT OF TENDER DOCUMENTS

9.1 Before the deadline for submission of Tenders, the Employer may modify the tender documents by issuing addendum

- 9.2 Any corrigendum / addendum issued shall be part of the tender documents and shall be made available on the website or e-portal. The Provisions in corrigendum /addenda shall take priority over the Tender Documents issued previously.
- 9.3 To give prospective Tenderers reasonable time in which to take an addendum into account in preparing their tenders, the Employer shall extend as necessary the deadline for submission of Tenders, in accordance with Sub-Clause 16.2 below.

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## C. PREPARATION OF TENDERS

### 10. DOCUMENTS COMPRISING THE TENDER

10.1 The Tender submitted by the Tenderer shall be in two covers (documents) and shall contain the documents as follows:

#### 10.1.1 First Cover (Document):

- Earnest Money Deposit/Scanned copy of Bank Guarantee (B.G) for balance Earnest Money Deposit;
- Qualification Information as per formats given in Section 3;

#### 10.1.2 Second Cover (Document):

- The Tender (in the format indicated in Section 4) (as per Karnataka Public Procurement Portal)
- Priced Schedule (Section 9); online through Karnataka Public Procurement Portal, no hardcopy of commercials should be attached or disclosed. (as per Karnataka Public Procurement Portal)

And any other materials required to be completing and submitting by Tenderers in accordance with these instructions. The documents listed under Sections 3, 4, 6 and 9 shall be filled in without exception.

#### 10.2 DELETED

### 11. TENDER PRICES

11.1 The contract shall be for the whole works as described in Sub-Clause 1.1, based on the priced Price Schedule submitted by the Tenderer.

11.2 The Tenderer shall quote the single percentage above/below/at par (both in figures and words) for each schedule of the Works described in the Price Schedule along with total tender price (both in figures and words). Schedules for which no amount or lumpsum price is entered by the Tenderer will not be paid by the Employer when executed and shall be deemed to be covered in the Priced schedule. Corrections, if any, shall be made by crossing out, initialing, dating and rewriting.

11.3 All duties, taxes, and other levies payable by the contractor under the contract, or for any other cause, shall be included in the Price schedule, prices and total Tender Price submitted by the Tenderer.

11.4 The percentage quoted by the Tenderer shall be subject to adjustment during the performance of the Contract in accordance with the provisions of Clause of the Conditions of Contract.

## 12. TENDER VALIDITY

- 12.1 Tenders shall remain valid for a period not less than **one hundred and eighty days** after the deadline date for tender submission specified in Clause 16. A tender valid for a shorter period shall be rejected by the Employer as non-responsive.
- 12.2 In exceptional circumstances, prior to expiry of the original time limit, the Employer may request that the Tenderers may extend the period of validity for a specified additional period. The request and the Tenderers' responses shall be made in writing or by cable. A Tenderer may refuse the request without forfeiting his earnest money deposit. A Tenderer agreeing to the request will not be required or permitted to modify his tender, but will be required to extend the validity of his earnest money deposit for a period of the extension, and in compliance with Clause 13 in all respects.

## 13. EARNEST MONEY DEPOSIT (TENDER/BID SECURITY)

- 13.1 Earnest Money Deposit/ Tender security (as per Karnataka Public Procurement Portal). The Tenderer shall furnish, as part of his tender, earnest money deposit in the amount as shown in column 4 of the Table of IFT for this particular work. This earnest money deposit shall be in favour of Rail Infrastructure Development Company (Karnataka) Limited Payable at Bangalore and in the form as mentioned in clause 13.7.
- 13.2 Instruments having fixed validity issued as earnest money deposit for the tender shall be valid for 45 days beyond the validity of the tender.
- 13.3 Any tender not accompanied by an acceptable earnest money deposit and not secured as indicated in Sub-Clauses 13.1 and 13.2 above shall be rejected by the Employer as non-responsive.
- 13.4 The earnest money deposit of unsuccessful Tenderers will be returned within 30 days of the end of the tender validity period specified in Sub-Clause 12.1.
- 13.5 The earnest money deposit of the successful Tenderer will be discharged when the Tenderer has signed the Agreement and furnished the required Performance Security.
- 13.6 The earnest money deposit may be forfeited:
- (A) If the Tenderer withdraws the Tender after tender opening during the period of tender validity;
  - (B) If the Tenderer does not accept the correction of the Tender Price, pursuant to Clause 24; or
  - (C) In the case of a successful Tenderer, if the Tenderer fails within the specified time limit to
    - (i) sign the Agreement; or
    - (ii) furnish the required Performance Security

**14. FORMAT AND SIGNING OF TENDER**

Tenderer shall submit the Tender electronically before the submission date and time published in Karnataka Public Procurement Portal. The Tenderer must submit Technical and Financial Tender as described in ITT.

All pages of the tender where entries or amendments have been made shall be initialed by the person signing the tender. The Tender shall contain no alterations or additions, except those to comply with instructions issued by the Employer, or as necessary to correct errors made by the Tenderer, in which case such corrections shall be initialed by the person signing the Tender.

<b>Language of Tender</b>	The language of the Tender: English
<b>Technical Tender</b>	Alternative technical solutions are not permitted.
<b>Technical Tender Documents</b>	All the Forms of Section 3: Qualification Information/Bidding Forms.
<b>Alternative Bids/Tenders</b>	Alternative Bids are not permitted.
<b>Currencies of Tender and Payment</b>	The amount (Lumpsum Price) shall be quoted by the Tenderer entirely in Indian Rupees (INR). For Evaluation and comparison purposes, the currencies of the Tender shall be converted in to Indian Rupees.
<b>Any amendments such as interlineations, erasures, or overwriting shall be valid only if they are signed or initialed by the Person signing the Tender</b>	<p>The written confirmation of authorization to sign on behalf of the Tenderer shall consist of:</p> <ol style="list-style-type: none"> <li>In case of Private/Public Companies, a POA from the Director of the Company who has been authorized by the Board of Directors through resolution to sign on behalf of the Company. Copy of Board Resolution shall also be submitted.</li> <li>In case of proprietorship Tenderers, Power of Attorney by the Proprietors.</li> <li>In case of partnership Tenderers, Power of Attorney duly signed by all the partners.</li> <li>In case of Limited Liability Partnership (LLP), a POA from the Director of the Company who has been authorized by the Board of Directors through resolution to sign on behalf of the Company. Copy of Board Resolution shall also be submitted.</li> <li>In case of Joint Venture, Power of Attorney duly signed by individual partners to the Lead partner as per the form given in Section-4 with stipulated documents.</li> </ol>

The Bid shall be digitally signed by using class-III digital signature of a person who is dully authorized to sign on behalf of the bidder. This authorization shall consist of a written confirmation as specified in the BDS and shall be attached to the bid. The name and position held by each person signing the authorization must be typed or printed below the signature. If either the Letter of Technical Bid or Letter of Price Bid or Bid-Security Declaration (if applicable) is not signed, the Bid shall be rejected. All pages of the bid, except for un-amended printed literature, shall be signed or initialed by the person signing the bid.



- I. If the Tender is submitted by proprietary firm, it shall be signed by the proprietor above his full name, full name of his firm with his current address.
- II. If the Tender is submitted by a firm in partnership, it shall be signed by a partner holding the power of Attorney for the firm. A certified copy of the Partnership deed and power of attorney shall accompany the Tender; Alternatively, it shall be signed by all the partners.
- III. If the Tender is submitted by a limited company or a limited corporation, it shall be signed by a duly authorized person holding the power of attorney for the firm. A certified copy of the power of attorney shall accompany the Tender.
- IV. If a Tender is submitted by a Joint venture, each firm in the Joint venture shall furnish the evidence admissible in law /Power of Attorney to sign the Form of Tender and Lead member as stated in JV Agreement shall sign the Tender documents for submission of Tender.

Any amendments such as interlineations, erasures, or overwriting shall be valid only if they are signed or initialed by the person signing the Tender

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**D. SUBMISSION OF TENDERS**

**15. SEALING AND MARKING OF TENDERS**

Tenderer shall submit the Tender electronically before the submission date and time published.

**16. DEADLINE FOR SUBMISSION OF THE TENDERS**

16.1 Tenders must be submitted online through Karnataka Public Procurement Portal to the Employer on or before the date as specified in the Karnataka Public Procurement Portal and the submission of tender is the responsibility of the Tenderer.

16.2 The Employer may extend the deadline for submission of tenders by issuing an amendment in accordance with Clause 9, in which case all rights and obligations of the Employer and the Tenderers previously subject to the original deadline will then be subject to the new deadline.

**17. LATE TENDERS**

17.1 In online e-procurement system, the Tenderer shall not be able to submit the Tender after the Tender submission time and date as the icon for the task in the Karnataka Public Procurement Portal will not be available. Any Tender received by the Employer after the deadline prescribed in Clause 16 will be rejected.

17.2 "It shall be the responsibility of the tenderers to ensure that their tender is submitted in the Karnataka public procurement portal within the last date and time specified for the receipt of the tenders

**18. MODIFICATION AND WITHDRAWAL OF TENDERS**

18.1 Tenderer may modify and correct or upload any relevant document in the portal till Tender submission date and time, as published in the Karnataka Public Procurement Portal.

18.2 No Tender may be modified after the deadline for submission of Tenders.

18.3 Withdrawal or modification of a Tender between the deadline for submission of Tenders and the expiration of the original period of Tender validity specified in Clause 12.1 above or as extended pursuant to Clause 12.2 may result in the forfeiture of the earnest money deposit pursuant to Clause 13.

18.4 DELETED.

**E. TENDER OPENING AND EVALUATION****19. OPENING OF FIRST COVER (Document):** Opening of First Cover (Document) of all Tenders and evaluation to determine qualified Tenderers:

- 19.1 The Employer will open the First Covers (Document) of all the Tenders received (except those received late or withdrawn), including modifications for First Cover (Document) made pursuant to Clause 18, in the presence of the Tenderers or their representatives who choose to attend as per Karnataka Public Procurement Portal on the date and the place specified in Clause 16. In the event of the specified date of Tender opening being declared a holiday for the Employer, the Tenders will be opened at the appointed time and location on the next working day.
- 19.2 DELETED
- 19.3 The Tenderer name, the presence or absence of earnest money deposit (amount, format and validity), the submission of qualification information and such other information as the Employer may consider appropriate will be announced by the Employer at the opening.
- 19.4 The Employer shall prepare minutes of the Tender opening, including the information disclosed to those present in accordance with Sub-Clause 19.3.
- 19.5 DELETED
- 19.6 The Employer will evaluate and determine whether each tender (a) meets the eligibility criteria defined in ITT Clause 2 is accompanied by the required earnest money deposit as per stipulations in ITT Clause 13 and meets the minimum qualification criteria stipulated in ITT Clause 3. The Employer will draw out a list of qualified Tenderers.

**20. OPENING OF SECOND COVER (DOCUMENT) OF QUALIFIED TENDERERS AND EVALUATION:**

- 20.1 The Employer will inform all the Qualified Tenderers the time, date and venue fixed for the opening of the Second Cover (Document) containing the priced Tenders published in Karnataka Public Procurement Portal. The Employer will open the Second Covers (Document) of Qualified Tenderers at the appointed time and date in the presence of the Tenderers or their representatives who choose to attend. In the event of the specified date of financial Tender opening being declared a holiday for the Employer, the Second Covers (Document) will be opened at the appointed time and location on the next working day.
- 20.2 DELETED
- 20.3 The Tenderers' names, the Tender prices, the total amount of each Tender, Tender modifications and withdrawals, and such other details as the Employer may consider appropriate, will be announced by the Employer at the opening. No Tender shall be rejected at Tender opening.
- 20.4 The Employer shall prepare minutes of the Second Cover (Document) Tender opening, including the information disclosed to those present in accordance with Sub-Clause 20.3.

## 21. PROCESS TO BE CONFIDENTIAL

- 21.1 Information relating to the examination, clarification, evaluation, and comparison of Tenders and recommendations for the award of a contract shall not be disclosed to Tenderers or any other persons not officially concerned with such process until the award to the successful Tenderer has been announced. Any effort by a Tenderer to influence the Employer's processing of Tenders or award decisions may result in the rejection of his Tender.

## 22. CLARIFICATION OF TENDERS

- 22.1 To assist in the examination, evaluation, and comparison of Tenders, the Employer may, at his discretion, ask any Tenderer for clarification of his Tender, including breakdowns of Lumpsum Price. The request for clarification and the response shall be in writing or by cable, but no change in the price or substance of the Tender shall be sought, offered, or permitted except as required to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the Tenders in accordance with Clause 24.
- 22.2 No Tenderer shall contact the Employer on any matter relating to its Tender from the time of the Tender opening to the time the contract is awarded.

**If they have any query/clarification related to e-Procurement on the Karnataka Public Procurement Portal, contact e-Procurement Help desk from 10:00 AM to 5:00 PM. Ph. No.: +91-8046010000/ 8068948777 or [support@eprochelpdesk.com](mailto:support@eprochelpdesk.com) Karnataka Public Procurement Portal through query option on or before specified time.**

- 22.3 Any effort by the Tenderer to influence the Employer in the Employer's Tender evaluation, Tender comparison or contract award decisions may result in the rejection of the Tenderers' Tender.

## 23. EXAMINATION OF TENDERS AND DETERMINATION OF RESPONSIVENESS

- 23.1 Prior to the detailed evaluation of Tenders, the Employer will determine whether each Tender; (a) has been properly signed; and; (b) is substantially responsive to the requirements of the Tender documents.
- 23.2 A Substantially responsive Tender is one which conforms to all the terms, conditions, and specifications of the Tender documents, without material deviation or reservation. A material deviation or reservation is one (a) which affects in any substantial way the scope, quality, or performance of the Works; (b) which limits in any substantial way, inconsistent with the Tender documents, the Employer's rights or the Tenderer's obligations under the Contract; or (c) whose rectification would affect unfairly the competitive position of other Tenderers presenting substantially responsive Tenders.
- 23.3 If a Tender is not substantially responsive, it will be rejected by the Employer, and may not subsequently be made responsive by correction or withdrawal of the nonconforming deviation or reservation.

## 24. CORRECTION OF ERRORS

- 24.1 Tenders determined to be substantially responsive will be checked by the Employer for any arithmetic errors. Errors will be corrected by the Employer as follows:

- where there is a discrepancy between the amount in figures and in words, the lower of the two will govern and
- Deleted.

24.2 The amount stated in the Tender will be adjusted by the Employer in accordance with the above procedure for the correction of errors and, with the concurrence of the Tenderer, shall be considered as binding upon the Tenderer. If the Tenderer does not accept the corrected amount the Tender will be rejected, and the earnest money deposit may be forfeited in accordance with Sub-Clause 13.6 (b).

## 25. EVALUATION AND COMPARISON OF TENDERS

25.1 The Employer will evaluate and compare only the Tenders determined to be substantially responsive in accordance with Clause 23.

25.2 In evaluating the Tenders, the Employer will determine for each Tender the evaluated Tender Price by adjusting the Tender Price as follows:

(a) Making any correction for errors pursuant to Clause 24; and

(b) **DELETED**

25.3 The Employer reserves the right to accept or reject any variation, deviation, or alternative offer. Variations, deviations, and alternative offers and other factors which are in excess of the requirements of the Tender documents or otherwise result in unsolicited benefits for the Employer shall not be taken into account in Tender evaluation.

25.4 The estimated effect of the price adjustment conditions under Clause 40 of the Conditions of Contract, during the implementation of the Contract, will not be taken into account in tender Evaluation

25.5 If the tender of the successful tenderer is seriously unbalanced in relation to the Employer's estimate of the cost of the work to be performed under the contract, the Employer may require the Tenderer to produce detailed price analyses for any or all items of Priced Schedule, to demonstrate the internal consistency of those prices with the construction methods and schedule proposed. After evaluation of the price analyses, the Employer may require that the amount of the performance security set forth in Clause 29 be increased at the expense of the successful Tenderer to a level sufficient to protect the Employer against financial loss in the event of default of the successful Tenderer under the contract.

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## F. AWARD OF CONTRACT

### 26. AWARD CRITERIA

- 26.1 Subject to Clause 27, the Employer will award the Contract to the Tenderer whose Tender has been determined to be substantially responsive to the Tender documents and who has offered the lowest evaluated Tender Price, provided that such Tenderer has been determined to be (a) eligible in accordance with the provisions of Clause 2, and qualified in accordance with the provisions of Clause 3.

### 27. EMPLOYER'S RIGHT TO ACCEPT ANY TENDER AND TO REJECT ANY OR ALL TENDERS

- 27.1 Notwithstanding Clause 26, the Employer reserves the right to accept or reject any Tender, and to cancel the Tender process and reject all Tenders, at any time prior to the award of Contract, without thereby incurring any liability to the affected Tenderer or Tenderers or any obligation to inform the affected Tenderer or Tenderers of the grounds for the Employer's action.

### 28. NOTIFICATION OF AWARD AND SIGNING OF AGREEMENT

- 28.1 The Tenderer whose Tender has been accepted will be notified of the award by the Employer prior to expiration of the Tender validity period by cable, telex, e-mail or facsimile confirmed by registered letter. This letter (hereinafter and in the *Conditions of Contract* called the "Letter of Acceptance") will state the sum that the Employer will pay the Contractor in consideration of the execution, completion, and maintenance of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Contract called the "Contract Price").
- 28.2 The notification of award will constitute the formation of the Contract, subject only to the furnishing of Performance Security in accordance with the provisions of Clause 29. Until a formal contract is prepared and executed, the notification of award shall constitute a binding Contract.
- 28.3 The Agreement will incorporate all agreements between the Employer and the successful Tenderer. It will be kept ready for signature of the successful Tenderer in the office of Employer within 30 days following the notification of award along with the Letter of Acceptance. Within 20 days of receipt, the successful Tenderer will sign the Agreement and deliver it to the Employer.
- 28.4 Upon the furnishing by the successful Tenderer of the Performance Security, the Employer will promptly notify the other Tenderers that their Tenders have been unsuccessful.

**Note: The Cost of Stamp duty of the contract agreement shall be borne by the contractor as per the Karnataka stamp duty Act.**

### 29. PERFORMANCE SECURITY

- 29.1 Within 20 days of receipt of the Letter of Acceptance, the successful Tenderer shall deliver to the Employer a Performance Security in any of the forms given below for an amount equivalent to **3% of the Contract price plus additional security for unbalanced tenders (additional security at 50% of the estimated cost of the unbalanced component)** in accordance with Clause 25.5 of ITT and Clause 43 of the Conditions of Contract.

- Banker's cheque/Demand draft, /Pay Order/ BG in favour of K-RIDE, Bangalore or
- A bank guarantee in the form given in Section 10; or
- Specified Small Savings Instruments pledged to K-RIDE, Bangalore.

29.2 If the Performance Security deposit is provided by the successful tenderer in the form of Bank Guarantee, it shall be issued either by a Nationalized / Scheduled bank.

29.3 The Performance Security deposit if furnished in cash or demand draft can, if requested, be converted to interest bearing securities at the cost of the contractor.

29.4 Failure of the successful tenderer to comply with the requirements of sub-clause 29.1 and clause 29 of additional ITT, shall constitute sufficient grounds for cancellation of the Tender award and forfeiture of the Earnest money deposit.

### **30. ADVANCE PAYMENT AND SECURITY:**

30.1 The Employer will provide an advance payment on the contract price as stipulated in the condition of contract subject to the maximum as stated in the contract data.

### **31. CORRUPT OR FRAUDULENT PRACTICES**

**31.1** "corrupt practice" means the offering, giving, receiving or soliciting of anything of value to influence the action of the public official in the procurement process or in contract execution;

"fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Procurement Entity, and includes collusive practice among the tenderers either prior to or after tender submission, designed to establish tender prices at artificial non-competitive levels and to deprive the Procurement Entity of the benefits of free and open competition" The debarment action shall be taken as per KTPP Act.

31.2 K-RIDE requires that the Tenderers/Suppliers/Contractors, observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, K-RIDE:

- a) will reject a proposal for award if it determines that the Tenderer recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question;
- b) will declare a firm ineligible, either indefinitely or for a stated period of time, to be awarded a K-RIDE contract if it at any time determines that the firm has engaged in corrupt or fraudulent practices in competing for, or in executing, a K-RIDE contract.

31.3 Furthermore, Tenderers shall be aware of the provision stated in sub-clause 50.2 of the Conditions of Contract.

### **32. PURCHASE PREFERENCE TO MAKE IN INDIA:**

The provisions of revised 'Public Procurement (Preference to Make in India) Order 2017' issued by Department of Industrial Policy and Promotion under Ministry of Commerce and Industry vide letter no. P-45021/2/2017-PP (BE-II) dated 28.05.2018 shall be applicable to the tendering process and award of the contract shall be done accordingly. In this connection,

the minimum local content shall be 50% and the margin of purchase preference shall be 20%. For award of contract, para 3.c. of the revised 'Public Procurement (Preference to Make in India) Order 2017' shall be applicable in addition to the other provisions in the tendering documents in this regard.

- 33. APPEAL:** The Tenderer shall submit online appeal within 30 days period from the date of receipt of order to the Employer through the Karnataka Public Procurement Portal. The Employer may after giving opportunity to the parties pass such order as it deems fit and such order shall be final.

K-RIDE



**ADDITIONAL INSTRUCTIONS TO TENDERERS**  
**(THIS SHOULD BE READ IN CONTINUATION OF ITT)**

ITT Clause Ref.	Description
2.3	<p><b>The following paras are added:</b></p> <p>Wherever the word JV/Consortium is mentioned there, it should be read as JV.</p> <p>For any purpose herein, 'Joint Venture' means an ad hoc association of firms that pool their resources and skills to undertake a large or complex contract in the role of "Contractor," with all firms (partners in the JV) being legally liable, jointly and severally, for the execution of the Contract in the event of a partner's withdrawal.</p> <p>A Tenderer may be a natural person, private entity, government-owned entity, or any combination of them with a format intent to enter into an agreement or under an existing agreement in the form of a Joint Venture. The Tenderer must ensure the following</p> <p>(a) In case of Single Entity:</p> <p style="padding-left: 40px;">(i) Submit Power of Attorney authorizing the signatory of the Tender to commit the Tenderer.</p> <p>(b) In case of Joint Venture:</p> <p style="padding-left: 40px;">(i) The number of partners in the JV shall not be more than three.</p> <p style="padding-left: 40px;">(ii) At the time of bidding, the tenderer (JV) to submit the JV Agreement, as per the form given in Section 3: Qualification and Information/Bidding Forms. On issue of LOA, the JV Agreement should be registered and shall be submitted along with the performance security.</p> <p style="padding-left: 40px;">(iii) The JV shall nominate a Representative through Power of Attorney (Form given in Section 3) who shall have the authority to conduct all business for and on behalf of any and all the parties of the JV during the Tendering process and, in the event the JV is awarded the Contract, during contract execution.</p> <p style="padding-left: 40px;">(iv) Submit Power of Attorney by individual partners to lead partners as per the form given in Section 3.</p> <p style="padding-left: 40px;">(v) In case a Joint Venture is the successful Tenderer, the appropriate Joint Venture Agreement for execution of work should be entered by the Joint Venture partners. The duly signed Joint Venture Agreement should be submitted along with the tender submission.</p> <p style="padding-left: 40px;">(vi) The lead member as aforesaid shall be authorized to incur liabilities and receive instructions for and on behalf of any and all the partners of the Joint venture and the entire execution of the contract.</p> <p style="padding-left: 40px;">(vii) All members of the Joint venture shall be Jointly and severally responsible for the execution of the Contract.</p> <p style="padding-left: 40px;">(viii) Change in constitution or percentage participation of JV shall not be permitted at any stage after submission of Tenders</p> <p>(c) Only firms that are registered or incorporated in India are eligible to compete. Any Tenderer from a country which shares a land with India will be eligible to Tender in this tender only if the Tenderer is registered with the Competent Authority.</p>

<p>2.4</p>	<p>(d) "Tenderer from a country which share a land border with India" for the purpose of this Order means: -</p> <ol style="list-style-type: none"> <li>1. An entity incorporated, established or registered in such a country; or</li> <li>2. A subsidiary of an entity incorporated, established or registered in such a country; or</li> <li>3. An entity substantially controlled through entities incorporated, established or registered in such a country; or</li> <li>4. An entity whose beneficial owner is situated in such a country; or</li> <li>5. An Indian (or other) agent of such an entity; or</li> <li>6. A natural person who is a citizen of such a country; or,</li> <li>7. A Joint Venture where any member of the Joint Venture falls under any of the above</li> </ol> <p>(e) The beneficial owner for the purpose of above clause will be as under:</p> <p>(i) In case of a company or Limited Liability Partnership, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person(s), has a controlling ownership interest or who exercises control through other means.</p> <p><b>Explanation-</b></p> <ol style="list-style-type: none"> <li>a. "Controlling ownership interest" means ownership of or entitlement to more than twenty-five percent of share or capital or profits of the company;</li> <li>b. "Control" shall include the right to appoint majority of the directors or to control the management or policy decisions including by virtue their shareholding or management rights or shareholders agreements or voting agreements;</li> </ol> <p>(ii) In case of a partnership firm, the beneficial owner is the natural person(s) who, whether acting alone or together, or through one or more juridical person, has ownership of entitlement to more than fifteen percent of capital or profits of the partnership;</p> <p>(iii) In case of an unincorporated association or body of individuals, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has ownership of or entitlement to more than fifteen percent of the property or capital or profit of such association or body of individuals;</p> <p>(iv) Where no natural person is identified under (i) or (ii) or (iii) above, the beneficial owner is the relevant natural person who holds the position of senior managing official;</p> <p>(v) In case of a trust, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership.</p> <p><b>The Tenderer shall submit a Certificate stating that they have read the above clause using the appropriate Performa given in Section 3 - Form 3C1 &amp; 3C2.</b></p> <p><b>Tenderer having a conflict of interest shall be disqualified. The conflict of interest is detailed below.</b></p>
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2.5	<p>A Tenderer or any of its constituents shall not have conflict of interest. All Tenderers found to have a conflict of interest shall be disqualified. A Tenderer may be considered to be in a conflict of interest with one or more parties in this Tendering process, if, including but not limited to:</p> <ul style="list-style-type: none"> <li>(a) they have controlling shareholders in common; or</li> <li>(b) they receive or have received any direct or indirect subsidy from any of them; or</li> <li>(c) they have the same legal representative for purposes of this Tender; or</li> <li>(d) they have a relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the Tender of another Tenderer, or</li> <li>(e) any firm, either individually or in Joint Venture (JV), submits more than one offer irrespective of whether the firm is quoting against this Tender. The Tenders submitted by two different Tenderers, having any common participant in JV formation or any common partner in partnership firms, or an individual will be treated as having conflict of interest or</li> <li>(f) a Tenderer who is Sub-contractor to another Tenderer will be treated as having conflict of interest. However, this does not limit the inclusion of the same sub-contractor in more than one Tender.</li> <li>(g) a Tenderer participated as a consultant in the preparation of the design or specifications of the contract that is the subject of the Tender; or</li> <li>(h) A Tenderer was affiliated for any period(s) during last two years before the date of issue of Invitation for Tenders with a firm or entity that has been hired (or is proposed to be hired) by the Employer as Engineer for the contract.</li> </ul> <p><b>The Tenderer shall be disqualified if:</b></p> <ul style="list-style-type: none"> <li>(a) The Tenderer or any of its constituents has been blacklisted/ banned from business dealings with all Government Departments by the Government of Karnataka or by Ministry of Railways or by K-RIDE at any time till finalization of Tenders, except in cases where such blacklisting/ banning has been withdrawn by Competent Authority or has ceased or expired on the deadline for submission of the Tenders, for which satisfactory evidence is to be produced.</li> <li>(b) Any previous contract of the Tenderer or any of its constituents had been fully terminated or part terminated for its failure as a JV partner with forfeiture of its full Performance Security, by Rail Infrastructure Development Company (Karnataka) Ltd.(K-RIDE) at any time starting from 3 years before the deadline for submission of Tenders and up to one day before the date of opening of price Tenders;</li> </ul> <p>Provided, however, there is no stay order or declaration by any Court against such termination of the contract by Rail Infrastructure Development Company (Karnataka) Ltd. or such termination of the contract has not been revoked by Rail Infrastructure Development Company (Karnataka) Ltd or competent authority of K-RIDE has not passed an order of non-applicability of disqualification of the Tenderer or any of its constituents despite such termination.</p> <ul style="list-style-type: none"> <li>(c) The Tenderer or any of its constituents has been imposed delay damages of 5% or more of contract value by K-RIDE due to delay in the implementation of any previous contract within the period of last 2 years before the deadline for submission of Tenders (Period of 2 years shall be reckoned from the date on which the total accrued amount of Delay Damages has reached 5% or more of the contract price) or such accrued delay damages has not been fully recovered before the deadline for submission of Tenders on account of contractor's request for deferring recovery to maintain cash flow and K-RIDE has acceded to the same in the interest of the project or the work under the previous</li> </ul>
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	<p>contract in question has not been completed before the deadline for submission of Tenders, unless imposition of such delay damages has been set aside by the Competent Authority.</p> <p>(d) The Tenderer or any of its constituents:</p> <p>(i) has suffered bankruptcy/insolvency or</p> <p>(ii) has any ongoing case of insolvency before the NCLT/any applicable Court where Interim Resolution Professional (IRP) has been appointed or is at any later stage of the insolvency process, as on the deadline of submission of Tenders or thereafter till finalization of Tenders.</p> <p>(e) The Tenderer is found ineligible by the Employer, in accordance with ITB-3.</p> <p>(f) The Tenderer or its constituent(s) has been declared by K-RIDE to be a poor performer and the period of poor performance is still in force on the deadline for submission of Tenders.</p> <p style="text-align: center;">OR</p> <p>The Tenderer or its constituent(s) has been declared by K-RIDE to be a poor performer at any time after the deadline for submission of Tenders and up to one day before the date of opening of price Tenders.</p> <p>(g) The Tenderer or any of its constituents has changed its name or created a new business entity as covered by the definition of "Allied Firm" under para 1102 (iii) of Chapter XI of Vigilance Manual of Indian Railways (available on website of Indian Railways), consequent to having been banned from business dealings or suspended from business dealings or having been declared poor performer.</p> <p><b>The Tenderer shall submit an affidavit stating that they are not liable to be disqualified as per this sub clause using the Form PS3 given in Section-3: Qualification and Information/Bidding Forms. Non-submission of an affidavit by the Tenderer shall result in summary rejection of his Tender.</b></p> <p>Tenderers shall immediately inform the Employer in case they cease to fulfil eligibility in terms of ITT <b>clause 2</b> above. In case the Tenderer fails to inform the Employer or submits a false affidavit, his Tender shall be summarily rejected and Tender security shall be forfeited. The Tenderer shall also be liable for Banning of Business dealings for a period up to five years</p>
2.6	<p><b>PARTNERS IN CASE OF JV</b></p> <p>(i) Lead partner must have a minimum of 50% participation in the JV.</p> <p>(ii) Partners having 25% or more percentage participation shall be termed as substantial partner/other Partners.</p> <p>(iii) In case of JV, change in constitution or percentage participation shall not be permitted at any stage after the bid submission.</p> <p>The bidder, in case of JV, shall clearly and unambiguously define the role and responsibilities for each partner in the JV agreement submitted as per Form JV/4 of Section-3, providing clearly that any abrogation/subsequent re-assignment of any responsibility by any partner of JV in favour of other JV partner or any change in constitution of partners of JV (without written approval of Client) from the one given in JV agreement at tender stage, will be treated, as 'breach of contract condition' and/or 'concealment of facts' as the case may be and acted accordingly. All Members of the JV must have experience in execution of similar work.</p>
2.7	<p><b>In addition to the documents asked Following needs to be submitted by the bidders;</b></p>

	<p>(a) Affidavit in case of Proprietary firm.</p> <p>(b) Partnership Deed in case of partnership firm.</p> <p>(c) Memorandum &amp; Article of Association in case of Public/Private limited company.</p> <p>(d) Authorization/POA in favour of authorised signatory of bidder to sign the bid.</p> <p>(e) Board of Resolution nominating particular director to authorize a signatory to sign the bid.</p> <p>(f) In case of JV partners the above relevant documents as applicable needs to be submitted.</p>
<b>3.3(a)</b>	<p><b>The following para is added:</b></p> <p><b>Materials, Equipment and Services</b></p> <p>The materials, equipment and services to be supplied under the Contract shall be from the approved sources as specified in Section 8A: Works Requirements and Price Schedule Section-9.</p>
<b>7.3</b>	<p><b>The following para is added:</b></p> <p>The Employer is not responsible for the completeness of the Bidding Document and their Addenda, if they were not obtained directly from the source stated by the Employer in the Invitation for Bids.</p> <p>The Bidder is expected to examine all instructions, forms, terms, and specifications in the Bidding Document. Failure to furnish all information or documentation required by the Bidding Document may result in the rejection of the bid.</p>
<b>8.3</b>	<p><b>The following para is added:</b></p> <p>The Pre-Tender meeting may also be attended through video conferencing (VC). Those Tenderers who wish to join the Video Conferencing shall send a request email on the email id (i.e. <a href="mailto:electrical.kride@gmail.com">electrical.kride@gmail.com</a>) by <b>20/11/2023 up to 11:30 hours IST</b>, so that a link for Video Conferencing can be sent by K-RIDE.</p> <p>Please note that the request received from the Tenderers (With details of the Company, its address, and the name and designation of the person attending the VC) will only be entertained. They should also mention the email id through which VC is desired to be joined.</p> <p>K-RIDE may allow maximum of two email ids for one company to participate in the VC. Any request for VC received after the given date and time for sending the link for VC will not be entertained.</p> <p>Prospective Tenderers will be able to join the VC through the link provided to them on Email ID. During pre- Proposal meeting, prospective Tenderers may request for clarifications.</p>
<b>10.3</b>	<p><b>The following para is added:</b></p> <p><b>Documents Comprising the Tender</b></p> <ul style="list-style-type: none"> <li>• The Tender shall comprise of Tender Security/Tender Security Declaration, Technical Tender and Price Tender. The Tenderer shall submit the Tender through Karnataka Public Procurement Portal.</li> <li>• On the stipulated date of opening of Tenders, initially, only the Technical Tenders are opened through Karnataka Public Procurement Portal. The Technical Tenders shall be evaluated by the Employer in accordance with the stipulated Qualification and Evaluation criteria. No amendments or changes to the Technical Tenders would be permitted after the opening of technical Tenders.</li> </ul>

- Tenderers who are qualified in the technical evaluation their price Tender shall be opened at a date and time advised by the Employer(K-RIDE) through e-tendering portal. The Price Tenders are evaluated and the Contract is awarded to the Tenderer whose Tender has been determined to be the lowest evaluated substantially responsive Tender.

**The Technical Tender shall contain the following:**

- All the Forms of Section-3: Qualification Information/Bidding Forms including letter of technical Bid (LTB) shall be scanned and uploaded.
- The Tenderer shall furnish a commitment in Letter of Technical Bid (LTB) for deployment of equipment and personnel as stipulated in Section 8A: Employers Work's Requirement.
- The Tenderer shall furnish commitment in LTB for submitting construction method statement for all major activities of work and get this approved from the engineer prior to the commencement of work on that activity in case of award of contract.
- The Tenderer shall furnish a commitment in Letter of Technical Bid (LTB) for adhering to mobilisation and construction schedule as stipulated in Section 8A: Employers Work's Requirement.
- **Tenderer should note that non-submission of the Letter of Technical Bid (LTB) by the Tenderer shall result in summary rejection of his Tender.**
- Tenderer shall submit the Approach and Methodology for performing the assignment by using appropriate Performa given in Section 3: Qualification Information/Bidding Forms.
- Scanned copy of Tender Security/Tender Security Declaration form (Section 3), in accordance with ITT Clause 13;
- Scanned copy of written confirmation authorizing the signatory of the Tender to commit the Tenderer, any amendments such as interlineations, erasures, or overwriting shall be valid only if they are signed or initialed by the person signing the Tender.
- Scanned copy of documentary evidence with establishing the Tenderer's qualifications to perform the contract; To establish its qualifications to perform the Contract in accordance with Section 2: ITT the Tenderer shall submit as part of its technical Tender the information requested in the corresponding information sheets included in Section 3: Qualification Information/Bidding Forms.

Domestic Tenderers, individually or in joint ventures, applying for eligibility for domestic preference shall supply all information required to satisfy the criteria for eligibility

- Scanned copy of Approach and Methodology - Performa given in Section-3: Qualification Information/Bidding Forms
- Scanned copy of Joint Venture Agreement entered into by all partners
- Scanned copy of Letter of Price Tender.
- All Section-3 Documents shall be scanned and submitted.

**The Price Tender shall contain the following:**

	<ul style="list-style-type: none"> <li>• Filled/completed schedules as required including Price Schedule in accordance with ITT Clauses should be submitted through Karnataka Public Procurement Portal only;</li> <li>• The Tenderer shall submit through Karnataka Public Procurement Portal, separate Technical Proposal and Price Proposal for each individual contract package, using the appropriate Submission Sheets furnished in Section-3: Qualification Information/Bidding Forms. These Forms must be completed without any alterations to their format, and no substitutes shall be accepted. All blank spaces shall be filled in with the information requested.</li> <li>• The Tenderer shall submit, as part of the Price Tender, the Schedules, including the Price Schedule through Karnataka Public Procurement Portal only.</li> </ul>
11.5	<p><b>The following para is added:</b></p> <p><b>Tender Prices</b></p> <ul style="list-style-type: none"> <li>• The prices/Percentage quoted by the Tenderer in the Price Schedule shall conform to the requirements specified below.</li> <li>• In the price Schedule, The Tenderer shall quote rates as single percentage Above/Below/At par as per the format for each schedule. The price quoted by the bidder in schedule will only be considered for evaluation of bids. Rates offered through any other medium or at any other location will not be considered. <b>If any Tenderer quotes more than one percentage for such schedules, its Tender shall be summarily rejected.</b></li> <li>• The Tenderer shall fill in the percentage against each schedule of the price schedule. <b>Items against which no amount or price/percentage is entered by the Tenderer will not be paid for by the Employer when executed and shall be deemed to be covered by the lumpsum amount quoted in the Price Schedule.</b></li> <li>• The price to be quoted in the Price Schedule, in accordance with ITT, shall be the total price of the Tender.</li> <li>• DELETED.</li> <li>• DELETED</li> <li>• Unless otherwise provided in the ITT and the Contract, the lumpsum amount quoted by the Tenderer are subject to adjustment during the performance of the Contract in accordance with the provisions of the Conditions of Contract. In such a case, the indices and weightages for the price adjustment formulae shall be as specified in the Tables of Adjustment Data included in Contract Data.</li> <li>• DELETED</li> <li>• All duties, taxes including GST, royalties, cess and other levies payable by the Contractor under the Contract, or for any other cause (including standard specifications), as of the date 28 days prior to the deadline for submission of Tenders, <b>shall be included in the percentage quoted in the Price Schedule and the total Tender Price submitted by the Tenderer.</b> GST shall be paid by the Tenderer as applicable in accordance with the prevailing rules of Government of India.</li> </ul>

	<ul style="list-style-type: none"> <li>• Tenderers should note that during the progress of the works, the foreign currency requirements of the outstanding balance of the Contract Price may be adjusted by agreement between the Employer and the Contractor in order to reflect any changes in foreign currency requirements for the Contract, in accordance with Sub-Clause 14/ITT (Currencies of Bid and Payment) of the Conditions of Contract. Any such adjustment shall be affected by comparing the percentages quoted in the Tender with the amounts already used in the Works and the Contractor's future needs for imported items.</li> <li>• <b>Tenderer should note that non-submission of the Letter of Price Tender (LPB) by the Tenderer shall result in summary rejection of his Tender.</b></li> <li>• Online alternative Price Tender corresponding to the alternative Technical Tender, if permissible, in accordance with ITT Clause 14;</li> </ul>
13.7	<p>The following para is added:</p> <p><b>In this tender, the tender security/ EMD has to be paid.</b></p> <p><b>The firm can choose either of the way for EMD payment.</b></p> <p><b>Full EMD as e-payment</b></p> <p>The Technical bids along with the Earnest Money Deposit (EMD) i.e., <b>Rs. 33,28,903/-</b> can be paid through e-payment as specified in sub clause 10.1.1 and 13.7 of Section. 2 of ITT in the e-procurement portal only using any of the following Five modes:</p> <p>Online Modes</p> <ul style="list-style-type: none"> <li>• Credit Card.</li> <li>• Direct Debit.</li> <li>• Net Banking</li> </ul> <p>Offline Modes</p> <ul style="list-style-type: none"> <li>• National Electronic Fund Transfer (NEFT).</li> <li>• Over the Counter (OTC)</li> </ul> <p>The EMD amount of Rs. <b>Rs. 33,28,903/-</b> accepted in the form of online and offline modes as mentioned above. For online mode bidder has to pay the EMD through one of the three modes (credit card, debit card &amp; Net banking) mentioned above. For offline payment modes bidder has to pay the EMD through National Electronic Fund Transfer (NEFT) or Over the Counter (OTC). For offline NEFT and OTC mode bidder has to complete the payment as per the user manual given in E-proc portal and enter the bank transaction reference number on the E-Proc portal to complete the procedure.</p> <p>For further details, kindly Click on the link  <a href="https://eproc.karnataka.gov.in/eprocportal/pages/contractors.jsp">https://eproc.karnataka.gov.in/eprocportal/pages/contractors.jsp</a>  then click on User Manuals &amp; Refer e-payments.</p> <p style="text-align: center;"><b><u>OR</u></b></p> <p><b>Part EMD as e-payment Rs.1,00,000 and balance Rs. 32,28,903/- to be furnished in the form of Bank Guarantee</b></p>



The Technical bids along with the Earnest Money Deposit (EMD) i.e., Rs. 33,28,903/- should be paid through e-payment as specified in sub clause 10.1.1 and 13.7 of Section. 2 of ITT in the e-procurement portal only using any of the following four modes:

- Credit Card.
- Direct Debit.
- National Electronic Fund Transfer (NEFT).
- Over the Counter (OTC).

The part of the EMD amount of **Rs.1.00 lakh** accepted in the form of electronic cash (not through DD/BG) and will be maintained in the Government of Karnataka central pooling account held at ICICI Bank until the contract is closed.

The balance required EMD of Rs. 32,28,903/- to be furnished in the form of Bank Guarantee (BG) of any Nationalized Bank/Scheduled Bank (as per RBI guidelines) payable to – **Managing Director/K-RIDE**, Bengaluru. The EMD shall have to be valid for 45 days beyond the validity of the tender. The scanned copy of the BG should be uploaded to the tender in the e-procurement platform. The Original Bank Guarantee shall compulsorily be produced & submitted for verification before the opening of the technical bid date and time as specified in e-portal to the concerned **AGM/Elec** in **K-RIDE** office. The bidder shall note that the Original Bank Guarantee submitted through post/in person, if it does not reach before the opening of the technical bid date and time as specified in e-portal to the concerned **AGM/Elec** in **K-RIDE** office the bid will not be considered for technical evaluation. The bids of the contractors who have failed to produce and submit the original bank guarantee of earnest money deposit of tender before the opening of the technical bid date and time as specified in e-portal to the concerned **AGM/Elec**, the bids will not be opened/If it is opened by default/manual/electronic error the bid will not be considered for technical evaluation and bid shall be rejected. Non reconciliation of tender earnest money deposit receipt of payment in Government of Karnataka central pooling account held at the ICICI Bank, the tender gets rejected.

#### Bank Guarantee Format

- (a) An unconditional bank guarantee using the Form given in Section 3: Qualification Information and Bidding Forms. The bank guarantee shall be from a bank having minimum net worth of over INR 500 million from the specified banks as under:
- (i) a Scheduled Bank in India, or
  - (ii) a Foreign Bank having their operations in India, or
  - (iii) a Foreign Bank which do not have operations in India is required to provide a counter-guarantee by State Bank of India,
- (b) The Scheduled Bank issuing the Bank Guarantee must be on “Structure Financial Messaging System (SFMS)” platform. A separate advice of the BG shall be invariably be sent by the issuing bank to the Employer’s Bank through SFMS and only after this the BG shall become operative and acceptable to the Employer.

Further, the Tender Security in Original form along with a copy of “MT760COV (in case of Bank Guarantee message) / MT767COV (in case of Bank Guarantee amendment message) Report” sent by the BG issuing Bank Sealed in an envelope shall be submitted, as stated in ITT 15.

The Issuing Bank shall send the SFMS to:

Beneficiary: Rail Infrastructure Development Company (Karnataka) Limited (K-RIDE)

Bank Name: Canara Bank

Branch: Prime Corporate Branch

	<p>Account No. 0430201012110 IFSC Code: CNRB0002636</p> <p>The Tender security shall be valid up to <b>45 days</b> beyond tender validity, or up to the date mentioned in the letter of request for extension, if any under ITT 12.</p> <p>In case the Tenderer has opted for Tender security in the form of an unconditional Bank Guarantee, the Tenderer should upload the scanned copy of Bank Guarantee with the Tender. Non submission of scanned copy of Bank Guarantee with the Tender on e-tendering portal and non-submission of original Bank Guarantee within the specified period shall lead to summary rejection of Tender. The details of the BG, physically submitted should match with the details available in the uploaded scanned copy and the data entered during Tender submission time, failing which the Tender will be rejected.</p> <p>Unless otherwise specified in the BDS, any Tender not accompanied by an enforceable and compliant Tender security as required in accordance with ITT, shall be summarily rejected by the Employer as non-responsive.</p> <p>The Tender security of the Tenderer who have been determined to be unqualified for opening of their financial Tender shall be returned within 3 working days after the opening of financial Tender. The Tender security of unsuccessful Tenderers shall be returned within 7 working days after issue of LOA to the successful Tenderer.</p> <p>The Tender security of the unsuccessful Tenderer shall be returned as promptly as possible once the successful Tenderer has signed the Contract and furnished the required performance security.</p> <p>The Tender security may be forfeited:</p> <ol style="list-style-type: none"> <li>a. if a Tenderer withdraws its Tender during the period of Tender validity specified by the Tenderer on the Letter of Tenders, except as provided in ITT Clause 12 or</li> <li>b. if a Tenderer misrepresents or omits the facts in order to influence the procurement process;</li> <li>c. if the successful Tenderer fails to: <ol style="list-style-type: none"> <li>i. sign the Contract in accordance with ITT Clause 28;</li> <li>ii. furnish a performance security in accordance with ITT 29;</li> <li>iii. accept the correction of its Tender Price pursuant to ITT 24; or</li> <li>iv. furnish a domestic preference security if so required.</li> </ol> </li> <li>d. if the undertaking of the affidavit submitted by the Tenderer or its constituents in pursuance to ITT clause 2 or any of the declarations of Letter of Technical Tender or Letter of Price Tender submitted by the Tenderer has been found to be false at any stage during the process of Tender evaluation.</li> </ol> <p>The Tender Security of a JV shall be in the name of the JV that submits the Tender or the lead member of the JV. If the JV has not been legally constituted at the time of Tendering, the Tender Security shall be in the names of all future partners as named in the letter of intent/ of JV mentioned in ITT Clause 2)</p>
14	<p><b>The following para is added:</b></p> <p>The Tender, as well as all correspondence and documents relating to the Tender exchanged by the Tenderer and the Employer, shall be written in English. Supporting documents and printed literature that are part of the Tender may be in another language provided they are accompanied by an accurate translation of the relevant passages in English in which case, for purposes of interpretation of the Tender, such translation shall govern.</p>

15	<p><b>The following para is added:</b></p> <p><b>Sealing and Marking of Tenders</b></p> <p>The Tenderer shall submit the technical Tender, Price Tender and the Tender Security/Tender Security Declaration through Karnataka Public Procurement Portal i.e., <a href="https://eproc.karnataka.gov.in">https://eproc.karnataka.gov.in</a>. The original of the Technical Proposal, which will contain all Forms of Section 3 except Price Schedule Section 9 and all other relevant data specified in the Tender document.</p> <p>The Price Bid, shall be submitted through Karnataka Public Procurement Portal only. This “PRICE BID” will contain only Price Schedule and all other relevant data specified in this Tender document. All forms should be typed on the Tenderer’s’ letter head as per the exact format of the Forms.</p> <p>The above forms should be scanned and submitted through <b>Karnataka Public Procurement Portal</b>.</p> <p>No details about price proposal shall be disclosed directly or indirectly in the technical proposal failing which the Tender shall be rejected. <b>Only Electronic Tender submission and opening procedure permitted.</b></p>
19.7	<p><b>The following para is added:</b></p> <p><b>Tender Opening</b></p> <ul style="list-style-type: none"> <li>• The Employer shall conduct the opening of Technical Tenders through Karnataka Public Procurement Portal i.e., <a href="https://eproc.karnataka.gov.in">https://eproc.karnataka.gov.in</a> on the date and at the time mentioned.</li> <li>• The date and time of the opening of Price Tenders will be announced through Karnataka Public Procurement Portal</li> <li>• At the end of the evaluation of the Technical Tenders, the Employer will intimate Tenderers who have submitted substantially responsive technical proposals and who have been determined as being qualified for award to attend the opening of the price Proposals. The date and time, of the opening of Price Tenders will be advised through email/e-procurement. Tenderers shall be given reasonable notice for the opening of Price Tenders.</li> <li>• The Employer will notify Tenderers in writing who have been rejected on the grounds of being substantially non-responsive to the requirements of the Tendering Document and who have been determined as being not qualified as a result of evaluation of technical proposal and their Price Tender shall not be opened. The Tender security of the Tenderers shall be returned as per due process.</li> <li>• The Employer shall conduct the opening of Price Tenders through Karnataka Public procurement portal i.e., <a href="https://eproc.karnataka.gov.in">https://eproc.karnataka.gov.in</a> of all Tenderers who have submitted substantially responsive Technical Tenders and who have been determined qualified as a result of technical evaluation.</li> </ul>
23.4	<p><b>The following para is added:</b></p> <p><b>Deviations, Reservations, and Omissions</b></p> <p>During the evaluation of Tenders, the following definitions apply:</p> <ol style="list-style-type: none"> <li>(a) “Deviation” is a departure from the requirements specified in the Tendering Document;</li> <li>(b) “Reservation” is the setting of limiting conditions or withholding from complete acceptance of the requirements specified in the Tendering Document; and</li> </ol>

	(c) "Omission" is the failure to submit part or all of the information or documentation required in the Tendering Document.
24.3	<p><b>The following para is added:</b></p> <p><b>Nonconformities, Errors, and Omissions</b></p> <ul style="list-style-type: none"> <li>• Provided that a Tender is substantially responsive, the Employer may waive any nonconformities in the Tender that do not constitute a material deviation, reservation or omission.</li> <li>• Provided that a Tender is substantially responsive, the Employer may request the Tenderer to submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities in the Tender related to documentation requirements. Requesting information or documentation on such nonconformities shall not be related to any aspect of the price of the Tender. Failure of the Tenderer to comply with the request may result in the rejection of its Tender.</li> </ul>
24.4	<p><b>The following para is added:</b></p> <p><b>Correction of Arithmetical Errors and Omissions in Tender and Evaluation of Tender Price</b></p> <ol style="list-style-type: none"> <li>1. Provided that the Tender is substantially responsive, the Employer shall correct arithmetical errors and omissions in the Tender and then arrive at the Evaluated Tender Price on the following basis: <ol style="list-style-type: none"> <li>(a) DELETED</li> <li>(b) if the amount/percentage has been quoted both in words and in figures and there is a discrepancy in such amount, then the lower of the two shall prevail and shall be considered for evaluation of the price of the schedule.</li> <li>(c) If the amount/percentage has been quoted either in words or in figures only, then the same shall be considered for evaluation of the price of the schedule.</li> <li>(d) If no amount/percentage has been indicated for any particular schedule in words, as well as in figures, irrespective of the fact whether the Tenderer has written or not written, in such cases, the lumpsum amount/percentage of the schedule shall be considered as zero and shall be calculated accordingly;</li> <li>(e) if there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected.</li> <li>(f) DELETED</li> </ol> </li> <li>2. If the Tenderer has submitted the lowest evaluated Tender does not accept the correction of errors and omissions as per above provisions, its Tender shall be disqualified and its Tender security shall be forfeited or its Tender-Securing Declaration executed.</li> </ol>
25.6	<p><b>The following para is added:</b></p> <p><b>Conversion to Single Currency</b></p> <p>For evaluation and comparison purposes the currencies of the Tender shall be converted into Indian Rupees as stated in BDS.</p> <p>An Abnormally Low Tender is one in which the Tender price, in combination with other elements of the Tender, appears so low that it raises material concerns as to the capability of the Tenderer to perform the contract at the offered price. The Employer may in such cases seek written clarifications from the Tenderer, including detailed price analysis of its Tender price in relation to scope, schedule, allocation of</p>

risks and responsibilities, and any other requirements of the Tender document. If, after evaluating the price analyses, the Employer determines that the Tenderer has substantially failed to demonstrate its capability to deliver the contract at the offered price, the Employer may reject the Tender/ proposal.

Additional Performance Security in case of abnormally low Tenders will have to be submitted.

**The calculation sheet is as below:**

If the bid, which results in the lowest Evaluated Bid Price is substantially on lower side and/or seriously unbalanced in the opinion of the Employer as per criteria defined below, the Employer may require the bidder to submit additional performance security as under:-

- a) If overall price quoted by the L1 bidder is below the engineer's estimated price by more than 10% and the difference between overall price quoted by the L1 and L2 is more than 5% of the estimated price, then the bid price of L1 bidder shall be treated as substantially on lower side and such bidder shall be bound to furnish additional performance security equal to the (0.9x engineer's estimated price – L1 price) or (0.95 x L2 price – L1 price)

whichever is lower, on this account. Example below demonstrates the method of calculation to arrive at additional performance security:

Suppose overall price quoted by the L1 bidder is 17% below the estimated price and the overall price quoted by L2 bidder is 8% below the estimated price. In this case the overall price quoted by the L1 bidder is lower by more than 10% of the estimated price and also the difference between overall price quoted by the L2 and L1 bidder is more than 5% of the estimated price, hence the L1 bidder shall be required to furnish additional performance security for an amount equal to  $\{0.9 \times \text{engineer's estimated price} - (1-17/100) \times \text{engineer's estimated price}\} = \{0.07 \times \text{engineer's estimated price}\} = 7\%$  of engineer's estimated price or  $\{0.95 \times (1-8/100) \times \text{engineer's estimated price} - (1-17/100) \times \text{engineer's estimated price}\} = \{0.044 \times \text{engineer's estimated price}\} = 4.4\%$  of engineer's estimated price; whichever is lower.

As per the above L1 bidder shall be required to submit additional performance security of 4.4% of engineer's estimated price.

- b) If for any bill/ schedule of quantities % age above or below quoted by the bidder on the estimated price is beyond 15% below the overall % age difference between the quoted contract price and the engineers estimated price, then the price for that particular schedule shall be treated as seriously unbalanced and bidder shall be bound to furnish additional performance security for such unbalanced price. Example below demonstrates the method of calculation to arrive at unbalanced price and additional performance security:

Suppose for the L1 bidder overall % age difference between quoted contract price and the engineers estimated price;

$$(\text{Overall contract price} - \text{Overall estimated price}) \times 100 \div \text{overall estimated price} = +4\%$$

$$\text{Maximum \% age below permitted over estimated price of any bill / schedule in this case} = +4 - 15 = -11\%$$

Suppose for the L1 bidder has quoted 20% below estimated price then the pricing shall be treated as unbalanced and the bidder shall be required to furnish additional performance security for an amount equal to (20 – 11) % of the estimated price.

26.2	<p><b>The following para is added:</b></p> <p><b>Award Criteria</b></p> <ul style="list-style-type: none"> <li>• The Employer shall award the Contract to the Tenderer whose Tender is substantially responsive to the Tendering Document, provided further that the Tenderer is determined to be qualified to perform the Contract satisfactorily and whose offer has been determined to be the lowest evaluated subject to ITT below. In case of more than one Tenders are evaluated to be lowest, Contract shall be awarded to the Tenderer having <b>higher average annual construction turnover</b> (calculated as total certified payments received for contracts in progress or completed) in equivalent INR within the last Two financial years.</li> <li>• The Employer has the right to review at any time prior to award of contract that the qualification criteria as specified in Section-3: Qualification Information and Bidding Forms are still being met by the Tenderer whose offer has been determined to be the lowest evaluated Tender. A Tender shall be rejected if the qualification criteria as specified in Section-3: Qualification Information and Bidding Forms are no longer met by the Tenderer whose offer has been determined to be the lowest evaluated Tender. In this event the Employer shall proceed to the next lowest evaluated Tender to make a similar reassessment of that Tenderer's capabilities to perform satisfactorily.</li> </ul>
29.5	<p><b>The following para is added:</b></p> <p><b>Performance Security</b></p> <p>The successful Tenderers shall have to submit a Performance Guarantee (PG) Within twenty (20) days from the date of issue of Letter of Acceptance (LOA). Extension of time for submission of PG beyond 20 days 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% of per annum shall be charged for the delay beyond 20 days, i.e. From 21st day after the date of issue of LOA. Further if the 60th day happens to be declared holiday in the office of K-RIDE, submission of PG can be accepted on the next working day.</p> <p>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 terminate. In case contract is terminated K-RIDE shall be entitled to forfeit the Tender security and other dues payable against to the contract. In case the tenderer has not submitted by security on the strength of their registration as a start-up recognized by the 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.</p> <p>Failure of the successful Tenderer to submit the above-mentioned Performance Security or to sign the Contract Agreement shall constitute sufficient grounds for the annulment of the award and forfeiture of the Tender security or execution of the Tender-Securing Declaration.</p> <p>The above provision shall also not apply to the furnishing of a Domestic Preference Security, if so required.</p>
New Clause-1	<p><b>LITIGATION HISTORY:</b> (Please see Annexure Tendering Forms).</p> <p>The Tenderer/Tenderers should provide accurate information on any litigation or arbitration resulting from contracts completed or under its execution over the last five years as on date of submission of this tender.</p> <p>If the litigation started by the Tenderer without recourse to measures of Dispute Resolution and Arbitration as provided in the Contract or the litigation in respect of challenge of award of Arbitration by the Tenderer, will be treated as Litigation case indulged by the Tenderer for this Para of Litigation History.</p>

SECTION:2: - INSTRUCTIONS TO TENDERERS (ITT)

	<p>A consistent history of awards against the Applicant or any partner of a joint venture may result in failure of the application.</p> <p><b>Note:</b> Tenderers including each of the partners of a Joint Venture, should provide information on any history of litigation or Arbitration resulting from contracts executed in the last 5 years as on date of submission of this tender. A separate sheet should be used for each partner of a Joint Venture</p>
<b>New Clause-2</b>	<p><b>Jurisdiction of Courts</b></p> <p>The Tendering process shall be governed by and construed in accordance with the laws of India and the Courts as indicated in Tender Data Sheet shall have exclusive jurisdiction over all the disputes/issues arising under, pursuant to and/ or in connection with the Tendering process. The <b>Jurisdiction of Courts is Bengaluru, Karnataka</b></p>

K-RIDE

# SECTION-3

## QUALIFICATION INFORMATION/BIDDING FORMS



**INDEX****SECTION-3: QUALIFICATION INFORMATION/BIDDING FORMS**

This Section contains the forms which are to be completed by the Bidder and to be submitted as part of this Bid.

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## **A) QUALIFICATION INFORMATION/BIDDING FORMS**

### **1. QUALIFICATION INFORMATION**

The information to be filled in by the Tenderer hereunder will be used for purposes of computing Tender capacity as provided for in Clause 2 of the Instructions to Tenderers. This information will not be incorporated in the Contract.

#### **1.1. Constitution or legal status of Tenderer**

Place of Registration: \_\_\_\_\_ [Attach copy]

Principal place of business: \_\_\_\_\_ [Attach Copy]

#### **1.2. Total value of construction works executed and payments received in the preceding five Financial Years. (Rs. In Crores) (attach certificate from Statutory Auditors)**

2018-2019: -----

2019-2020: -----

2020-2021: -----

2021-2022: -----

2022-2023: -----

1.3. Work performed as Contractor (in the same name) on works of similar nature over during the five financial years specified in 1.2 above.

Project Name	Name of Employer	Description of Work	Contract Number	Value of contract Rs. Cr.	Date of Issue of work order	Specified period of completion	Actual date of completion	If partner in a JV, specify participation in total contract amount	Remarks explaining reasons for delay in completion of work
1	2	3	4	5	6	7	8	9	10

**Note:**

- (1) If the qualifying work of similar nature is done by a joint venture, then Value shall be considered as per percentage participation by the member(s) in that joint venture.
- (2) Value of \*similar nature of work completed shall be updated up to 2023-24 price level as per table given below:

Financial year	2018-19	2019-20	2020-21	2021-22	2022-23
Indian Currency					
Foreign Currency					

- (3) For completed works, the value of work done shall be updated to current FY 2023-24 price level assuming 10% inflation for Indian rupees every year or part thereof up to the month previous to the Bid submission month. Credentials if submitted in foreign currency shall be converted into Indian currency i.e., Indian Rupee as under: Bids will be compared in Indian Rupees only. The exchange rate of foreign currency shall be applicable 28 days before the tender submission date. For conversion of foreign currency to Indian Rupee exchange rates published by Financial Benchmarks Private limited ([www.fbil.org.in](http://www.fbil.org.in)) 28 days before the date of bid submittal will be considered. In case the particular day happens to be a holiday the exchange rate published on the next working day will be considered. In case of works in foreign currency the effect of inflation is considered as included, as the exchange rate prevailing 28 days before tender submission is being considered for conversion to Indian Rupees,

The bidder shall attach a copy of the Certificate(s) issued by the employer in support of the information being furnished in the above form, failing which the claim of the bidder shall be liable to be rejected (in case of experience as a sub-contractor, the employer shall be the owner of the Project who has engaged the main Contractor).

SEAL AND SIGNATURE

1.4. Quantities of work executed as contractor (in the same name) during the last five financial years.

Year	Name of Work	Name of Employer	Quantity of work performed (As mentioned in Qualification of the Tenderer Clause 3.2)	Remarks (Indicate contract reference Contract No., Award Date, Completion date, Role in contract, total contract amount, JV participation proportion, performance)
			Design, Supply, Erection, Testing & Commissioning of 25 KV, AC, 50 HZ, Single Phase, Traction Overhead Equipment for Railway Electrification	
2018-2019				
2019-2020				
2020-2021				
2021-2022				
2022-2023				

**Note:**

- 1) Copy of Certificate(s) issued by the employer in support of the information being furnished above, shall be attached with each respective form, as per detailed requirements indicated in clause 3.2 (c) of Section 2 failing which the claim of the bidder shall be liable to be rejected (in case of experience as a sub-contractor, the employer shall be the owner of the Project who has engaged the main Contractor).

\_\_\_\_\_  
SEAL AND SIGNATURE

1.5. Information on works for which Tenders have been submitted and works which are yet to be completed as on the date of this Tender.

(A) Existing commitments and on-going works:

Description of Work	Place & State	Contract No. & Date	Name and Address of Employer	Value of Contract (Rs. In Crores)	Stipulated period of completion	Value of works remaining to be completed (Rs. In Crores) (Attach certificate from Engineer in charge)	Value of the works to be executed in the next 'P+3' months	Anticipated date of completion
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

where,

P = The completion period (in months) specified for the work

(B) Works for which Tenders already submitted:

Description of Work	Place & State	Name and Address of Employer	Estimated value of works (Rs. In Crores)	Stipulated period of completion	Date when decision is expected	Remarks if any
(1)	(2)	(3)	(4)	(5)	(6)	(7)

- 1.6. The following items of equipment are considered essential for successfully carrying out the works. The Tenderer should furnish all the information listed below. (The item of the equipment required nos and capacity should match with those specified in ITT clause 3.3(a)

Item of Equipment	Requirement			Owned and available nos/Age/Capacity/Condition	Remarks (The details of hired/leased equipment details to be indicated)
	Nos	Capacity	Owned		

- 1.7. Reports on the financial standing of the tenderer, such as profit and loss statements and auditor's reports for the last five years;
- 1.8. Qualification and experience of the key technical and management personnel in permanent employment with the tenderer and those that are proposed to be deployed on this contract, if awarded.
- 1.9. Name, address, and telephone, telex, and fax numbers of the Tenderers' bankers who may provide references if contacted by the Employer.
- 1.10. Evidence of access to financial resources to meet the qualification requirement specified in ITT Clause 3.3 (b): Cash in hand, Letter of Credit etc. List them and attach certificate from the Banker in the suggested format given in Section 3, Form No.CL3 & CL4.
- 1.11. Proposals for subcontracting components of works amounting to more than 20% of the contract price.

Item of Work	Value of Sub-Contract	Identified Sub-Contractor (Name and Address)	Experience of similar works (Attach Certificates from the respective Employers)	Remarks (Undertaking from Specialist subcontractors to be provided as per Form CL-2)



- 1.13. **The proposed methodology and program of construction, backed with equipment planning and deployment, duly supported with broad calculations and quality control procedures proposed to be adopted, justifying their capability of execution and completion of the work as per technical specifications within the stipulated period of completion as per milestones.**

**APPROACH & METHODOLOGY PROPOSED FOR PERFORMING THE ASSIGNMENT**

Name of Project: “.....”

The approach and methodology will be detailed precisely under the following topics:

1. Understanding of the assignment
2. Work Breakdown structure/ Work plan.
3. Composition of the Team
4. Organizational set up/ Construction methodology for execution of the work as outline in Section 8A
5. Documentation and procedures to be prepared, adopted and furnished to K-RIDE (Rail Infrastructure Company (Karnataka) Limited).
6. Reporting Procedure
7. Sourcing of Material

**Note:**

- i. **The approach and methodology should be precise and relevant to the assignment. Include Bar charts.**



**B) ADDITIONAL QUALIFICATION INFORMATION/BIDDING FORMS**

**Form: PS1**

**LETTER OF TECHNICAL BID**

(Separately for each Package) .....  
Date.....

Invitation for Bid No.:.....

To,  
.....

We, the undersigned, declare that:

- (a) We have examined and have no reservations to the Bidding Documents, including Addenda issued in accordance with Instructions to Tenderer (ITT);
- (b) We offer to execute the Works in conformity with the Bidding Documents;
- (c) Our bid shall be valid for a period of 180 days from the date fixed for the bid submission deadline in accordance with the Bidding Documents, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;
- (d) If our bid is accepted, we commit to obtain a performance security in accordance with the Bidding Documents;
- (e) If our bid is accepted, we commit to deploy key equipment and key personnel consistent with the requirements stipulated in Section 8A: Works Requirements.
- (f) If our bid is accepted, we commit to submit work method statements for all major activities and get these approved from the engineer prior to commencing work on such activities. We also understand that the work shall be executed as per the approved method statements and KEY DATES without any deviations and delay in completion.
- (g) We, including any subcontractors or suppliers for any part of the contract, do not have any conflict of interest in accordance with ITT clause 2.4;
- (h) We declare that we are not participating, as a Bidder or as a subcontractor, in more than one bid in this bidding process in accordance with ITT clause 2.2, other than alternative offers submitted in accordance with ITT clause 14;

- (i) We declare that we are not liable to be disqualified in Accordance with ITT clause 2.5, and we are enclosing the affidavit for the same as per the Performa given in the bid document.
- (j) We understand that this bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal contract is prepared and executed; and
- (k) We have not made any deviations from the requirement of the bidding document and we have also not made any tampering or changes in the bidding documents on which the bid is being submitted and if any tampering or changes are detected at any stage, we understand the bid will invite summary rejection and invocation of bid security declaration, the contract will be liable to be terminated along with forfeiture of performance security, even if LOA has been issued.
- (l) We understand that we will be considered for participating for which we have submitted the bid security(ies) declaration form and we will be considered for award, subject to fulfilling the eligibility criteria as given in bidding document;
- (m) If our bid is accepted, we opt to take payment into the bank account, nominated by us.
- (n) We declare that the submission of this bid confirms that no agent, middleman or any intermediary has been, or will be engaged to provide any services or any other item of work related to the award and performance of this contract. We further confirm and declare that no agency commission or any payment which may be construed as an agency commission has been, or will be, paid and that the bid price does not include any such amount. We acknowledge the right of the Employer, if he finds to the contrary, to declare our bid to be noncompliant and if the contract has been awarded to declare the contract null and void
- (o) We understand that you are not bound to accept the lowest evaluated bid or any other bid that you may receive.
- (p) A Power of Attorney to sign and submit this letter is attached.
- (q) Having inspected the site, examined the complete bid document including Employer's requirements, Conditions of Contract, Special Conditions of Contract, particular conditions of Contract, Technical Specifications, Safety, Health & Environment (SHE) manual, Eligibility Cum Qualification Criteria, Instructions to Bidder and Addenda/Corrigendum etc., thereto (if any) for above mentioned work and prepared the bid entirely in accordance with all the requirements of the bid document and agree entirely with them.
- (r) We here by confirm that we have visited the sites of work and have become conversant with the local conditions of working.
- (s) For the purpose of your evaluation, study, review and decision-making we are ready to let you inspect our business premises / site, etc.
- (t) We authorize K-RIDE or any of their authorized representative to approach, enquire, verify and check the matter furnished in our submission with the concerned client / owner of the Project / Contract and the concerned Banker of reference provided by us.

- (u) We undertake to hold in confidence all documents and information whether Technical or Commercial supplied to us at any time by or on behalf of K-RIDE in connection with this bid and without your written authority or as otherwise required by law not to publish or otherwise disclose the same.
- (v) If our bid is accepted, we agree to establish our project office in Bangalore.
- (w) We have submitted the Statement of Integrity, Eligibility, Social, and Environmental Responsibility signed and abide by the same.
- (x) We understand that this Bid shall be governed by and construed in all respects according to the laws for the time being force in India. The courts at Bangalore will have exclusive jurisdiction in the matter.
- (y) We undertake that, in competing for (and, if the award is made to us, in executing) the above contract, we will strictly observe the laws against fraud and corruption in force in India namely "Prevention of Corruption Act 1988".

We hereby confirm that this Tender complies with the Tender validity and Earnest money deposit required by the Tender documents.

- (z) We confirm and declare that by virtue of our signature below, to the best of knowledge and belief that the information provided by us as required in this Bid Document, all supporting and explanatory information is truthful and exact.

Name.....  
 ..... In the capacity  
 of.....  
 .....

Signed  
 .....  
 .....

Duly authorized to sign the Bid for and on behalf of  
 ..... .....

Date  
 .....  
 .....

**(SEAL AND SIGNATURE OF THE BIDDER)**

**LETTER OF PRICE BID**

Date.....

Invitation for Bid No.....

To,

.....

We, the undersigned, declare that:

- (a) We have examined and have no reservations to the Bidding Documents, including Addenda issued in accordance with Instructions to Bidders (ITT) 9;
- (b) We offer to execute the Work in conformity with the Bidding Documents;
- (c) The total price of our Bid, indicated in the Price Bid on Karnataka e-procurement portal
- (d) We understand that this bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal contract is prepared and executed; and
- (e) We have not made any deviations from the requirement of the bidding document and we have also not made any tampering or changes in the bidding documents on which the bid is being submitted and if any tampering or changes are detected at any stage, we understand the bid will invite summary rejection and forfeiture of bid security/the contract will be liable to be terminated along with forfeiture of performance security, even if LOA has been issued.
- (f) We understand that you are not bound to accept the lowest evaluated bid or any other bid that you may receive.

Name.....

In the capacity of .....

Signed .....

Duly authorized to sign the Bid for and on behalf of .....

Date .....

Seal .....

**Form: PS 3**

**FORMAT FOR AFFIDAVIT TO BE SUBMITTED BY BIDDER ALONGWITH THE BID**

(To be separately given for each package)

*(To be executed in presence of Public Notary on non-judicial stamp paper of the appropriate value in accordance with relevant stamp Act. The stamp paper has to be in the name of the bidder) \*\**

I ..... **(Name and designation)** \*\*..... appointed as the attorney/authorized signatory of the bidder (including its constituents), M/s. \_\_\_\_\_ (hereinafter called the bidder) for the purpose of the Bid for the work of \_\_\_\_\_ as per the bid No. \_\_\_\_\_ of K-RIDE, do hereby solemnly affirm and state on behalf of the bidder including its constituents as under:

- \*1. That the bidder or any of its constituents has not been Blacklisted/ banned for business dealings for all Government Departments or by Ministry of Railways or by K-RIDE at any time and/or no such blacklisting is in force as on the deadline for submission of bids.
- \*2. That none of the previous contracts of the bidder or any of its constituents had been terminated/rescinded for Contractor's failure or part terminated for its failure as a JV partner with forfeiture of its full Performance Security, by Rail Infrastructure Development Company (Karnataka) Ltd. during the period of last 3 years before the deadline for submission of bids.

*(Add Proviso of Clause 2, (ITT) suitably, if any Contract was so terminated).*

- \*3. The bidder or any of its constituents has not been imposed liquidated damages of 5% or more of contract value by any Government Department or by Ministry of Railways or by K-RIDE due to delay in the implementation of any previous contract (either in the capacity of a single entity or as constituent of any other JV) within the period of last 2 years before the deadline for submission of bid [2 years shall be reckoned from the date on which imposed L.D. has exceeded 5% of the contract price] and there are no such accrued delay damages which has not been fully recovered before the deadline for submission of bids on account of contractor's request for deferring recovery to maintain cash flow and K-RIDE has acceded to the same in the interest of the project and the work under the previous contract in question has been completed before the deadline for submission of bid, unless imposition of such delay damages has been set aside by the Competent Authority.
- 4. That the Bidder or any of its constituents is neither Bankrupt/Insolvent nor is in the process of winding-up nor is such a case pending before any Court on the deadline of submission of the bid.
- \*5. That the name of the Bidder or any of its constituents is not on the list of "Poor Performer" of any Government Department or by Ministry of Railways or by K-RIDE as on the deadline for submission of bid.
- 6. We declare that the bidder or any of its constituents have not either changed their name or created a new business entity. Consequent to having been banned business dealings for specified period which is not over or suspended business dealings or having been declared as poor performer.

7. We declare and certify that balance sheets for last five financial years including that for the latest concluded financial year are being submitted.

OR

We declare and certify that balance sheet for the latest concluded financial year has not been finalized till date and that is why we are furnishing financial data for last five financial years ignoring the latest concluded financial year.

(# - Delete whichever is not applicable) \*\*.

8. We declare and certify that we have not made any misleading or false representation in the forms, statements and attachments in proof of the qualification requirements.
9. We declare that the information and documents submitted along with the bid by us are correct and we are fully responsible for the correctness of the information and documents, submitted by us.
10. We understand that in case we cease to fulfil the requirements of qualifying and eligibility criteria at any time after opening of bids and till finalization of bids, it will be our bounden duty to inform the Employer of our changed status immediately and in case of our failure to do so, our bid shall be rejected and bid security shall be forfeited. In case such failure comes to the notice of Employer at any time after award of the contract, it will lead to termination of the contract and forfeiture of Bid or Performance Security. We shall also be liable for Banning of Business dealings up to a period of five years.
11. We understand that if the contents of the affidavit are found to be false at any stage during bid evaluation, it will lead to rejection of our bid and forfeiture of the bid security. Further, we **[insert name of the bidder]** \*\* \_\_\_\_\_ and all our constituents understand that we shall be liable for banning of business dealings up to a period of five years.
12. We declare and certify that we have not made any misleading or false representation in the forms, statements and attachments in proof of the qualification requirements.
13. We also understand that our offer will be evaluated based on the documents/credentials submitted along with the offer and same shall be binding upon us.
14. We declare that the information and the document submitted along with the tender by us are correct and we are fully responsible for the correctness of the information and documents, submitted by us.
15. We undersigned that if the certificate regarding Eligibility Criteria 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 tender EMD besides banning of business for five years in K-RIDE. Further, we (Insert name of the Tenderer)\*\* ..... and all our constituents understand that our offer shall be summarily rejected.
16. We also understand that if the certificate submitted by us are found to be false/forged or incorrect at any time after the award of contract, it will lead to termination of the contract, along with forfeiture of EMD/SD and performance guarantee besides any other action provided in the contract including banning of business for five year in K-RIDE.

**(SEAL AND SIGNATURE OF THE BIDDER)**

**Verification:**

We above named tenderer do hereby solemnly affirm and verify that the contents of our above affidavit are true and correct. Nothing has been concealed and no part of it is false.

**(SEAL AND SIGNATURE OF THE BIDDER)**

\*Modify the contents wherever necessary, in terms of sub-clause 2 ITT.

\*\* The contents in *Italics* are only for guidance purpose and details as appropriate, are to be filled in suitably by Bidder.

Attestation before Magistrate/Public Notary

K-RIDE

**Form – BDF/1**

**FORMAT OF BID SECURITY (BANK GUARANTEE)**

WHEREAS \_\_\_\_\_ having its registered office at \_\_\_\_\_  
 \_\_\_\_\_ (hereinafter called the –Bidder) has submitted his bid dated \_\_\_\_\_ for the work  
 “Design, Supply, Erection, Testing & Commissioning of 25kV, AC, 50Hz, Single phase, Traction Over Head Equipment for  
 doubling of 1. Banaswadi (Incl) (211/090) - Baiyyappanahalli A Cabin (Excl) (205/378 in BAND-BYPL line) Section (10 TKM  
 approx.) 2.a Baiyyappanahalli A Cabin (incl) (205/378 in BAND-BYPL line & 205/650 in BYPL-SBC line) - Bellandur Road  
 (Excl.) (197/600) Section 2.b Anekal Road (Excl.) (171/600) - Hosur (Excl.) (159/750) Section (25.5 TKM approx.) Overall TKM  
 of 35.5 approximately and including any modification in existing OHE/PSI if required in Bangalore division of South Western  
 Railway..” (hereinafter called “the Works”) KNOW ALL PEOPLE by these presents that  
 we \_\_\_\_\_ having its registered office at \_\_\_\_\_ (hereinafter called  
 the Bank) are bound unto the Managing Director, Rail Infrastructure Development Company Karnataka Ltd (**K-  
 RIDE**), Bangalore. (hereinafter called “the Employer”) in the sum of  
 Rs. \_\_\_\_\_ (Rupees \_\_\_\_\_) for which payment well and truly to be made to the said  
 Employer the Bank binds itself, his successors and assigns by these presents; SEALED with the Common Seal of  
 the said Bank this day \_\_\_\_\_.

THE CONDITIONS OF THIS OBLIGATION ARE:

(1) If after Bid opening the Bidder withdraws his Bid during the period of Bids validity specified in the Form of Bid.

OR

(2) If the Bidder having been notified of the acceptance of his Bid by the Employer during the period of Bid Validity.

- a. Fails or refuses to execute the form of Agreement in accordance with the instructions to Bidders, if required; or
- b. Fails or refuse to furnish the Performance Security, in accordance with the instruction to Bidders; or
- c. Does not accept the correction of the Bid Price pursuant to clause 24

We undertake to pay to the Employer up to the above amount upon receipt of his first written demand, without the Employer having to substantiate his demand, provided that in his demand the Employer will note that the amount claimed by him is due to him owing to the conditions of one or both of the two conditions, specifying the occurred condition or conditions.

This Guarantee will remain in force up to and including the date 225 days after the deadline for submission of bids as such deadline is stated in the instructions to Bidders or as it may be extended by the Employer, notice of which extension(s) to the Bank is hereby waived. Any demand in respect of this Guarantee should reach the Bank not later than the above date.

DATE \_\_\_\_\_ SIGNATURE OF THE BANK \_\_\_\_\_

WITNESS \_\_\_\_\_

SEAL \_\_\_\_\_



**Form: JV/1**

**PRO-FORMA LETTER OF PARTICIPATION FROM EACH PARTNER OF JOINT VENTURE (JV)**

(On each Firm's Letter Head)

No.....

Dated:.....

From,

.....  
.....

To,

The General Manager,  
Rail Infrastructure Development Company (Karnataka) Limited,  
"Samparka Soudha", 1st Floor,  
B.E.P Premises (Opp. Orion Mall),  
Rajajinagar 1st Block,  
Bangalore - 560 010.

Gentlemen,

Re: ... "[Insert name of work] ....."

Ref: Your notice for Invitation for Bid (IFB) .....

1. We wish to confirm that our company/firm (delete as appropriate) has formed a Joint Venture by name of ..... with for the purposes associated with IFB referred to above.

*(Members who are not the lead partner of the JV should add the following paragraph) \**

2. 'The JV is led by ... whom we hereby authorize to act on our behalf for the purposes of submission of Bid for ..... and authorize to incur liabilities and receive instructions for and on behalf of any and all the partners or constituents of the Joint Venture.'

OR

*(Member(s) being the lead member of the group should add the following paragraph) \**

2. 'In this group we act as leader and, for the purposes of applying for qualification, represent the Joint Venture.'

3. In the event of our group being awarded the contract, we agree to be jointly with..... (names of other members of our JV) ..... and severally liable to the (K-RIDE) Rail Infrastructure Development Company

(Karnataka) Limited, Bangalore, its successors and assigns for all obligations, duties and responsibilities arising from or imposed by the contract subsequently entered into between Rail Infrastructure Development Company (Karnataka) Limited, Bangalore and our JV.

4.   \*/We, further agree that entire execution of the contract shall be carried out exclusively through the lead partner.

Yours faithfully,

(Signature)

(Name of Signatory) .....

(Capacity of Signatory) .....

Seal

\* Delete as applicable

K-RIDE

**Form: JV/2**

**FORMAT FOR POWER OF ATTORNEY FOR AUTHORISED  
SIGNATORY OF JOINT VENTURE (JV) PARTNERS**

**POWER OF ATTORNEY**

*(To be executed on non-judicial stamp paper of the appropriate value in accordance with relevant stamp Act. The stamp paper to be in the name of the company who is issuing the power of Attorney)*

Know all men by these presents, we ... do hereby constitute, appoint and authorize Mr/Ms. .... who is presently employed with us and holding the position of .....as our attorney, to do in our name and on our behalf, all such acts, deeds and things necessary in connection with or incidental to our bid for the work of ...Including signing and submission of all documents and providing information/responses to Rail Infrastructure Development Company (Karnataka) Limited, Bangalore, representing us in all matters, dealing with Rail Infrastructure Development Company (Karnataka) Limited, Bangalore, in all matters in connection with our bid for the said project and if successful, till the whole of the bid process.

We hereby agree to ratify all acts, deeds and things lawfully done by our said attorney pursuant to this Power of Attorney and that all acts, deeds and things done by our aforesaid attorney shall and shall always be deemed to have been done by us.

Dated this the ..... day of ..... 20...

(Signature of authorized Signatory)

.....

(Signature and Name in Block letters of Signatory)

Seal of Company

Witness

Witness 1:

Name:

Address:

Occupation:

Witness 2:

Name:

Address:

Occupation:

\*Notes:

- i. To be executed by all the partners individually, in case of a Joint Venture.
- ii. The mode of execution of the Power of Attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s) and when it is so required the same should be under common seal affixed in accordance with the required procedure.
- iii. Also wherever required, the executants(s) should submit for verification the extract of the charter documents and documents such as resolution/ power of attorney in favour of the person executing this power of attorney for the designation of power hereunder on behalf of the bidder.

**Form: JV/3**

**FORMAT FOR POWER OF ATTORNEY TO  
LEAD PARTNER OF JOINT VENTURE (JV)**

*(To be executed on non-judicial stamp paper of the appropriate value in accordance with relevant stamp Act.  
The stamp paper to be in the name of the company who is issuing the power of Attorney)*

**POWER OF ATTORNEY**

Whereas Rail Infrastructure Development Company (Karnataka) Limited Bangalore, has invited Bids for the work of

Whereas, the members of the Joint Venture comprising of M/s. ...., M/s. ...., and M/s. .... are interested in submission of bid for the work of ... *[Insert name of work]* ... in accordance with the terms and conditions contained in the bidding documents.

Whereas, it is necessary for the members of the Joint Venture to designate one of them as the Lead Partner, with all necessary power and authority to do, for and on behalf of the Joint Venture, all acts, deeds and things as may be necessary in connection with the bid for the project, as may be necessary in connection the Joint Venture's bid for the project.

NOW THIS POWER OF ATTORNEY WITNESSETH THAT:

We, M/s. ...., hereby designate M/s. ...., being one of the partners of the Joint Venture, as the lead partner of the Joint Venture, to do on behalf of the Joint Venture, all or any of the acts, deeds or things necessary or incidental to the Joint Venture's bid for the contract, including submission of bid, participating in conferences, responding to queries, submission of information/ documents and generally to represent the Joint Venture in all its dealings with K-RIDE/ Railway or any other Government Agency or any person, in connection with the contract for the said work until culmination of the process of bidding till the contract agreement is entered into with the Rail Infrastructure Development Company (Karnataka) Limited, Bangalore and thereafter till the expiry of the contract agreement.

We hereby agree to ratify all acts, deeds and things lawfully done by lead member, our said attorney, pursuant to this power of attorney and that all acts deeds and things done by our aforesaid attorney shall and shall always be deemed to have been done by us/ Joint Venture.

Dated this the ..... Day of ..... 202...

.....

(Signature)

.....

(Name in Block letters of Executant)

Seal of Company

Witness 1:  
Name:  
Address:  
Occupation:

Witness 2:  
Name:  
Address:  
Occupation:

**Notes:**

1. To be executed by all the Partners of the JV except the lead Partner.
2. The mode of execution of the Power of Attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s) and when it is so required the same should be under common seal affixed in accordance with the required procedure.

K-RIDE

**Form: JV/4**

**DRAFT FORMAT OF JOINT VENTURE AGREEMENT**

M/s ..... having its registered office at ..... (hereinafter referred to as .....)  
acting as the Lead Partner of the first part,

and

M/s ..... having its registered office at ..... (here in after referred to as  
.....) in the capacity of a Joint Partner of the other part.

and

M/s ..... having its registered office at ..... (here in after referred to as  
.....) in the capacity of a Joint Partner of the other part.

The expressions of ..... and ..... shall wherever the context admit, mean and include their  
respective legal representatives, successors-in-interest and assigns and shall collectively be referred to as “the  
Parties” and individually as “the Party”

**WHEREAS:**

Rail Infrastructure Development Company (Karnataka) Limited (K-RIDE) [hereinafter referred to as “Employer”]  
has invited bids for ... “[Insert name of work] .....” Vide LOA No.....awarded contract.

**NOW, THEREFORE, THE PARTIES AGREE AS FOLLOWS:**

1. The following documents shall be deemed to form and be read and construed as an integral part of this  
AGREEMENT.
  - i. Notice for Bid, and
  - ii. Bidding document
  - iii. Any Addendum/Corrigendum issued by Rail Infrastructure Development Company (Karnataka)  
Limited
  - iv. The bid submitted on our behalf jointly by the Lead Partner.
  - v. Letter of Acceptance issued by Rail Infrastructure Development Company (Karnataka) Ltd.
2. The ‘Parties’ have studied the documents and LOA issued to enter into Joint Venture as under and have  
agreed to participate.
3. M/s .....shall be the lead member of the JV for all intents and purpose and shall represent the Joint  
Venture in its dealing with the Employer. For the purpose of execution, the parties agree to nominate .....  
as the leader duly authorized to sign and submit all documents and enter into correspondence with the  
Employer.
4. The ‘Parties’ have resolved that the distribution of share and responsibilities between the JV partners is as  
under

(a) Lead Partner Share ..... %

**Responsibilities**

*(I) Key Activities and %age execution assigned*

i. ....

*(II) Price Schedule No. and %age execution assigned*

i. ....

ii. ....

iii. ....

(b) Joint Venture Partner Share.....%

**Responsibilities**

*(I) Key Activities and %age execution assigned*

i. ....

*(II) Price Schedule No. and %age execution assigned*

i. ....

ii. ....

iii. ....

(c) Joint Venture Partner Share.....%

**Responsibilities**

*(I) Key Activities and %age execution assigned*

i. ....

*(II) Price Schedule No. and %age execution assigned*

i. ....

ii. ....

iii. ....

**Note:** In case any Bill or items of a Bill are proposed to be executed by more than one JV partner then indicate the breakup of that Item/Bill no. for each JV partner.

**5. JOINT AND SEVERAL RESPONSIBILITIES**

The Parties undertake that they shall be jointly and severally liable to the Employer in the discharge of all the obligations and liabilities as per the contract with the Employer and for the performance of contract awarded to their JV.

**6. ASSIGNMENT AND THIRD PARTIES**

*The parties shall co-operate throughout the entire period of this AGREEMENT on the basis of exclusivity and neither of the Parties shall make arrangement or enter into agreement either directly or indirectly with any other party or group of parties on matters relating to the Project except with prior written consent of the other party and the Employer.*

## 7. EXECUTIVE AUTHORITY

The said Joint Venture through its authorized representative shall receive instructions, payments from the Employer. The management structure for the project shall be prepared by mutual consultations to enable completion of project to quality requirements within permitted cost and time.

## 8. GUARANTEES AND BONDS

*Performance Security and other Securities of a JV shall be in the name of the JV that submits the bid.*

## 9. BID SUBMISSION

*Each Party shall bear its own cost and expenses for preparation and submission of the bid and all costs until conclusion of a contract with the Employer for the Project. Common expenses shall be shared by both the parties in the ratio of their actual participation.*

## 10. INDEMNITY

*Each party hereto agrees to indemnify the other party against its respective parts in case of breach/default of the respective party of the contract works of any liabilities sustained by the Joint Venture.*

11. For the execution of the respective portions of works, the parties shall make their own arrangements to bring the required finance, plants and equipment, materials, manpower and other resources.

## 12. DOCUMENTS & CONFIDENTIALITY

Each Party shall maintain in confidence and not use for any purpose related to the Project all commercial and technical information received or generated in the course of preparation and submission of the bid.

## 13. ARBITRATION

*Any dispute, controversy or claim arising out of or relating to this agreement shall be settled in the first instance amicably between the parties. If an amicable settlement cannot be reached as above, it will be settled by arbitration in accordance with the Indian Arbitration and Conciliation Act 1996 or any amendments thereof. The venue of the arbitration shall be Bangalore.*

## 14. VALIDITY

*This Agreement shall remain in force till the defect liability period is over and Securities are released.*

15. This AGREEMENT is drawn in ..... number of copies with equal legal strength and status. One copy is held by M/s ..... and the other by M/s. & .....M/s ..... and a copy submitted with the Bid.

16. This AGREEMENT shall be construed under the laws of India.



**17. NOTICES BETWEEN JV PARTNERS**

Notices shall be given in writing by fax confirmed by registered mail or commercial courier to the following fax numbers and addresses:

Lead Partner	Other Partner	Other Partner
.....	.....	.....
.....	.....	.....
(Name & Address)	(Name & Address)	(Name & Address)

IN WITNESS WHEREOF THE PARTIES, have executed this AGREEMENT the day, month and year first before written.

M/s.....	M/s.....
.....	.....

(Seal)	—(Seal)
--------	---------

**Witness**

1.....(Name & Address)  
 2..... (Name & Address)




\*\*\*

**Bidders Qualification**

To establish its qualifications to perform the contract in accordance with Section 2 (Qualification Information) the Bidder shall provide the information requested in the corresponding Information Sheets included hereunder.

To establish its qualifications to perform the contract in accordance with Section 2 (Qualification Criteria) the Bidder shall provide the information requested in the corresponding Information Sheets included hereunder.

**Form ELI - 1: Bidder's Information Sheet**

Bidder's Information	
<b>Bidder's legal name</b>	
<b>Bidder's country of constitution</b>	
<b>Bidder's year of constitution</b>	
<b>Bidder's legal address in country of constitution</b>	
<b>Bidder's authorized representative</b>  (name, address, telephone numbers, fax numbers, e-mail address)	
<b>Bidder's Bank Details:</b> (a) Name of the Bank and branch: (b) Account Number: (c) IFSC code: (d) Bank's Contact Number and Fax Number: (e) PAN: GST Registration No:	

**The bidder shall attach copies of the following original documents with the form:**

1. In case of single entity, articles of incorporation or constitution of the legal entity named above, in accordance with ITT clause 2.
2. Authorization to represent the firm or JV named in above, in accordance with ITT clause 14.
3. In case of JV, JV agreement, in accordance with ITT clause 2.

---

**SEAL AND SIGNATURE**

K-RIDE

**Form ELI - 2: JV Information Sheet**

Each member of a JV must fill in this form separately

JV Information	
<b>Bidder's legal name</b>	
<b>JV Partner's legal name</b>	
<b>JV Partner's country of constitution</b>	
<b>JV Partner's year of constitution</b>	
<b>JV Partner's legal address in country of constitution</b>	
<b>JV Partner's authorized representative information</b> (name, address, telephone numbers, fax numbers, e-mail address)	
<b>Bidder's Bank Details:</b> (f) Name of the Bank and branch: (g) Account Number: (h) IFSC code: (i) Bank's Contact Number and Fax Number: (j) PAN: (k) GST Registration No:	

**The bidder shall attach copies of the following original documents with the form:**

1. Articles of incorporation or constitution of the legal entity named above, in accordance with ITT clause 2.
2. Authorization to represent the firm named above, in accordance with ITT clause 14.

**SEAL AND SIGNATURE**

**Note for Form ELI-1 & ELI-2:** Following needs to be submitted by the bidder;

- (a) Affidavit in case of Proprietary firm.
- (b) Partnership Deed in case of partnership firm.
- (c) Memorandum & Article of Association in case of Public/Private limited company.
- (d) Authorization/POA in favour of authorised signatory of bidder to sign the bid.
- (e) Board of Resolution nominating particular director to authorize a signatory to sign the bid.
- (f) In case of JV partners the above relevant documents as applicable needs to be submitted.

**Form FIN-1: Financial Situation**

(Each Bidder or each member of a JV must fill in this form separately)

**NAME OF BIDDER/JV PARTNER**

	<b>Financial Data for Last 5 Years [Indian National Rupees]</b>				
	Year 1:	Year 2:	Year 3:	Year 4:	Year 5:
1. Total Assets					
2. Current Assets					
3. Total Liabilities					
Current Liabilities					
5. <b>Net Worth</b> [= 1 – 3]					
6. Working Capital [= 2 - 4]					
7. Profit Before Tax (PBT)					

**1. The bidder shall attach copies of the following original documents with the form**

Copies of the audited balance sheets, including all related notes, and income statements for the last five years, as indicated above, complying with the following conditions.

- i. All such documents reflect the financial situation of the Bidder or partner to a JV, and not sister or parent companies.
- ii. Historic financial statements must be audited by a certified accountant.
- iii. Historic financial statements must be complete, including all notes to the financial statements.
- iv. Historic financial statements must correspond to accounting periods already completed and audited (no statements for partial periods shall be requested or accepted).

**2. Contents of this form should be certified by a Statutory Auditor**

- i. In the event that the audited accounts for the latest concluded Financial Year are not available, the Bidder shall furnish information pertaining to the last five financial years after ignoring the latest concluded financial year. In case, the bidder submits audited financial information for the last six or more years, only the figures for the latest five years shall be considered for evaluation.
- ii. Financial data for last five financial years has to be submitted by the bidder along with audited balance sheets. The financial information of the Bidder must be certified either by the Independent Financial Auditor (statutory Auditor) of the company appointed under the companies' Act.

- iii. In case any discrepancy in data is found between the balance sheet and the financial information submitted, the data as available in the balance sheet will be considered.
- iv. In case the audited balance sheet of the last financial year is not made available by the Bidder, he has to submit an affidavit certifying that 'The Balance Sheet has actually not been audited so far'. In such a case the financial data of previous '4' audited financial years will be taken into consideration for evaluation. If audited balance sheet of any year other than the last financial year is not submitted, then the bid will be considered as non-responsive
- v. In case the company's financial year is from Jan 19 to Dec 19, then it will be considered under financial year 2019 - 20 similar procedure will be applicable for other financial years also.

\_\_\_\_\_  
**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 Statutory Auditor )**

**Name of Statutory Auditor :** \_\_\_\_\_

**Registration No:** \_\_\_\_\_

\_\_\_\_\_  
**(Seal)**

**Form FIN-2: Annual Construction Turnover for the last 5 Financial years**

Each Bidder or each member of a JV must fill in this form separately:

**NAME OF BIDDER/JV PARTNER:**

Sl. No.	Year	Annual Turnover	Multiplying factor	Updated Annual turnover
		INR	INR	INR
1	2018-2019			
2	2019-2020			
3	2020-2021			
4	2021-2022			
5	2022-2023			

Annual Turnover Data for the Last 5 Financial Years (Construction only)			
Year	Amount Currency	Exchange Rate	Indian National Rupees Equivalent
<b>Average Annual Construction Turnover for last 5 Financial Years</b>			

1. The information supplied shall be substantiated by data in the audited balance sheets and profit and loss accounts for the relevant years and submitted as attachments to form Fin-1 in respect of the bidder or all partners constituting the bidder.
2. Contents of this form should be certified by a Statutory Auditor.
3. In case the audited balance sheet of the last financial year is not made available by the Bidder, he has to submit an affidavit certifying that 'The Balance Sheet has actually not been audited so far'. In such a case the financial data of previous '4' audited financial years will be taken into consideration for evaluation. If audited balance sheet of any year other than the last financial year is not submitted, then the bid will be considered as non-responsive

**SEAL AND SIGNATURE**

### Form FIN-3: Current Contract Commitments / Works in Progress

Bidders and each partner to a JV should provide information on their current commitments on all contract that have been awarded, or which a letter of intent or acceptance has been received, or for contracts approaching completion, but for which an unqualified, full completion certificate has yet to be issued.

#### Contract Commitments

Sl.No.	Description of work	Contract No. & date	Name & address of Employer, Tel./Fax/ Email	Value of contract in INR	Stipulated Period of completion	Value of Balance work	Anticipated date of Completion
1							
2							
3							
4							
5							
<b>Total</b>							

1. For calculation of 'Updated contract value' in column 5 above, assume inflation as per multiplying Factors given in FIN-2.
2. Bidder should provide information on their current commitments or all contracts that have been awarded or for which a letter of intent or acceptance has been received or for contracts approaching completion but for which a completion certificate is yet to be issued.
3. The exchange rate of foreign currency shall be applicable 28 days before the tender submission date. For conversion of foreign currency to Indian Rupee exchange rates published by Financial Benchmarks Private limited ([www.fbil.org.in](http://www.fbil.org.in)) 28 days before the date of bid submittal will be considered. In case the particular day happens to be a holiday the exchange rate published on the next working day will be considered. In case of works in foreign currency the effect of inflation is considered as included, as the exchange rate prevailing 28 days before tender submission is being considered for conversion to Indian Rupees,

**Note:** Enclose Certificate(s) from Engineer(s) Incharge (not below the rank of Executive Engineer) for Value of outstanding work. In case it is not feasible to furnish certificate from all the units the bidder should record the following certificate on Fin 3:

*"Certified that current commitments on all the contracts that have been awarded or for which a letter of intent or acceptance has been received or for the works in progress or the works approaching completion, value of outstanding work has been indicated in the above table correctly. It is further certified that if later on the employer discovers that information provided in the table is incorrect then the employer will treat our bid invalid and it will be liable for rejection"*

**SEAL AND SIGNATURE**



**FORM NO. 1**

**DELETED**

K-RIDE

**FORM NO. 2**

**CHECKLIST FOR CLAUSES PERTAINING TO SUMMARY  
REJECTION OF BID**

We, the undersigned, declare that we have read and understood the content of ITT clauses section:2 mentioned below. We also understand that our bid shall be summarily rejected in case we fail to comply the requirements of undermentioned clauses:

<b>ITT Clause No. Section 2</b>	<b>Reason for Summary Rejection</b>
2.5	Non-submission of Affidavit (Form PS-3)
2.5	Non-submission of immediate information to the Employer in case Bidder ceases to fulfill eligibility in terms of ITT clause 2.
10.3	Letter of Technical Bid (Form PS-1)
11.5	Quoting more than one percentage for any schedule
11.5	Non-submission of the Letter of Price Bid (LPB) (Form:PS-2)
13	Bid not accompanied with EMD/Bid Security
14	Bid not accompanied with power of attorney/General power of Attorney to sign on behalf of the bidders

**SEAL AND SIGNATURE OF THE BIDDER**

**Form: 3 C 1**

**FORMAT FOR CERTIFICATE TO BE SUBMITTED BY BIDDER ALONGWITH THE BID**  
*(On the letter head of the Firm)*

We/I, \_\_\_\_\_, having registered office at \_\_\_\_\_ do hereby certify that “I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India; I certify that this bidder is not from such country or, if from such a country, has been registered with the Competent Authority. I hereby certify that this bidder fulfils all requirements in this regard and is eligible to be considered. (Where applicable, evidence of valid registration by the competent Authority shall be attached.)”

Dated this \_\_\_\_ day of \_\_\_\_\_, 2023

For- \_\_\_\_\_

Authorized Signatory Signature \_\_\_\_\_

Full Name: \_\_\_\_\_

Place: \_\_\_\_\_

K-RIDE

**(SEAL AND SIGNATURE OF THE BIDDER)**

**Form: 3 C 2**

**FORMAT FOR CERTIFICATE TO BE SUBMITTED BY  
BIDDER ALONGWITH THE BID FOR SUB CONTRACTING**

*(On the letter head of the Firm)*

We/I, \_\_\_\_\_, having registered office at \_\_\_\_\_ do hereby certify that “I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India and on sub-contracting to contractors from such countries; I certify that this bidder is not from such a country or, if from such a country, has been registered with the competent Authority and will not sub-contractor any work to a contractor from such countries unless such contractor is registered with the competent Authority. I hereby certify that his bidder fulfils all requirements in this regard and is eligible to be considered. (Where applicable, evidence of valid registration the Competent Authority shall be attached.)”

Dated this \_\_\_\_ day of \_\_\_\_\_, 2023

For: \_\_\_\_\_

Authorized Signatory Signature \_\_\_\_\_

Full Name: \_\_\_\_\_

Place: \_\_\_\_\_

K-RIDE

**(SEAL AND SIGNATURE OF THE BIDDER)**

**Form 5**

**Key Personnel for the work**

MINIMUM QUALIFICATION AND EXPERIENCE REQUIRED FOR KEY PERSONNEL TO BE DEPLOYED FOR THE WORK

Sl. No	Key Personnel	Qualifications & Total Experience	Particular Experience (Minimum requirement)	Minimum Number of Personnel Required	Name of the key personnel proposed	Qualification	Total number of years of experience	Number of Years in similar works experience
1	OHE Engineer	Bachelor's Degree/Diploma in Electrical Engineering	Minimum 3 Years for graduate & 5 years for Diploma in relevant field.	4				

**Note:**

- Further details to be updated as per clause 3.3 (c) of section 2 ITT.

(Signature)

(Name of Signatory) .....

(Capacity of Signatory) .....

Seal.....

**Format of Curriculum Vitae (cv) for proposed key professional staff**

- Proposed Position:
- Name of Firm:
- Name of Staff:
- Profession:
- Date of Birth:
- Years with Firm/Entity: Nationality:
- Membership in Professional Societies:
- Detailed Tasks Assigned:
- Key Qualifications:

[Give an outline of staff member’s experience and training most pertinent to tasks on assignment. Describe degree of responsibility held by staff member on relevant previous assignments and give dates and locations. ]

Education:  
 [Summarize college/university and other specialized education of staff member and degrees obtained.]  
 Employment Record:

[Starting with present position, list in reverse order every employment held. List all positions held by staff member since graduation, giving dates, names of employing organizations, titles of positions held, and locations of assignments. Also give types of activities performed and client references, where appropriate.]

<b>Period</b>	<b>Name of Employing Organization</b>	<b>Name of the Project</b>	<b>Title / Position</b>	<b>Activity performed</b>	<b>Location of the Assignment</b>

Languages:  
 [For each language, indicate proficiency: excellent, good, fair, or poor; in speaking, reading, and writing]

Certification:

I, the undersigned, certify that to the best of my knowledge and belief, these data correctly describe me, my qualifications, and my experience.

Date:  
 [Signature of staff member and authorized representative of the Firm] Day/Month/Year

Full name of staff member: \_\_\_\_\_  
 Full name of the authorized representative: \_\_\_\_\_

**POWER OF ATTORNEY (POA) FOR SUBMITTING BID  
(FOR SINGLE ENTITY/SOLE BIDDER ONLY)**

Know all men by these presents, we \_\_\_\_\_(name and address of the registered office) do hereby constitute, appoint and authorize Mr./Ms \_\_\_\_\_(name and residential address) who is presently employed with us and holding the position of \_\_\_\_\_ as our attorney, to do in our name and on our behalf, all such acts, deeds and things necessary in connection with or incidental to our bid for the Project, including signing and submission of all documents and providing information/responses to K-RIDE, representing us in all matters before K-RIDE, and generally dealing with K-RIDE in all matters in connection with our Bid for the Project.

We hereby agree to ratify all acts, deeds and things lawfully done by our said attorney pursuant to this Power of Attorney and that all acts, deeds and things done by our aforesaid attorney shall always be deemed to have been done by us.

\_\_\_\_\_(Signature)  
(Name, Title and address) of the Person issuing the POA

Notes:

- (i) The bidder should submit the notarized Power of Attorney.
- (ii) The mode of execution of the Power of Attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the executant(s) and when it is so required the same should be under common seal affixed in accordance with the required procedure.
- (iii)The bidder should submit following additional document in support of the POA as case-to-case basis
  - a) Proprietorship Affidavit in case of Proprietary bidder.
  - b) Partnership deed in case partnership bidder.
  - c) Board Resolution in case of Public/Private limited company.
  - d) Memorandum & Article of Association in case of a Public Private limited.
  - e) Board Resolution in case of a Limited Liability Partnership.

**FORM CL-2**

**UNDERTAKING FROM NOMINATED/IDENTIFIED SUB-CONTRACTOR**

**(Refer Clause of EQC)**

**(On the Letterhead of Nominated/Identified sub-contractor)**

I/We,.....(Legal Name of Nominated/Identified Subcontractor) hereby confirm that we are associating with .....(Legal name of the bidder) for the work of .....(Name of work as stated in Invitation for Bids {IFB}), for the key activity stated in clause 3.2 ( c)/(d) of ITT (if applicable).

I/We hereby undertake that in case M/s.....(Legal name of the bidder) are awarded the work of .....(Name of work as stated in Invitation for Bids {IFB}),the key activity stated in clause 3.2 ( c)/(d) of ITT shall be undertaken by us as per bid conditions (if applicable).

**STAMP & SIGNATURE OF AUTHORISED  
SIGNATORY OF NOMINATED/IDENTIFIED SUB CONTRACTOR**

**STAMP & SIGNATURE OF AUTHORISED  
SIGNATORY OF BIDDER**



**Availability of Financial Resources**  
**(Section-2, ITT clause 3.3 (b))**

Bidders must demonstrate sufficient financial resources, comprising of Working Capital supplemented by credit line statements or overdraft facilities to meet the Bidder’s financial requirements for

- a) its current contract commitments, and
- b) the subject contract.

In case of a Joint Venture, each Joint Venture Partner must fill out this form separately and provide the Joint Venture Partner’s name:

Joint Venture Partner: \_\_\_\_\_

Financial Resources		
No.	Source of financing	Amount (equivalent)
1	Working Capital	
2	Credit Line	
Total Available Financial Resources		

*<sup>a</sup>To be considered, Credit Line must be substantiated by a letter from the bank issuing the line of credit, specific for the subject contract, as prescribed. Any letter or document not complying with this requirement shall not be considered as supplementary financial resources.*

**Note:**

In case the financial statement data is other than Indian Rupees, the equivalent Indian Rupees with the exchange rates as defined in the Section-2, ITT.

**Evidence of Availability of Credit Line Financial Resources**

**(Section-2 ITT, Clause:3(b))**

*[Each Bidder to fill out this form in case of demonstrating financial resources comprising credit line statements or overdraft facilities from bank.]*

**Project Name:**

Bidding Package Name and Identification Number: ..... (to be filled in as indicated in ITT 1) ...

**BANK CERTIFICATE**

This is to certify that M/s ..... is a reputed company with a good financial standing.

If the contract for the work, namely..... is awarded to the above firm, we shall be able to provide overdraft / credit facilities to the extent of Rs ..... to meet their working capital requirements for executing the above contract.

\_\_\_Sd.\_\_\_\_

Name of Bank: \_\_\_\_\_

Senior Bank Manager \_\_\_\_\_

Address of the Bank \_\_\_\_\_

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[In case of Joint Venture, change the text as follows:]

This is to certify that M/s ..... who has formed a Joint Venture with M/s. .... and M/s. .... for participating in this bid, is a reputed company with a good financial standing.

If the contract for the work, namely..... is awarded to the above joint venture, we shall be able to provide overdraft / credit facilities to the extent of Rs..... to M/s ..... to meet their working capital requirements for executing the above contract.

**Form EXP-1****WORK EXPERIENCE CERTIFICATE**

To whom so ever it may concern  
(Issued for the purpose of Quoting in K-RIDE tenders)

M/s/Sri ..... (Name and address of the contractor) is a working contractor of this unit and was awarded the following work. The relevant details of the work are as under: -

Sl. No	Description	Details
1	Name of work	
2	Acceptance Letter No and Date	
3	Agreement Number, date and name of the agency	
4	Agreement value in Rupees (in words and figures)	
5	Due date of completion	
6	Actual date of completion of work	
7	Value of Final Bill if passed (in words)	
8	Work completed but Final measurements not recorded. a) Amount paid so far as in CC bill No.	
9	Work completed. Final measurements recorded with negative variation a) Amount so far paid as in CC bill No.	
10	Work completed. If Final measurements recorded with Positive variation which is not sanctioned yet. Original agreement value of Last sanctioned agreement value whichever is lower.	
11	Scope of work (Broad category of works i.e., the name of the work in the agreement on which work is	
12	Details of values of major components/ works executed in the completed work.	

Note:

The Certificate to satisfy similar work should be signed by an officer not lower than JAG officer in Railways and Executive Engineer rank or equivalent grade in other department of Govt. of India/State Government/PSUs of Government of India / State Undertaking and Competent Authority of Public Listed Company.

Signature :.....

Name of officer.....

Designation: .....

Address: .....

Office seal: -.....

Phone/FAX No.: .....

Date : .....

--00--00--00--

# **SECTION-4**

**FORM OF TENDER, LETTER OF ACCEPTANCE,  
NOTICE TO PROCEED WITH THE WORK AND  
AGREEMENT FORM ETC.,**

**FORM OF TENDER, LETTER OF ACCEPTANCE, NOTICE TO PROCEED WITH THE WORK AND AGREEMENT FORM ETC.,**

<b>SL. NO.</b>	<b>TITLE</b>	<b>FORM NUMBER</b>	<b>PAGE NO.</b>
1	LETTER OF ACCEPTANCE	FORM-1	97
2	ISSUE OF NOTICE TO PROCEED WITH THE WORK	FORM-2	98
3	AGREEMENT FORM	FORM-3	99

K-RIDE

**FORM OF TENDER (DELETED)**

Please refer Form PS-1 of Section 3: Qualification Information/Bidding Forms.

K-RIDE

**LETTER OF ACCEPTANCE**(Letter head paper of the Employer)

\_\_\_\_\_ [date]

To: \_\_\_\_\_ [name and address of the Contractor]

Dear Sirs,

This is to notify you that your Tender dated \_\_\_\_\_ for execution of the "Design, Supply, Erection, Testing & Commissioning of 25kV, AC, 50Hz, Single phase, Traction Over Head Equipment for doubling of 1. Banaswadi (Incl) (211/090) - Baiyyappanahalli A Cabin (Excl) (205/378 in BAND-BYPL line) Section (10 TKM approx.) 2.a) Baiyyappanahalli A Cabin (incl) (205/378 in BAND-BYPL line & 205/650 in BYPL-SBC line) - Bellandur Road (Excl.) (197/600) Section 2.b) Anekal Road (Excl.) (171/600) - Hosur (Excl.) (159/750) Section (25.5 TKM approx.) Overall TKM of 35.5 approximately and including any modification in existing OHE/PSI if required in Bangalore division of South Western Railway. Tender No: KRIDE/2023-24/EL/WORK\_INDENT14, Dated:\_\_\_\_\_ for the Contract Price of Rupees\_\_\_\_\_.(\_\_\_\_\_[amount in words and figures], as corrected and modified in accordance with the Instructions to Tenderers is hereby accepted by our Agency.

You are hereby requested to furnish (Performance Security) plus additional security for unbalanced tenders in accordance with of Clause 25.5 of ITT, in the form detailed in Clause 29.1 of ITT and clause 43 of the conditions of contract for an amount of Rs. \_\_\_\_\_ (As defined in contract data) within 20 days of the receipt of this letter of acceptance valid up to 30 days from the date of expiry of Defects Liability Period i.e., up to ..... and sign the contract.

Yours faithfully,

Authorized Signature

Name and Title of Signatory

Name of Agency.



**ISSUE OF NOTICE TO PROCEED WITH THE WORK**

(Letter head of the Employer)

\_\_\_\_\_ (Date)

To

\_\_\_\_\_ (name and address of the Contractor)

\_\_\_\_\_

\_\_\_\_\_

Dear Sirs:

With reference to LOA, for the construction of "Design, Supply, Erection, Testing & Commissioning of 25kV, AC, 50Hz, Single phase, Traction Over Head Equipment for doubling of 1. Banaswadi (Incl) (211/090) - Baiyyappanahalli A Cabin (Excl) (205/378 in BAND-BYPL line) Section (10 TKM approx.) 2.a) Baiyyappanahalli A Cabin (incl) (205/378 in BAND-BYPL line & 205/650 in BYPL-SBC line) - Bellandur Road (Excl.) (197/600) Section 2.b) Anekal Road (Excl.) (171/600) - Hosur (Excl.) (159/750) Section (25.5 TKM approx.) Overall TKM of 35.5 approximately and including any modification in existing OHE/PSI if required in Bangalore division of South Western Railway." a Tender Price of Rs.\_\_\_\_\_, you are hereby instructed to proceed with the execution of the said works in accordance with the contract documents.

Yours faithfully,

(Signature, name and title of signatory authorized to sign  
on behalf of Employer)

## AGREEMENT FORM

### Agreement

This agreement, made the \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_\_, between \_\_\_\_\_ (Name and Address of Employer) (herein after called "the Employer") of the one part and \_\_\_\_\_ [name and address of contractor] (herein after called "the Contractor") of the other part.

Whereas the Employer is desirous that the Contractor execute "Design, Supply, Erection, Testing & Commissioning of 25kV, AC, 50Hz, Single phase, Traction Over Head Equipment for doubling of 1. Banaswadi (Incl) (211/090) - Baiyyappanahalli A Cabin (Excl) (205/378 in BAND-BYPL line) Section (10 TKM approx.) 2.a) Baiyyappanahalli A Cabin (incl) (205/378 in BAND-BYPL line & 205/650 in BYPL-SBC line) - Bellandur Road (Excl.) (197/600) Section 2.b) Anekal Road (Excl.) (171/600) - Hosur (Excl.) (159/750) Section (25.5 TKM approx.) Overall TKM of 35.5 approximately and including any modification in existing OHE/PSI if required in Bangalore division of South Western Railway" Tender No: KRIDE/2023-24/EL/WORK\_INDENT14, Dated: \_\_\_\_\_ (herein after called "The Works") and the Employer has accepted the Tender by the Contractor for the execution and completion of such Works and the remedying of any defects therein at a contract price of Rupees.....

NOW THIS AGREEMENT WITNESSETH as follows:

1. In this Agreement, words and expression shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to, and they shall be deemed to form and be read and construed as part of this Agreement.
2. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the Works and remedy any defects therein in conformity in all aspects with the provisions of the Contract.
3. The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying the defects wherein the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.
4. The following documents shall be deemed to form and be read and construed as part of this Agreement, viz:
  - i) Letter of Acceptance;
  - ii) Notice to proceed with the works;
  - iii) Contractor's Tender;
  - iv) Contract Data;
  - v) Conditions of contract (including Special Conditions of Contract and Particular Condition of Contract)
  - vi) Specifications;
  - vii) Bill of Quantities; and
  - viii) Any other document listed in the Contract Data as forming part of the contract.

In witness whereof the parties thereto have caused this Agreement to be executed the day and year first before written.

The Common Seal of \_\_\_\_\_  
was hereunto affixed in the presence of:  
Signed, Sealed and Delivered by the said \_\_\_\_\_

\_\_\_\_\_ in the presence of:  
Binding Signature of Employer \_\_\_\_\_  
Binding Signature of Contractor \_\_\_\_\_

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# **SECTION – 5**

## **CONDITIONS OF CONTRACT(CC) AND SPECIAL CONDITIONS OF CONTRACT (SCC)**

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CONDITIONS OF CONTRACT

**A. GENERAL**

**1. DEFINITIONS**

- 1.1 Terms which are defined in the Contract Data are not also defined in the Conditions of Contract but keep their defined meanings. Bold letters are used to identify defined terms.

**Bill of Quantities** means the priced and completed Bill of Quantities forming part of the Tender.

**Compensation Events** are those defined in Clause 38 hereunder.

The **Completion Date** is the date of completion of the Works as certified by the Employer in accordance with Sub Clause 46.1.

The **Contract** is the contract between the Employer and the Contractor to execute, complete and maintain the Works. It consists of the documents listed in Clause 2.2 below.

The **Contract Data** defines the documents and other information which comprise the Contract.

The **Contractor** is a person or corporate body or Joint Venture whose Tender to carry out the Works has been accepted by the Employer.

The **Contractor's Tender** is the completed Tender document submitted by the Contractor to the Employer.

The **Contract Price** is the price stated in the Letter of Acceptance and thereafter as adjusted in accordance with the provisions of the Contract.

**Days** are calendar days; **months** are calendar months.

A **Defect** is any part of the Works not completed in accordance with the Contract.

The **Defects liability period** is the period named in the Contract Data and calculated from the Completion Date.

The **Employer** is the party who will employ the Contractor to carry out the Works.

**Equipment** is the Contractor's machinery and vehicles brought temporarily to the Site to construct the Works.

The **Initial Contract price** is the Contract Price listed in the Employer's Letter of Acceptance.

The **Intended Completion Date** is the date on which it is intended that the Contractor shall complete the Works. The Intended Completion Date is specified in the Contract Data. The Intended Completion Date may be revised only by the Employer by issuing an extension of time.

'**Joint Venture**' means an ad hoc association of firms that pool their resources and skills to undertake a large or complex contract in the role of "Contractor," with all firms (partners in the JV) being legally liable, jointly and severally, for the execution of the Contract in the event of a partner's withdrawal.

**Materials** are all supplies, including consumables, used by the contractor for incorporation in the Works.

**Plant** is any integral part of the Works which is to have a mechanical, electrical, electronic or chemical or biological function.

The **Site** is the area defined as such in the Contract Data.

**Specification** means the Specification of the Works included in the Contract and any modification or addition made or approved by the Employer.

The **Start Date** is given in the Contract Data. It is the date when the Contractor shall commence execution of the works. It does not necessarily coincide with any of the Site Possession Dates.

**A Subcontractor** is a person or corporate body who has a Contract with the Contractor to carry out a part of the work in the Contract which includes work on the Site.

A **Variation** is an instruction given by the Employer which varies the Works.

The **Works** are what the Contract requires the Contractor to construct, install, and turn over to the Employer, as defined in the Contract Data.

## **2. INTERPRETATION**

2.1 In interpreting these Conditions of Contract, singular also means plural, male also means female or neuter, and the other way around. Headings have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The Employer will provide instructions clarifying queries about the Conditions of Contract.

2.2 The documents forming the Contract shall be interpreted in the following order of priority:

- (1) Agreement
- (2) Letter of Acceptance, notice to proceed with the works
- (3) Contractor's Tender
- (4) Contract Data
- (5) Conditions of Contract
- (6) Specifications
- (7) Drawings
- (8) Bill of Quantities and
- (9) any other document listed in the Contract Data as forming part of the Contract.

## **3. LAW GOVERNING CONTRACT**

3.1 The law governing the Contract is the Laws of India supplanted by the Karnataka Local Acts.

## **4. EMPLOYER'S DECISIONS**

4.1 Except where otherwise specifically stated, the Employer will decide contractual matters between the Employer and the Contractor.

## **5. DELEGATION**

5.1 The Employer may delegate any of his duties and responsibilities to other people after notifying the Contractor and may cancel any delegation after notifying the Contractor.



**6. COMMUNICATIONS**

6.1 Communications between parties which are referred to in the conditions are effective only when in writing. A notice shall be effective only when it is delivered (in terms of Indian Contract Act).

**7. SUBCONTRACTING:**

7.1 The Contractor may subcontract with the approval of the Employer but may not assign the Contract without the approval of the Employer in writing. Subcontracting does not alter the Contractor's obligations.

**8. OTHER CONTRACTORS**

8.1 The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities, and the Employer.

**9. PERSONNEL**

9.1 The Contractor shall employ the technical personnel (of number and qualifications) as may be stipulated by K-RIDE from time to time during the execution of the work. The technical staff so employed shall be available at site as may be stipulated by the Employer.

9.2 If the Employer asks the Contractor to remove a person who is a member of the Contractor's staff or his work force stating the reasons, the Contractor shall ensure that the person leaves the Site within seven days and has no further connection with the work in the Contract.

**10. EMPLOYER'S AND CONTRACTOR'S RISKS**

10.1 The Employer carries the risks which this Contract states are Employer's risks, and the Contractor carries the risks which this Contract states are Contractor's risks.

**11. EMPLOYER'S RISKS**

11.1 The Employer is responsible for the excepted risks which are:

- (a) Rebellion, riot commotion or disorder unless solely restricted to employees of the Contractor or his Sub Contractors arising from the conduct of the Works; or
- (b) a cause due solely to the design of the Works, other than the Contractor's design; or
  - (i) could not have reasonably foreseen; or
  - (ii) could reasonably have foreseen, but against which he could not reasonably have taken at least one of the following measures;
    - (A) prevent loss or damage to physical property from occurring by taking appropriate measures or
    - (B) insure against such loss or damage

**12. CONTRACTOR'S RISKS**

12.1 All risks of loss of or damage to physical property and of personal injury and death which arise during and in consequence of the performance of the Contract other than the excepted risks are the responsibility of the Contractor.

**13. INSURANCE:**

13.1 The Contractor shall prior to commencing the works, effect and thereafter maintain insurances, in the joint names of the Employer and the Contractor, (cover from the first working day after the Start Date to the end of Defects Liability Period), in the amounts stated in the Contract Data:

(a) for loss of theft or damage to the Works, Plants and Materials and the Contractor's equipment;

(b) for liability of both Parties for loss, damage, death and injury to third parties or their property arising out of the Contractor's performance of the Contract including the Contractor's liability for damage to the Employer's property other than the Works and

(c) for liability of both Parties and of any Employer's representative for death and injury to the Contractor's personnel except to the extent that liability arises from the negligence of the Employer, any Employer's representative or their Employees.

13.2 Policies and certificates for insurance shall be delivered by the Contractor to the Employer for his approval before the Start Date. All such insurance shall provide for compensation to be payable to rectify the loss or damage incurred. All payments received from insurers relating to loss or damage shall be held jointly by the Parties and used for the repair of the loss or damage or as compensation for loss or damage that is not to be repaired.

13.3 If the Contractor fails to effect or keep in force any of the insurances referred to in the previous sub-clauses or fails to provide satisfactory evidence, policies or receipts, the Employer may without prejudice to any other right or remedy, effect insurance for the cover relevant to such default and pay the premiums due and recover the same as a deduction from any other monies due to the Contractor. If no payment is due, the payment of the premiums shall be a debt due.

13.4 Alterations to the terms of an insurance shall not be made without the approval of the Employer.

13.5 Both Parties shall comply with any conditions of the insurance policies.

**14. SITE INVESTIGATION REPORTS:**

14.1 The Contractor, in preparing the tender, shall rely on any site investigation reports referred to in the Contract data, supplemented by any information available to the Tenderer.

**15. QUERIES ABOUT THE CONTRACT DATA**

15.1 The Employer will clarify queries on the Contract Data.

**16. CONTRACTOR TO CONSTRUCT THE WORKS**

16.1 The Contractor shall construct the Works in accordance with the Specification and Drawings.

**17. THE WORKS TO BE COMPLETED BY THE INTENDED COMPLETION DATE**

- 17.1 The Contractor may commence execution of the Works on the Start Date and shall carry out the Works in accordance with the program submitted by the Contractor, as updated with the approval of the Employer, and complete them by the Intended Completion Date.

**18. APPROVAL BY THE EMPLOYER:**

- 18.1 The Contractor shall submit Specification and drawings showing the proposed Temporary Works to the Employer, who is to approve them if they comply with the Specifications and Drawings.
- 18.2 The Contractor shall be responsible for the design of Temporary Works and Railway Electrification Works
- 18.3 The Employer's approval shall not alter the Contractor's responsibility for design of the Temporary Works and Railway Electrification Works
- 18.4 The Contractor shall obtain approval of Designers to design of the temporary and Railway Electrification Works
- 18.5 All Drawings prepared by the Contractor for the execution of the temporary or permanent Works, are subject to prior approval by the Employer before their use.

**19. SAFETY**

- 19.1 The Contractor shall be responsible for the safety of all activities on the Site.

**20 DISCOVERIES**

- 20.1 Anything of historical or other interest or of significant value unexpectedly discovered on the Site is the property of the Employer. The Contractor is to notify the Employer of such discoveries and carry out the Employer's instructions for dealing with them.

**21 POSSESSION OF THE SITE**

- 21.1 The Employer shall give possession of all parts of the Site to the Contractor progressively, If possession of a part is not given by the date stated in the Contract Data the Employer is deemed to have delayed the start of the relevant activities and this will be compensation event.

**22 ACCESS TO THE SITE**

- 22.1 The Contractor shall allow the Employer and any person authorized by the Employer access to the Site, to any place where work in connection with the Contract is being carried out or is intended to be carried out and to any place where materials or plant are being manufactured / fabricated / assembled for the works.

**23 INSTRUCTIONS**

- 23.1 The Contractor shall carry out all instructions of the Employer which comply with the applicable laws where the Site is located.

**24 PROCEDURE FOR RESOLUTION OF DISPUTES:**

- 24.1 If the Contractor is not satisfied with the decision taken by the Employer, the dispute shall be referred by either party to Arbitration within 30 days of the notification of the Employer's decision.
- 24.2 If neither party refers the dispute to Arbitration within the above 30 days, the Employer's decision will be final and binding.
- 24.3 The Arbitration shall be conducted in accordance with the arbitration procedure stated in the Special Conditions of Contract.

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**B. TIME CONTROL**

**25. PROGRAM**

- 25.1 Within the time stated in the Contract Data the Contractor shall submit to the Employer for approval a Program showing the general methods, arrangements, order, and timing for all the activities in the Works.
- 25.2 The Employer's approval of the Program shall not alter the Contractor's obligations. The Contractor may revise the Program and submit it to the Employer again at any time. A revised Program is to show the effect of Variations and Compensation Events.

**26. EXTENSION OF THE INTENDED COMPLETION DATE**

- 26.1 The Employer shall extend the Intended Completion Date if a Compensation Event occurs or a Variation is issued which makes it impossible for Completion to be achieved by the Intended Completion Date.
- 26.2 The Employer shall decide whether and by how much to extend the Intended Completion Date within 21 days of the Contractor asking the Employer for a decision upon the effect of a Compensation Event or Variation and submitting full supporting information.

**27. DELAYS ORDERED BY THE EMPLOYER**

- 27.1 The Employer may instruct the Contractor to delay the start or progress of any activity within the Works.

**28. MANAGEMENT MEETINGS**

- 28.1 The Employer may require the Contractor to attend a management meeting. The business of a management meeting shall be to review the progress achieved and the plans for remaining work.
- 28.2 The responsibility of the parties for actions to be taken is to be decided by the Employer either at the management meeting or after the management meeting and stated in writing to be distributed to all who attended the meeting.

**C. QUALITY CONTROL**

**29. IDENTIFYING DEFECTS**

29.1 The Employer shall check the Contractor's work and notify the Contractor of any Defects that are found. Such checking shall not affect the Contractor's responsibilities. The Employer may instruct the Contractor to search for a Defect and to uncover and test any work that the Employer considers may have a Defect.

**30. TESTS**

30.1 If the Employer instructs the Contractor to carry out a test not specified in the Specification to check whether any work has a Defect and the test shows that it does, the Contractor shall pay for the test and any samples. If there is no Defect the test shall be a Compensation Event.

**31. CORRECTION OF DEFECTS**

31.1 The Employer shall give notice to the Contractor of any Defects before the end of the Defects Liability Period, which begins at Completion and is defined in the Contract Data. The Defects Liability Period shall be extended for as long as Defects remain to be corrected.

31.2 Every time notice of a Defect is given, the Contractor shall correct the notified Defect within the length of time specified by the Employer's notice.

**32. UNCORRECTED DEFECTS**

32.1 If the Contractor has not corrected a Defect within the time specified in the Employer's notice, the Employer will assess the cost of having the Defect corrected, and the Contractor will pay this amount.

**D. COST CONTROL**

**33. Price Schedule:**

- 33.1 The BOQ shall contain items of the Design and construction, installation, testing, and commissioning work to be done by the Contractor.
- 33.2 The BOQ is used to calculate the Contract Price. The Contractor is paid. For the quantity of the work done at the rate in the BOQ for each item.

**34. VARIATIONS**

- 34.1 The Employer shall have power to order the Contractor to do any or all of the following as considered necessary or advisable during the progress of the work by him
- (a) Increase or decrease of any item of work included in the BOQ .;
  - (b) Omit any item of work;
  - (c) Change the character or quality or kind of any item of work;
  - (d) Change the levels, lines, positions and dimensions of any part of the work;
  - (e) Execute additional items of work of any kind necessary for the completion of the works; and
  - (f) Change in any specified sequence, methods or timing of construction of any part of the work.
- 34.2 The Contractor shall be bound to carry out the work in accordance with any instructions in this connection, which may be given to him in writing by the Employer and such alteration shall not vitiate or invalidate the contract.
- 34.3 Variations shall not be made by the Contractor without an order in writing by the Employer, provided that no order in writing shall be required for increase or decrease in the quantity of an item appearing in the BOQ so long as the work executed conforms to the approved drawings.
- 34.4 The Contractor shall promptly request in writing to the Employer to confirm verbal orders and the officer issuing oral instructions shall confirm it in writing within 30 days of request, failing which the work shall be carried out as though there is no variation. In case variation is approved it shall be accompanied with BOQ failing which the contractor shall be responsible for deviation if any.

**35. PAYMENTS FOR VARIATIONS**

- 35.1 Payment for increase/ decrease in the quantities of components of schedules A to G shall be made as per the details provided in the notes of BOQ. The Contractor shall execute and be bound for variations of all change of scope of orders till the price does not exceed 25% of the Contract Price as specified in LOA/Original agreement.
- 35.2 The rates for additional, substituted or altered item of work, Contractor shall be requested to submit his quotation for the items supported by analysis of the rate or rates claimed, within 7 days.
- 35.3 If the Contractor's quotation is determined unreasonable, the Employer may order the Variation and make a change to the Contract Price which shall be based on Employer's own forecast of the effects of the Variation on the Contractor's costs.

35.4 Under no circumstances the Contractor shall suspend the work on the plea of non-settlement of rates for items falling under this Clause.

**36. SUBMISSION OF BILLS FOR PAYMENT**

36.1 The Contractor shall submit to the Employer monthly bills of the value of the work completed less the cumulative amount paid previously.

36.2 The Employer shall check the Contractor's bill and determine the value of the work executed which shall comprise of (i) value of the quantities of the items as per stage payment of BOQ and (ii) valuation of Variations and Compensation Events.

36.3 The Employer may exclude any item paid in a previous bill or reduce the proportion of any item previously paid in the light of later information.

**37. PAYMENTS**

37.1 Payments shall be adjusted for deductions for advance payments other than recoveries in terms of contract and taxes, at source as applicable under law. The Employer shall pay the Contractor within 60 days of submission of bill. The Contractor shall be liable to pay liquidated damages for shortfall in progress.

37.2 Items of the Works for which no rate or price has been entered in will not be paid for by the Employer and shall be deemed to be covered in lumpsum Price of the Contract.

**38. COMPENSATION EVENTS:**

38.1 The following are Compensation Events unless they are caused by the Contractor:

- (a) The Employer orders a delay or does not issue drawings, specifications or instructions required for execution of works on time.
- (b) The Employer instructs the Contractor to uncover or to carry out additional tests upon work which is then found to have no Defects.
- (c) The Employer gives an instruction for dealing with an unforeseen condition, caused by the Employer, or additional work required for safety or other reasons.
- (d) The effect on the Contractor of any of the Employer's Risks.
- (e) The Employer unreasonably delays issuing a Certificate of Completion.

Other Compensation Events listed in the Contract Data or mentioned in the Contract

38.2 If a Compensation Event would cause additional cost or would prevent the work being completed before the Intended Completion Date, the Contract Price shall be increased and/or the Intended Completion Date is extended. The Employer shall decide whether and by how much the Contract Price shall be increased and whether and by how much the Intended Completion Date shall be extended.

38.3 As soon as information demonstrating the effect of each Compensation event upon the Contractor's forecast cost has been provided by the Contractor, it is to be assessed by the



Employer and the Contract Price shall be adjusted accordingly. If the Contractor's forecast is deemed unreasonable, the Employer shall adjust the Contract Price based on Employer's own forecast. The Employer will assume that the Contractor will react competently and promptly to the event.

- 38.4 The Contractor shall not be entitled to compensation to the extent that the Employer's interests are adversely affected by the Contractor not having given early warning or not having cooperated with the Employer.

**39. TAX**

- 39.1 The rates quoted by the Contractor shall be deemed to be inclusive of the sales, GST and other taxes that the Contractor will have to pay for the performance of this Contract. The Employer will perform such duties in regard to the deduction of such taxes at source as per applicable law.

**40. PRICE ADJUSTMENT:**

**CHANGE IN COSTS - PRICE ADJUSTMENT  
PRICE ADJUSTMENT CLAUSE FOR WORKS CONTRACTS**

Contract price shall be adjusted for increase or decrease in rates and prices of labour, materials, fuels and lubricants in accordance with the following principles and procedures and as per formula given here under.

- (a) The price Adjustment shall apply for the work done from the date of commencement up to the end of original period of completion and shall not apply to work carried out beyond the stipulated period of completion for reasons attributable to the Contractor.
- (b) The Price adjustment shall be determined during each quarter from the formula given in contract data.
- (c) Following expression and meanings are assigned to the work done during the quarter:

R=Total value of work done during the month shall include the value of materials on which secured advance has been granted, if any during the month less the value of materials in respect of which the secured advance has been recovered, if any, during the month. This excludes the cost of work on items for which rates were fixed under Variations Clause 35/PCC for which the escalation will be regulated as mutually agreed at the time of fixation of rate. It will also exclude the value of work done during the month which was programmed to be done prior to this month as per work schedule in the agreement.

(d) To the extent that full compensation for any rise or fall in costs to the contractor is not covered by the provisions of this or other Clauses in the Contract, the unit rates included in the contract shall be deemed to include amounts to cover the contingency of such other rise or fall in costs.

**41. LIQUIDATED DAMAGES**

- 41.1 The Contractor shall pay liquidated damages to the Employer at the rate per day stated in the Contract Data for each day that the Completion Date is later than the Intended Completion Date (for the whole of the works or the milestone as stated in the Contract Data). The total amount of

liquidated damages shall not exceed the amount defined in the Contract Data. The Employer may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages does not affect the Contractor's liabilities.

- 41.2 If the Intended Completion Date is extended after liquidated damages have been paid, the Employer shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment of bill.

**42. ADVANCE PAYMENTS:**

- 42.1 The Employer shall make payment to the Contractor of the amounts stated in the Contract Data by the date stated in the Contract Data, against provision by the Contractor of an unconditional bank guarantee in a form acceptable to the Employer issued by a Nationalized/Scheduled Bank in amounts equal to the advance payment. The guarantee shall remain effective until the advance payment has been repaid, but the amount of the guarantee shall be progressively reduced by the amounts repaid by the Contractor. The advance payments shall be repaid with prevailing bank interest.

- 42.2 The Contractor is to use the advance payment only to pay for Mobilization expenses required specifically for execution of the Works. The Contractor shall demonstrate that advance payment has been used in this way by supplying copies of invoices or other documents to the Employer

- 42.3 The advance payment shall be repaid by deducting proportionate amounts from payments otherwise due to the Contractor, following the schedule of completed percentages of the Works on a payment basis. No account shall be taken of the advance payment or its repayment in assessing valuation of the work done, variations, price adjustments, compensation events or liquidated damages

**43. SECURITIES:**

- 43.1 The Performance Security (including additional security for unbalanced tenders) shall be provided to the Employer no later than the date specified in the Letter of Acceptance and shall be issued in an amount and form and type of instrument acceptable to the Employer. The Performance Security as indicated in the contract data shall be valid until a date 60 days after the expected end of completion Period and the additional security for unbalanced tenders shall be valid until a date 60 days from the expected end of completion Period. The security deposit will be released against BG.

**44. COST OF REPAIRS:**

- 44.1 Loss or damage to the Works or Materials to be incorporated in the Works between the Start Date and the end of the Defects Correction periods shall be remedied by the Contractor at the Contractor's cost if the loss or damage arises from the Contractor's acts or omissions.

**E. FINISHING THE CONTRACT**

**45. COMPLETION**

45.1 The Contractor shall request the Employer to issue a Certificate of Completion of the Works and the Employer will do so upon deciding that the Work is completed.

**46. TAKING OVER**

46.1 The Employer shall take over the Site and the Works within seven days of issuing a certificate of Completion.

**47. FINAL ACCOUNT**

47.1 The Contractor shall supply to the Employer a detailed account of the total amount that the Contractor considers payable under the Contract before the end of the Defects Liability Period. The Employer shall issue a Defect Liability Certificate and certify any final payment that is due to the Contractor within 90 days of receiving the Contractor's account if it is correct and complete. If it is not, the Employer shall issue within 90 days a schedule that states the scope of the corrections or additions that are necessary. If the Final Account is still unsatisfactory after it has been resubmitted, the Employer shall decide on the amount payable to the Contractor and make payment within 60 days of receiving the Contractor's revised account.

**48. AS ERECTED DRAWINGS AND /OR OPERATING AND MAINTENANCE MANUALS**

48.1 If "As Erected Drawings" (Completion Drawing) and/or operating and maintenance manuals are required, the Contractor shall supply them by the dates stated in the Contract Data.

48.2 If the Contractor does not supply the Drawings by the dates stated in the Contract Data, or they do not receive the Employer's approval, the Employer shall withhold the amount stated in the Contract Data from payments due to the Contractor.

**49. TERMINATION**

49.1 The Employer may terminate the Contract if the other party causes a fundamental breach of the Contract.

49.2 Fundamental breaches of Contract include, but shall not be limited to the following:

- (a) the Contractor stops work for 45 days when no stoppage of work is shown on the current Program and the stoppage has not been authorized by the Employer;
- (b) - "DELETED"-
- (c) The Contractor becomes bankrupt or goes into liquidation other than for a reconstruction or amalgamation;
- (d) - "DELETED"-

**SECTION – 5: CONDITIONS OF CONTRACT(CC) AND SPECIAL CONDITIONS OF CONTRACT (SCC)**

- (e) the Employer gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Employer;
- (f) the Contractor does not maintain a security which is required;
- (g) the Contractor has delayed the completion of works by the number of days for which the maximum amount of liquidated damages can be paid as defined in the Contract data; and
- (h) if the Contractor, in the judgment of the Employer has engaged in corrupt or fraudulent practices in competing for or in the executing the Contract.

For the purpose of this paragraph: “corrupt practice” means the offering, giving, receiving or soliciting of anything of value to influence the action of a public official in the procurement process or in contract execution. “Fraudulent practice” means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Borrower, and includes collusive practice among Tenderers (prior to or after Tender submission) designed to establish Tender prices at artificial non-competitive levels and to deprive the Borrower of the benefits of free and open competition.”

- 49.3 When either party to the Contract gives notice of a breach of contract to the Employer for a cause other than those listed under Sub Clause 49.2 above, the Employer shall decide whether the breach is fundamental or not.
- 49.4 Notwithstanding the above, the Employer may terminate the Contract for convenience.
- 49.5 If the Contract is terminated the Contractor shall stop work immediately, make the Site safe and secure and leave the Site as soon as reasonably possible.

**50. PAYMENT UPON TERMINATION**

- 50.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Employer shall prepare bill for the value of the work done less advance payments received up to the date of the bill, less other recoveries due in terms of the contract, less taxes due to be deducted at source as per applicable law and less the percentage to apply to the work not completed as indicated in the Contract Data. Additional Liquidated Damages shall not apply. If the total amount due to the Employer exceeds any payment due to the Contractor, the difference shall be a debt payable to the Employer.
- 50.2 If the Contract is terminated at the Employer's convenience, the Employer shall prepare bill for the value of the work done, the reasonable cost of removal of Equipment, repatriation of the Contractor's personnel employed solely on the Works, and the Contractor's costs of protecting and securing the Works and less advance payments received up to the date of the certificate, less other recoveries due in terms of the contract, and less taxes due to be deducted at source as per applicable law and make payment accordingly.

**51. PROPERTY**

- 51.1 All materials on the Site, Plant, Equipment, Temporary Works and Works are deemed to be the property of the Employer, if the Contract is terminated because of a contractor's default.

**52. RELEASE FROM PERFORMANCE**

- 52.1 If the Contract is frustrated by any event entirely outside the control of either the Employer or the Contractor the Employer shall certify that the Contract has been frustrated. The Contractor shall make the Site safe and stop work as quickly as possible after receiving this certificate and shall be paid for all work carried out before receiving it and for any work carried out afterwards to which commitment was made.

K-RIDE

**F. SPECIAL CONDITIONS OF CONTRACT**

**1. LABOUR :**

The Contractor shall, unless otherwise provided in the Contract, make his own arrangements for the engagement of all staff and labour, local or other, and for their payment, housing, feeding and transport.

The Contractor shall, if required by the Employer, deliver to the Employer a return in detail, in such form and at such intervals as the Employer may prescribe, showing the staff and the numbers of the several classes of labour from time to time employed by the Contractor on the Site and such other information as the Employer may require.

**2. COMPLIANCE WITH LABOUR REGULATIONS:**

During continuance of the Contract, the Contractor and his sub-contractors shall abide at all times by all existing labour enactments and rules made there under, regulations, notifications and bye laws of the State or Central Government or local authority and any other labour law (including rules), regulations, bye laws that may be passed or notification that may be issued under any labour law in future either by the State or the Central Government or the local authority. The Contractor shall keep the Employer indemnified in case any action is taken against the Employer by the competent authority on account of contravention of any of the provisions of any Act or rules made there under, regulations or notifications including amendments. If the Employer is caused to pay or reimburse, such amounts as may be necessary to cause or observe, or for non-observance of the provisions stipulated in the notifications/bye laws/Acts/Rules/regulations including amendments, if any, on the part of the Contractor, Employer shall have the right to deduct any money due to the Contractor including his amount of security deposit. The Employer shall also have right to recover from the Contractor any sum required or estimated to be required for making good the loss or damage suffered by the Employer.

The employees of the Contractor and the Sub-Contractor in no case shall be treated as the employees of the Employer at any point of time.

**3. PROTECTION OF ENVIRONMENT:**

The Contractor shall take all reasonable steps to protect the environment on and off the Site and to avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other causes arising as a consequence of his methods of operation. During continuance of the contract, the Contractor and his sub-contractors shall abide at all times by all existing enactments on environmental protection and rules made there under, regulations, notifications and bye-laws of the State or Central Government, or local authorities and any other law, bye-law, regulations that may be passed or notification that may be issued in this respect in future by the State or Central Government or the local authority.

**4. CLAIMS, DISPUTES AND ARBITRATION**

**4.1 Contractor's Claims**

If the Contractor considers himself to be entitled to any extension of the Time for Completion and/or any additional payment, under any Clause of these Conditions or otherwise in connection with the Contract, the Contractor shall give notice to the Engineer, describing the event or circumstance giving rise to the claim. The notice shall be given as soon as practicable, and not

**SECTION – 5: CONDITIONS OF CONTRACT(CC) AND SPECIAL CONDITIONS OF CONTRACT (SCC)**

later than 28 days after the Contractor became aware, or should have become aware, of the event or circumstance.

If the Contractor fails to give notice of a claim within such period of 28 days, the Time for Completion shall not be extended, the Contractor shall not be entitled to additional payment, and the Employer shall be discharged from all liability in connection with the claim. Otherwise, the following provisions of this Sub-Clause shall apply.

The Contractor shall also submit any other notices which are required by the Contract, and supporting particulars for the claim, all as relevant to such event or circumstance.

The Contractor shall keep such contemporary records as may be necessary to substantiate any claim, either on the Site or at another location acceptable to the Engineer. Without admitting the Employer's liability, the Engineer may, after receiving any notice under this Sub-Clause, monitor the record-keeping and/or instruct the Contractor to keep and provide further contemporary records. The Contractor shall permit the Engineer to inspect all these records, and shall (if instructed) submit copies to the Engineer.

Within 45 days after the Contractor became aware (or should have become aware) of the event or circumstance giving rise to the claim, or within such other period as may be proposed by the Contractor and approved by the Engineer, the Contractor shall send to the Engineer a fully detailed claim which includes full supporting particulars of the basis of the claim and of the extension of time and/or additional payment claimed. If the event or circumstance giving rise to the claim has a continuing effect:

- (a) this fully detailed claim shall be considered as interim;
- (b) the Contractor shall send further interim claims at monthly intervals, giving the accumulated delay and/or amount claimed, and such further particulars as the Engineer may reasonably require; and
- (c) the Contractor shall send a final claim within 28 days after the end of the effects resulting from the event or circumstance, or within such other period as may be proposed by the Contractor and approved by the Engineer.

Within 45 days after receiving a claim or any further particulars supporting a previous claim, or within such other period as may be proposed by the Engineer and approved by the Contractor, the Engineer shall respond with approval, or with disapproval and detailed comments. He may also request any necessary further particulars, but shall nevertheless give his response on the principles of the claim within such fixed period of time.

Each Payment Certificate shall include such amounts for any claim as have been reasonably substantiated as due under the relevant provision of the Contract. Unless and until the particulars supplied are sufficient to substantiate the whole of the claim, the Contractor shall only be entitled to payment for such part of the claim as he has been able to substantiate.

The Engineer shall proceed in accordance with Sub-Clause: [Determinations] to agree or determine (i) the extension (if any) of the Time for Completion (before or after its expiry) in accordance with Sub-Clause: [Extension of Time for Completion], and/or (ii) the additional payment (if any) to which the Contractor is entitled under the Contract.

The requirements of this Sub-Clause are in addition to those of any other Sub-Clause which may apply to a claim. If the Contractor fails to comply with this or another Sub-Clause in relation to any claim, any extension of time and/or additional payment shall take account of the extent (if any) to which the failure has prevented or prejudiced proper investigation of the claim, unless the claim is excluded under the second paragraph of this Sub-Clause.

## **4.2 Amicable Settlement**

In case any dispute between the Engineer and the Contractor for which claim has already been made by the contractor, remains unresolved, the Contractor shall, then, give notice of dissatisfaction and intention to commence arbitration to the Employer duly specifying the subject of the dispute or difference as also the amount of claim item wise. The Parties shall make attempts to settle the dispute amicably before the commencement of arbitration as per procedure set by K-RIDE. However, unless both Parties agree otherwise, demand for arbitration may be made by the Contractor after ninety days from the day on which a notice of dissatisfaction and intention to commence arbitration was given, even if no attempt at amicable settlement has been made.

### **Procedure for Amicable Settlement in contracts**

1. Amicable Settlement Committee at senior management level shall make an attempt to resolve the issues/disputes within 90 days of request by the Contractor.
2. The committee shall comprise of the following: -
  - (i) GM /K-RIDE directly in-charge of the project;
  - (ii) Concerned finance officer, and
  - (iii) GM /K-RIDE (in the same order) directly in-charge of the project of other discipline(s) in case the issues involve other discipline(s) of the engineering
3. Whenever the Contractor submits a request for amicable settlement, MD/K-RIDE should forward the same to concerned GM /K-RIDE (in the same order) directly in-charge of the project. GM /K-RIDE on receipt of the same shall issue a note to the concerned finance officer and concerned GM/K-RIDE of other discipline in case the issues involved other discipline(s) of engineering, about the request for amicable settlement to be dealt by them and fix a date in consultation with them for a hearing. The date should then be communicated to the MD/K-RIDE, GM/ /K-RIDE of other department (if the issues involved their department) and Contractor for presenting their case before the Amicable Settlement Committee.
4. This being an additional workload like arbitration, the Committee members shall be paid fee by K-RIDE at the rates payable to the Arbitrators of K-RIDE.

## **4.3 Arbitration**

Any dispute, in respect of which amicable settlement has not been reached, arising between the Employer and the Domestic or Foreign Contractor related to any matter arising out of or connected with this contract, then the contractor shall be entitled to demand in writing that the dispute or difference be referred to arbitration.

Only such dispute(s) or difference(s) in respect of which the demand had been made for amicable settlement under GCC 4.2 but could not be settled, shall be referred to arbitration.

The Arbitration proceedings shall commence from the day, a written and duly quantified demand for arbitration is received by Managing Director, Rail Infrastructure Development Company (Karnataka) Limited, Bangalore /K-RIDE).



The disputes so referred to arbitration shall be settled in accordance with the Indian Arbitration & Conciliation Act, 1996 and any statutory modification or re-enactment thereof.

Any dispute or difference or claim arising out of, or in connection with, or relating to the present contract or the breach, termination or invalidity thereof shall be referred and settled under the Arbitration Centre – Karnataka (Domestic and International) Rules 2012, by one or more arbitrators appointed in accordance with its rules.

**4.3.1 Procedure for Appointment of Arbitrators: The arbitrators shall be appointed as per following procedure:**

Any dispute or difference or claim arising out of, or in connection with, or relating to the present contract or the breach, termination or invalidity thereof shall be referred and settled under the Arbitration Centre – Karnataka (Domestic and International) Rules 2012, by one or more arbitrators appointed in accordance with its rules.

**4.3.2** Arbitration proceedings shall be held at Bangalore, India or at a place where K-RIDE's (dealing the contract) office is located, and the language of the arbitration proceedings and that of all documents and communications between the Parties shall be in English.

**4.3.3** 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.

**4.3.4** The fees and other charges of the conciliator/arbitrators shall be as per the fee structure fixed by the employer with reference to the Rules of Arbitration Centre – Karnataka (Domestic and International) Rules 2012. The cost of arbitration shall be borne equally by the respective parties.

**4.3.5** Performance under the contract shall continue during the arbitration proceedings and payments due the Contractor by the Employer shall not be withheld, unless they are the subject matter of the arbitration proceeding.

**4.3.6 Excepted matters:**

The following are the list of excepted matters in arbitration.

- a. Assistance by Employer for the Stores to be obtained by the Contractor.
- b. Illegal Gratification.
- c. Meaning and intent of specifications and Drawings.
- d. Rates for Non-tendered items of works.
- e. Signing of "No claim Certificate"
- f. Measurement of works.
- g. Provisions of Payment of Wages Act 1936.
- h. Provisions of Contract Labour (Regulation and Abolition) Act, 1970.
- i. Provisions of Employees Compensation Act 1923.
- j. Provisions of Mines Act 1952.
- k. Right of Employer to determine the Contract

- I. Payment on determination of Contract by Employer.

## **5.1 JURISDICTION OF COURTS**

The Contract Agreement shall be subject to exclusive jurisdiction of Courts as indicated in the Contract Data. The Jurisdiction **of Courts is Bengaluru, Karnataka**

## **5.2 Settlement through Court**

It is a term of this contract that the Contractor shall not approach any Court of Law for settlement of such disputes or differences unless an attempt has first been made by the parties to settle such disputes or differences through Dispute resolution as above.

6. If K-RIDE wishes to engage third party consultants for quality control assessment, apart from the K-RIDE quality control and field tests, the Contractor should co-operate with both Quality control authorities and the third party.
7. Defect liability period will be ONE Year from the date of commercial operations of the Section/Corridor.
8. Royalty Charges shall be recovered as per the prevailing rates by the Department of Mines & Geology, if not paid by the Contractor.
9. As per GO No. CD/300/ LET/ 2006: Dated 18-12-2007, 1% cess will be deducted from the bill as per labour welfare act.
10. All the works are to be carried out as per the Standard specification Issued from time to time.

**SECTION – 6**  
**CONTRACT DATA**

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K-RIDE

## SECTION 6: CONTRACT DATA

Items marked "N/A" do not apply in this Contract.

The following documents are also part of the Contract:

### Clause Reference

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>• The Methodology and Program of Construction</li> <li>• Site Investigation Reports</li> <li>• The Schedule of Key and Critical Equipment to be deployed on the work as per agreed program of construction.</li> </ul> | <p>(25 of GCC)</p> <p>(14 of GCC)</p> <p>(3.3 of ITT, 25 GCC)</p> |
|---|---|

The Employer is:

Name: K-RIDE

(1.1 of GCC)

Address: K-RIDE, Bangalore

Name of authorized Representative: K-RIDE

NAME OF WORK: "Design, Supply, Erection, Testing & Commissioning of 25kV, AC, 50Hz, Single phase, Traction Over Head Equipment for doubling of 1. Banaswadi (Incl) (211/090) - Baiyyappanahalli A Cabin (Excl) (205/378 in BAND-BYPL line) Section (10 TKM approx.) 2.a) Baiyyappanahalli A Cabin (incl) (205/378 in BAND-BYPL line & 205/650 in BYPL-SBC line) - Bellandur Road (Excl.) (197/600) Section 2.b) Anekal Road (Excl.) (171/600) - Hosur (Excl.) (159/750) Section (25.5 TKM approx.) Overall TKM of 35.5 approximately and including any modification in existing OHE/PSI if required in Bangalore division of South Western Railway.

Tender No: KRIDE/2023-24/EL/WORK\_INDENT14, Dated:04/11/2023

### Description of Work:

The proposed work is in connection with Railway Electrification of proposed line between Banaswadi - Baiyyappanahalli A Cabin, Baiyyappanahalli A panel - Bellandur Road and Anekal Road - Hosur as provision of Doubling.

- a) The proposed Railway Electrification will connect railway stations viz. Banaswadi, BYPL A Cabin, Anekal Road, Maranayakanahalli.
- b) Entire section is mostly plain and maximum ruling gradient is 1 in 100 compensated. This project site lies in the state of Karnataka.
- c) The section falls in the basic wind speed of 33 m/s classification given in IS 875-1987. Accordingly, the basic wind pressure of 73 kgf/m<sup>2</sup> respectively is to be adopted. Increased wind pressure is also to be adopted on embankments more than 100 meters i.e., 150 kgf/m<sup>2</sup>. This conforms to the wind pressure adopted by State Electricity Boards for the design of their EHT transmission lines.

- d) Electric Locomotives with chimney height not exceeding 4.232m (WAP with their pantographs in the locked down position) and diesel Locomotives with height of 4.42 (14 ft. 6 inch) would run on this section.

The start date shall be the date of issue of notice to proceed with the work. [1.1 of GCC]

The Intended Completion Date for the whole of the Works is  
15 MONTHS INCLUDING MONSOON with the following milestones - [17, 26 of GCC]

#### MILESTONE DATES:

**Physical works to be completed as per Milestones**

**Milestones will be intimated later after issue of LOA.**

**Note: The material shall be supplied as per the target sections mentioned in the milestones and as approved by K-RIDE.**

**The Defect Liability period is One year.**

**The insurance requirement is as below.**

SI No.	Type of Cover	Minimum cover for Insurance <sup>36</sup>
(i)	Works and Plant and materials	The sum stated in the Agreement
(ii)	Loss or Theft or damage to equipment	Full replacement cost
(iii)	Loss or damage to property of Third Party	Full replacement cost
(iv)	Personal injury or death insurance (a) for Third Party	The Contractor to take appropriate policy in accordance with the statutory requirements applicable to Karnataka.
	(b) for Contractor's employees or labour	

#### PRICE ADJUSTMENT:

##### CHANGE IN COSTS - PRICE ADJUSTMENT

**PRICE ADJUSTMENT CLAUSE FOR WORKS CONTRACTS: Refer Particular Conditions of Contract, Clause: Price Adjustment Clause**

#### Liquidated Damages:

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 10% of the contract

value or of the total value of the item or groups of items of work for which a separated distinct completion period is specified in the contract.

S.No.	Damage & Delay	Rate of Penalty
(i)	For delay in achieving physical/Financial target as per the agreed programme	0.01% of contract value for each week or part of the week

S.No.	Duration of extension of time under Clause 41 of GCC	Rate of Penalty
(i)	Up to Twenty percent of original period of completion including period of extension of DOC granted under Section 41 of GCC	As decided by Engineer, between 0.01% to 0.10% of contract value for each week or part of the week
(ii)	Above Twenty percent but upto Thirty percent of original period of completion including period of extension of DOC granted under Section 41 of GCC	0.20% of contract value for each week or part of the week
(i)	Above Thirty percent but upto Forty percent of original period of completion including period of extension of DOC granted under Section 41 of GCC	0.30% of contract value for each week or part of the week
(ii)	Above Forty percent of original period of completion including period of extension of DOC granted under Section 41 of GCC	0.50% of contract value for each week or part of the week

Provided further, that if the employer 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 employer shall be entitled without prejudice to any other right or remedy available in that behalf.

The amounts of the advance payment are:

[GCC 42]

Nature of Advance	Amount Rs.	Conditions to be fulfilled
Mobilization	5% of the contract price (In Two Installments)	On submission of unconditional bank guarantee (further details are in Particular conditions of contract)

(The advance payment will be paid to the contractor no later than 30 days after fulfillment of the above condition.)

**Repayment of advance payment for mobilization:**

The recovery of the Mobilization and Plant and Machinery Advances shall be made from each bill in equal monthly instalments commencing after 15% of contract value is billed and recovery to be completed within 85% of the contract value and the recovery shall be made at the rate 10% of the amount the Interim

payment certificate until such time as loan has been repaid, always provided that the loan shall be completely repaid prior to the expiry of the original time for completion pursuant to Clauses 17 and 26.

The date by which “as-erected” drawings (in suitable scale) in 6 sets are required is within 30 days of issue of certificate of completion of Whole or Section of the Work as the case may be. [GCC 48]

**The amount to be withheld for failing to supply “As Erected” drawings Rs. 10.00 Lakhs**

The following events shall also be fundamental breach of the contract: [GCC 49.2]

The contractor has contravened Sub-clause 7.1 and Clause 9 of Condition of contract.

The percentage to apply to the value of the work not completed representing the Employer's additional cost for completing the works shall be **30%**  
[GCC 50.1]

**Jurisdiction of Courts:**

Jurisdiction of Courts is Bengaluru, Karnataka

K-RIDE



# **SECTION 8A**

## **EMPLOYER'S REQUIREMENT – GENERAL INFORMATION AND SCOPE OF WORK**

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## **SECTION 8A:**

### **WORKS/EMPLOYER'S REQUIREMENTS**

#### **GENERAL INFORMATION & SCOPE OF WORK**

##### **Brief Scope**

**Name of work:**

“Design, Supply, Erection, Testing & Commissioning of 25kV, AC, 50Hz, Single phase, Traction Over Head Equipment for doubling of 1. Banaswadi (Incl) (211/090) - Baiyyappanahalli A Cabin (Excl) (205/378 in BAND-BYPL line) Section (10 TKM approx.) 2.a) Baiyyappanahalli A Cabin (incl) (205/378 in BAND-BYPL line & 205/650 in BYPL-SBC line) - Bellandur Road (Excl.) (197/600) Section 2.b) Anekal Road (Excl.) (171/600) - Hosur (Excl.) (159/750) Section (25.5 TKM approx.) Overall TKM of 35.5 approximately and including any modification in existing OHE/PSI if required in Bangalore division of South Western Railway”.

This work pertains to “Design, Supply, Erection, Testing & Commissioning of 25kV, AC, 50Hz, Single phase, Traction Over Head Equipment for doubling of 1. Banaswadi (Incl) (211/090) - Baiyyappanahalli A Cabin (Excl) (205/378 in BAND-BYPL line) Section (10 TKM approx.) 2.a) Baiyyappanahalli A Cabin (incl) (205/378 in BAND-BYPL line & 205/650 in BYPL-SBC line) - Bellandur Road (Excl.) (197/600) Section 2.b) Anekal Road (Excl.) (171/600) - Hosur (Excl.) (159/750) Section (25.5 TKM approx.) Overall TKM of 35.5 approximately and including any modification in existing OHE/PSI if required in Bangalore division of South Western Railway”.

#### **EMPLOYERS REQUIREMENT - SCOPE OF WORK**

##### **1. OBJECTIVE**

The objective of the contract is :

The objective of the contract is the **Design, Supply, Erection, Testing & Commissioning of 25 KV, AC, 50 Hz, Single Phase, Traction Over Head Equipment for Railway Electrification.** Erection and removal of the Temporary Works and the rectification of defects by the contractor in the manner stipulated by the Contract. In full recognition of this objective, and with full acceptance of the obligations, liabilities and risks which may be involved, the Contractor shall undertake the execution of the Works. The general and specific requirements of the employer are detailed out in this document for understanding of the bidders and for mandatory compliance by the successful bidder/contractor. The Employer's requirements have been divided into different sections / sub-heads for convenience only. They do not restrict any cross-references. The Contractor shall take into account inter-relations between various parts of works. No claim shall be entertained on account of compartmental interpretations.

### **Additional Scope of Work**

Along with the scope of BAND-BYPL, BYPL-BLRR & AEK-HSRA sections, the execution of balance work of BLRR-AEK Section may also be included in the scope of this tender. If so, for execution of balance work in BLRR-AEK Section, after award of the contract, the contractor shall take handover of the material for schedule B of the tender at site and all other schedules from OHE store near HLE Station. The transportation of material from HLE OHE store to the contractor's depot shall be the contractor's responsibility, for which the rates shall be paid at actual MT-KM as per schedule-G item no. G1. Post handover, the scope of watch and ward of the material, storage and security of the material will be the contractor's responsibility for which no extra rates are admissible. For erection of material at site the erection rates will be applicable as per the respective items of BOQ of this tender.

For any shortage of the material during execution of balance work in BLRR-AEK section, material shall be supplied by the contractor as per the scope of supply of material of this tender. The material supplied should be as per the milestone dates given by the contractor.

For any change in scope of work up to 25% of the total cost of LOA, the quantity variation will be granted. Any change in scope of work above 25% of LOA cost shall be dealt as per the procedures laid down in the tender and the policies of K-RIDE.

CRS of any section of work cannot be treated as completion of all the work of that section of work. Any modification of OHE aroused due to any work related to civil or other wings of K-RIDE shall be treated as the scope of work of the contractor till the completion of defect liability period for which the rates shall be applicable as per the respective BOQ items, provided such work is not called on account of non-compliance of specifications, approved drawings and instructions given by the purchaser from time to time.

Reconciliation of material shall be done after completion of work and at intermediate periods. No material shall be taken back by K-RIDE. The final payment shall be made as per the actual supply and erection of material at site less the material handed over to the contractor.

Note: - Balance work in BLRR-AEK section refers to all the work required to be done for OHE electrification in BLRR-AEK Section and for successful CRS of all the lines as per the approved ESP of doubling including any modification of OHE required to accommodate the FOB/ROB/Underpass/other civil amenities in the station and open route. The work also includes the commissioning of Auxiliary transformers and switching stations.

## **2. RELEVANT DOCUMENTS**

The Engineer shall provide ESP, L-SECTION, Existing LOP to Contractor for the execution of works in accordance with the agreed terms and conditions of the Contract Agreement. The contractor has to do detailed site survey including the existing OHE work, in case of any discrepancy in the existing LOP K-RIDE shall not bear any responsibility and be accountable on this account. The contractor has to make necessary changes in the existing OHE to incorporate any required modification

according to approved Engineering Scale Plan (ESP) and Signal Interlocking Plan (SIP) and incorporate all the details in the various drawings such as LOP, CSD, SED, Sectioning Diagram etc.

The following Documents shall be referred in conjunction with each other by the Contractor for construction work as these are mutually complimentary to each other:

- a) ESP/L-Section Drawings issued by the Engineer
- b) Existing LOP
- c) Phase Plans of Yard
- d) Employer's Requirements as part of Contract
- e) Technical Specifications
- f) Indian and International Standards referenced therein.
- g) Indian Railway Schedule of dimensions, RDSO & CORE specification.
- h) AC Traction Manual, OHE design manual Vol-I,II,III.
- i) The schedules and any other documents forming part of the Contract.

The Contractor shall always seek advice from the Engineer in the event of conflicts among above cited documents. In case of conflict, Engineer's decision shall be final and binding.

### 3. GENERAL

The tendered work is part of the doubling with Electrification Project for Section Banaswadi - BYPL A cabin, BYPL A cabin- Bellandur Road and Anekal Road - Hosur of South Western Railway. The works are located on the alignment between Yesvantpur – Hosur

This Second line is covering following stations as mentioned below:

S.No	Station	State	Division	Railway
1.	Banaswadi	Karnataka	Bangalore	SWR
2.	BYPL A Cabin	Karnataka	Bangalore	SWR
3.	Anekal Road	Karnataka	Bangalore	SWR
4.	Maranayakanahalli	Karnataka	Bangalore	SWR

The proposed work is in connection with Railway Electrification of proposed line between Banaswadi - BYPL A cabin, BYPL A cabin- Bellandur Road and Anekal Road - Hosur as provision of Doubling.

- a) The proposed Railway Electrification will connect railway stations viz. Banaswadi, BYPL A cabin, Anekal Road, Maranayakanahalli, Hosur
- b) Entire section is mostly plain and maximum ruling gradient is 1 in 100 compensated. This project site lies in the state of Karnataka
- c) The section falls in the basic wind speed of 33 and 39 m/s classification given in IS 875-1987. Accordingly, the basic wind pressure of 73 and 105 kgf/m<sup>2</sup> respectively is to be

adopted. Increased wind pressure is also to be adopted on embankments more than 100 meters i.e., 150 kgf/m<sup>2</sup>. This conforms to the wind pressure adopted by State Electricity Boards for the design of their EHT transmission lines.

- d) Electric Locomotives with chimney height not exceeding 4.232m (WAP with their pantographs in the locked down position) and diesel Locomotives with height of 4.42 (14 ft. 6 inch) would run on this section.
- e) Details of Power Supply arrangements:

Locations of Sectioning and Sub- Sectioning stations are as under:

SSP :

- i. BYPL SSP.

SP :

- i. Nil

TSS: Hosur TSS

#### **Approaches to the project site:**

The land acquired for the project caters for construction and operation of the proposed line. The contractor shall plan for approach roads to various sites of work conducting detailed survey and should include the cost of inputs for any such approach roads in his bid for the work.

Bidders should find out the capacity of the quarries and accordingly plan procurement of coarse/fine aggregates either from the existing quarries or establish their own quarries and crushing arrangements.

It is the responsibility of the contractor to thoroughly examine the site of work and all constraints before submitting the bid(s).

- i. **DELETED**
- ii. Any services affected by the works must be temporarily supported by the contractor. The work of temporarily supporting and protecting the public utility, services during execution of the works shall be deemed to be part of the contract
- iii. The contractor shall take all precautions for safeguarding the environment during the course of the construction of the works. He shall abide by all laws, rules and regulations in force governing pollution and environmental protection that are applicable in the area where the works are situated. The contractor must take all necessary steps to fix specially dust nuisance during the construction of the works.

- iv. The levels, measurements and other information concerning the existing site as shown on the drawings such as Engineer scale plan ESP/L Section are believed to be correct and indicative, but the contractor should verify them for himself and also examine the nature of the ground as no claim or allowance whatsoever will be entertained on account of any error or omission in the levels or strata turning out different during execution from what is shown on the drawings-..
- v. **DELETED**
- vi. The preliminary works such as site clearance, barricading, trail trenching etc., wherever required, shall be taken up simultaneously along with mobilization activities.
- vii. **DELETED**
- viii. The contractor shall at all-time carryout the work on either side of existing IR tracks in a manner creating least interference to the flow of traffic. The contractor shall take prior approval of the Engineer and Indian Railways before commencing any work.
- ix. **DELETED**
- x. **DELETED**
- xi. **DELETED**
- xii. **DELETED**
- xiii. **DELETED**
- xiv. Tree cutting/Trimming shall be done by the contractor. No extra payment shall be made for this purpose. Permission for cutting/trimming will be arranged by Contractor at her/his own cost. **Contractor has to make sure that any branch of tree should be minimum 4 meters away from OHE.**
- xv. **DELETED**
- xvi. All disposable excavated material shall be collected and transported for disposal at contractors dumping yard which has to be approved by relevant authorities. Dumping yard area cannot be provided by the employer.
- xvii. **DELETED**
- xviii. The CONSTRUCTION PROGRAMME AND PROJECT MONITORING is to be given as mentioned in General Conditions of Contract. The detailed programme has to be in the form of a quantified bar chart or MSP / Primavera activities from start to completion of the work.
- xix. **DELETED**
- xx. Maintaining and keeping the Existing Railway banks, structures and adjacent roads clean in the area of work and where construction machineries ply.

- xxi. Measures to minimize water, air and noise pollution;
- xxii. All aspects of quality assurance, including testing of materials and other components of the work, as specified and as directed;
- xxiii. DELETED**
- xxiv. Maintenance of the completed Work during the maintenance period as directed;
- xxv. Submission of completion (i.e., 'As-Erected') drawings and other related documents as specified; and
- xxvi. The contractor shall not display any name-board for the works without the written permission of the engineer.
- xxvii. DELETED**

#### **4. OBTAINING CLEARANCES/CERTIFICATES FROM AUTHORITIES**

The contractor shall arrange well in advance stage wise as may be required, submission of all the required documents and drawings for approval from other authorities and installation of the works and their inspection and obtain approval/completion certificates with respect to his work as required for use and connection of the utilities and occupation from the Statutory Authorities. The Contractor shall obtain and deliver to the Engineer, on completion of the works, the final Inspection Report and approval from the Authorities. The contractor shall prepare and submit Station working rule & diagram. Contractor shall do joint inspection of insulators, SED and Tower Car checking with Indian Railway. Contractor shall be responsible for preparing EIG and CRS documents/Certificates and attending remarks.

#### **5. INTER COMMUNICATION FACILITIES**

Telephone and fax services are available at Bengaluru.

The contractor shall provide effective network communication facilities for carrying out the work during the period of contract by way of Radio trunking service working on UHF/VHF. 4 Nos of such equipment in activated condition shall exclusively be given to Engineer-in-charge at site, from the date the physical work start till 100 % physical works are completed from. The contractor is expected to provide such communication facilities for the total contractual period.

#### **6. SITE INFORMATION**

To the extent which was practicable (taking account of cost and time), the Contractor shall be deemed to have obtained all necessary information as to risks, contingencies and other circumstances which may influence or affect the Bid or Works. To the same extent, the Contractor shall be deemed to have inspected and examined the Site, its surroundings, the above data and other available information,



and to have been satisfied before submitting the Bid as to all relevant matters, including (without limitation):

- (a) the form and nature of the Site, including sub-surface conditions,
- (b) the hydrological and climatic conditions,
- (c) Required modification in existing system
- (d) Line / Power block working
- (e) the extent and nature of the work and Goods necessary for the execution and completion of the Works and the remedying of any defects,
- (f) the Laws, procedures and labour practices of the Country, and
- (g) the Contractor's requirements for access, accommodation, facilities, personnel, power, transport, water and other services.
- (h) Data made available by the Employer in accordance with the preceding paragraph shall be deemed to include data listed elsewhere in the contract as open for inspection at the address stipulated in the Contract.

#### **RESTRICTIONS IN WORKING : DELETED**

#### **7. Power & Traffic Block**

It has to be noted by the Bidder that,

- (i) Track Block may be granted at any time during day or night to suit convenience of traffic operations and will ordinarily be granted over a distance covered by one or two consecutive block sections. Contractor will normally be allowed to take advantage of block shadows. Normally the total durations of block on any section will be maximum of 1.5 to 2.5 hours in a day for all the tracks in the section taken together, the total of blocks on any track being limited to 1 or 2 hours in a day. Block provided may be utilized for one or more work utilizing track lorries or ladder trolleys or tower car to suit convenience of work.

Blocks will not ordinarily be given for laying the feeders except where crossing of track is involved, which will have to be laid manually in general.

- (ii) Any Traffic/ power blocks, temporary speed restrictions and caution orders required in connection with execution of works by the contractor, shall be got sanctioned from the Railway authorities well in advance, through the Engineer. The Railways may sanction the same for specific sites within the overall recovery time available in the Railways time table. The contractor shall have to schedule his programme according to the convenience of the Railways. No claim from the contractor for any delay/inconvenience/loss on this account shall be entertained by the Employer/Engineer.
- (iii) The contractor shall undertake the work involving Railway Track, Railway Electrification installations in co-ordination with the Engineer/ Employer and Railways in accordance with the programme of work. Where traffic/power blocks are involved, the contractor shall ensure that interruption to Railway operations, if any, is kept to the bare minimum level.

- (iv) The contractor may use light ladder trolleys/ Rail cum Road vehicle on tracks for carrying out installation of dropper and adjustment of traction overhead equipment. On the existing track rail cum road vehicle will not be permitted. 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 drawing of these should be submitted within three months from the date of issue of letter of intent/acceptance of tender to enable the purchaser to obtain approval from the competent authorities for the use of such trolleys on track, if required.
- (v) In order to minimize blocking the track for work, the contractor shall consider the working conditions on the sections and assess use of all alternative methods of construction on a part or whole of the work. He should submit clear proposal along with financial implication, if any to the purchaser for such special method of saving of blocks that could be obtained along with reduction/redundancy of the facilities being provided by the Railway /KRIDE.
- (vi) The protection required for block working i.e. flagmen, flags etc shall be provided by the contractor, Competency for the above shall, however, be given by the Railway authority. Protection of track by banner flags etc shall be done in accordance with General Rules of Indian Railway and Subsidiary Rules of the concerned Zonal Railway where work is being carried out. Contractor shall provide Safety helmet, Safety belt, retro reflective jackets and Safety shoes to their staff while working at site.
- (vii) In case of theft/breakdown, the contractor shall restore the traffic in minimum possible time. Failure to do so shall attract suitable penalty.
- (viii) The construction of activity will have to be planned in such a manner that they do not obstruct or interfere with the railways tracks and other utilities. Since the entire Alignment is coming in parallel to the existing IR track, the movement of trains is expected, wherever the stations / approaches to the stations may have to be planned in such a way that the erection shall be done from one end. Unless the competent authorities permit to execute such works using cranes and restricting the movement of the trains, the same may be planned to carry out during night. Also, while working in the night hours' noise pollution should be kept to an acceptable level. The bidder should take all these facts into account while quoting rates and devise his methodology of working accordingly.
- (ix) Where work is required to be carried out at locations adjacent to such Existing IR tracks, structures, monuments, religious structures, etc., suitable safety and protection arrangements will have to be ensured. Nothing extra will be payable on these accounts. It should also be ensured that no damage is caused to any such element and Engineer/ Employer shall be indemnified against such damage at no extra cost.

## 8. GENERAL CLIMATIC CONDITIONS

Bengaluru is located in meridians of 12° N latitude and 77°3' E Longitude, spread over an area of 531 sqm km. located at an altitude of 900m, Bengaluru boasts of delightful weather around the year registering maximum temperature of 34° centigrade in summer and minimum temperature of 14° centigrade in winter. Bengaluru receives both the Southwest and Northeast Monsoons, getting an annual average rainfall of 760 mm, generally during the months of May to September/October. Bengaluru falls in Seismic Zone II

## 9. WORK CONTENT

- I. The bidder shall be required to prepare the drawings such as Layout plans, Cross section drawings of foundations, structure erected drawings etc. as per extant instructions and get them approved from the Engineer/Employer. Contractor shall get soil testing done to verify soil bearing at a stretch of not more than 5 km of OHE foundations and at the location of new TSS/SWS and where ever soil strata changes. However, contractor shall verify the Soil bearing capacity as per guidelines.
- II. The successful bidder shall obtain/possess a valid electrical license to handle power system installation electrical equipment, issued by any license issuing authority, in accordance with the relevant provision of Indian Electricity Rule and Amendments thereafter.
- III. Supply of all materials, apparatus, plant, equipment, tools, fuel, water, strutting, timbering, transport, offices, stores, workshop, staff, labor and the provision of proper and sufficient protective works, diversion, temporary fencing, lighting and watching required for the safety of the public and protection of works on adjoining land; first-aid equipment, accommodation and sanitation for the staff and workmen, effecting and maintenance of all insurances, the payment of all wages, salaries, provident fund, fees, royalties, duties or the other charges arising out of the erection of works and the regular clearance of rubbish, clearing up, leaving the site perfect and tidy on completion.
- IV. The work content in this contract consists of, but not limited to, furnishing all labors, materials, equipment's, tools, plants and necessary machinery as required to completely execute all the works relating to Electrification of said section if and to the extent required etc. including viaduct for track supporting structures within the stations.
- V. The work to be constructed and maintained as per Price Schedule, Technical Specification, relevant Codes, and specifications of RDSO, CORE drawings, best engineering practices and/or as directed by the Engineer.

### 9.1 **The Scope of Railway Electrification Works**

The scope of works shall, inter-alia, include the following but not be limited to:

- a) Design, supply, system quality management, installation, testing including integrated testing and commissioning of the 25 KV AC and all associated works including preparation of all drawings.
- b) Modifications to the existing OHE System in the open routes and yards based on the approved plans this includes shifting of existing PTFE, IOL, UIOL, Auxiliary transformer, CLS Panels, Gantry mast, Feeder wire mast, Anti creep wire if any etc.
- c) Slewing and erection of OHE for RUB/ROB/FOB Works.
- d) Presentations, PERT charts, reviews and audit support as specified in this Specification;

- e) Ground Investigation including, survey, design, identification of locations, soil bearing pressure and soil bearing resistivity reports and installation for foundations for trackside equipment.
- f) Decommissioning, removal and/or responsible for disposal of Temporary Works;
- g) Defects liability of Traction distribution 25 kV AC OHE work after commissioning as stipulated in the General Conditions (GC),
- h) Assist in obtaining statutory clearances and submittal of information asked for by statutory bodies (e.g., Government of India, Ministry of Railways, Commissioner of Railway Safety, Electrical Inspector to Govt. of India (EIG) etc. as directed; by Engineer) authorities to ensure energization of newly erected OHE, removal of existing overhead Line / conductors wherever required, Liaison with Karnataka state electricity supply
- i) Provision of integration test plans for commissioning of the electrification works.
- j) Water proofing of the Platform shelter where the mast has been provided under the cover over platform.

#### **Document Submitted during Construction Stage by Contractor**

1. Construction and Installation activity Plan;
2. RITES/ Factory acceptance test certificates for equipment;
3. Operation and maintenance manuals covering, installation, operation and maintenance instruction of all equipment;
4. Records and drawings of equipment to be installed;
5. Inter connection drawings;
6. Site test report of equipment;
7. Earthing and bonding plans;
8. Joint Inspection test report with the Indian Railways
9. Testing and commissioning documents, as required by the Engineer.
10. Drawings for Layout Plan (LOP), Cross Sectional Drawing (CSD), Structure Erection drawing (SED), sectioning diagram, General Power supply drawings, Station working rules and station working diagrams.
11. Contractor shall maintain site register, hindrance register, inspection register and to get certified from the engineer-in-charge.
12. Insurance certificate that stores has been insured
13. Labour insurance certificate.

The drawings and documents to be submitted for each stage of construction shall be proposed to the Engineer for his approval and subsequently used for construction. The above is not an exhaustive list covering all the works to be done under this Tender. Major works only have been listed for guidance.

## 9.2 Some Special stipulations/features:

- 9.2.1 For supporting the OHE on the major bridges, the contractor shall provide special fabricated galvanized steel mast of suitable length to be erected on the bridge piers to maintain the required height the OHE. The drawing of OHE masts to be provided on bridges piers shall be got approved form the engineer/employer
- 9.2.2 In case the length of the bridge is more than 1 KM and anti-creep needs to be provided in the tension length of OHE, no anchoring arrangement may be possible in case the bridge is designed with concrete slabs, in such cases load calculations for OHE tensions anticipated on the masts of anti-creep terminations on the bridge piers shall be done by the contractor and submitted for approval of the Engineer prior to erection of masts and OHE.

## 9.3 Design & Drawings:

- i. The contractor shall execute the work according to Standard Specifications of RDSO/CORE, ACTM & Traction Design Manual
- ii. The design of OHE span shall be for basic wind speed of 33 and 39 m/sec and accordingly designed wind pressure 73 and 105 kg/m<sup>2</sup> respectively is to be adopted.
- iii. The contractor shall furnish the details of soil test report for designs.
- iv. Auto tensioning devices at Cross-overs, Turnouts, overlap type neutral sections and all other such locations having short tension lengths shall be provided with hexagonal tie-rods as per latest RDSO instructions
- v. Porcelain and composite insulators shall be tested as per latest RDSO instructions.
- vi. Normally use of Porcelain insulators only permitted. As per RDSO circular No.TI/OHE/INS/GEN/13 dated 19.06.2013 composite insulators of 1050 mm CD shall be used in stone pelting areas only with the approval of competent authority of K-Ride. The latest RDSO/ Railway Board guidelines issued up till 28 days prior to tender submission deadline shall be applicable.
- vii. Any calculations, designs, drawings, 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. The contractor will not be required to furnish drawings, designs and calculations etc for basic designs and employment schedule in case no modification/deviation is proposed by the contractor for particular basic design/employment schedule. In case of new developments in designs, comments on Research Designs and Standards Organization (here-in after called RDSO) basic drawings/designs/employment schedules, will be submitted by the contractor to the Engineer. If the RDSOs / drawings/ designs/equipments are not revised, contractor need not submit drawings /designs/employment schedules to the Engineer. In the event of the contractor suggesting any alternation/deviation in standard drawing, he shall submit the retracted drawings with full clarifications and justifications of the change to the Engineer. The Engineer, if convinced of the need of the alteration, shall approach RDSO for necessary approval.

- viii. The contractor shall be solely responsible for the correctness of the positions, 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.
- ix. If any dimension figured upon a drawing differs from that obtained by scaling the drawings the figured dimension should be normally taken as correct unless it is prima facie a mistake. But all such cases shall be brought to the notice of the Engineer and the discrepancy set right before execution.
- x. 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 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 or unless the Engineer insists on adoption of his own designs in spite of the contractor not being agreeable to it.
- xi. The contractor shall be responsible for and shall bear, and pay the costs for any alteration or works arising from any discrepancy, errors or omissions in the designs and drawings supplied by him, whether such designs and drawings have been approved by the Engineer or not.
- xii. The contractor is forbidden to use any patents or registered drawings, process or patterns in fulfilling his contract without the previous consent in writing of the owner of such patent, drawing, pattern or trade mark, except where these are specified by the Engineer himself. Royalty, where payable, for the use of the 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 process, drawings or patterns, which he may use of his own accord.
- xiii. In the case of patents taken by the contractor of the drawings or patterns registered by him or of those patents, drawings, or patterns for which he holds a license, the signing of the contract automatically gives the Engineer the right to repair by himself the purchased articles covered by the patent or by any person or body chosen by him and to obtain from any sources he desires the component parts required by him in carrying out the repair work. In the event of infringement of any patent rights due to above action of the 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.
- xiv. Minimum 120 m distance shall be available between stop signals and center line of insulated overlaps.
- xv. Separate DJ close boards shall be provided for MEMU/EMU
- xvi. Modified protective screen shall be provided at all FOBs/ROBs (ETI/C/0068(07/09) Rev. H) or latest.
- xvii. Catenary wire shall be used in place of GI wire for anti-creep locations.
- xviii. Catenary wire shall be used in Bridle wire for tramway OHE.
- xix. Double eye distance rod shall be used as per RDSO drg. TI/MI/0008 Rev 0 or latest.

- xx. Forged OHE fittings shall be used for Register arm book, Drop Bracket, Steady arm hook, Stay Sleeve, Register Arm Eye, Steady Arm Clamp, Mast fittings for hook insulators, 9 T Turn Buckle, 9 T Clevis, 18 mm Single Clevis & Clevis and Eye.

#### **9.4 Provisional Acceptance**

- i) Immediately after completion of works/such part of works, the Contractor shall certify and advise the Engineer in writing that the works 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.
- ii) The test or tests as stipulated in approved Technical Specifications shall be carried out jointly by the Railway / Engineer and the contractor within a month after the receipt of the Contractor's notification as stated in sub-Para above.
- iii) The provisions contained in the relevant GCC clause shall be followed for taking over of the installations.

#### **9.5 Use of Rejected/Sub Standard Items/ Equipment**

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/substandard equipment/item for a time reasonably sufficient to enable him to obtain other replacement. During such period, if the rejected/substandard equipment/item is used commercially the Contractor shall not be entitled to the payment on energization until such rejected equipment is rectified and/or replaced, but the Engineer shall not be entitled to claim any damages arising out of rejected/ substandard equipment/item in respect of such period.

#### **9.6 Guarantee**

- (i) The Contractor shall guarantee satisfactory working of the installations erected by him, for a period of 12 (Twelve) months from the date of commercial operation or from the date of Provisional Acceptance by the Engineer whichever is earlier. The guarantee for spares (if any) should be coincident with the guarantee for erected equipment.  
The provisions contained in the relevant GCC clause shall be followed for rectification of defects
- (ii) During the defect liability period 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. The Contractor shall bear the cost of all 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/Employer.
- (iii) During the defect liability period 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 about the works proposed to be carried out by the Engineer/Employer.

- (iv) If it becomes necessary for the Contractor to replace or renew any defective portion of the equipment under the Para aforesaid then the provision 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 whichever is later. Such extension shall not apply in case of defects of a minor nature, the decision of the Engineer or his 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.
- (v) The repaired or renewed parts shall be delivered and erected on site free of charge to the satisfaction of Engineer/Employer.

#### **9.6.1 Accountably and disposal of released materials**

- (i) The Contractor shall liaison with the Engineer to finalize the procedure for taking over of the whole or part of the section and for disposal of the released materials.
- (ii) All released materials shall be handed over to the authorized Railway Representative through the Engineer at the nearest OHE/PSI depot or places nominated by Railway/K-RIDE.
- (iii) The material released on account of modifications/alterations shall be accounted by the contractor in the presence of the Engineer and the Railway Representative, except for the material permitted to be re-used by the Engineer. For this material, only erection cost shall be paid, under the appropriate item of the Schedule.
- (iv) If any shortfall of released material is noticed at the time of completion of the work, the contractor shall be liable to pay for the shortfall as per the prevailing rates or the same shall be recovered from the final bill of the contractor as per the extant policy of K-RIDE.

#### **9.7 Codes and specifications**

The works shall be carried out as per Standard Specifications of Indian Railways/South Western Railway/ RDSO/CORE/ K-RIDE (as detailed by K-RIDE), which can be obtained on payment. Wherever reference is made in the Contract to specific standards and codes to be met by the goods and materials to be furnished and work performed or tested the provisions of the latest current edition or revision of the relevant standards and codes in effect shall apply, unless otherwise expressly stated in the Contract. Where such standards and codes are national or relate to a particular country or region, other authoritative standards which ensure an equal or higher quality than the standards and codes specified will be accepted subject to the Engineer's prior review and written approval. Differences between the standards specified and the proposed alternative standards must be fully described in writing by the Contractor and submitted to the Engineer at



least 28 days prior to the date when the Contractor desires the Engineer's approval. In the event the Engineer determines that such proposed deviations do not ensure equal or higher quality, the Contractor shall comply with the standards specified in the documents.

All goods and materials to be incorporated in the goods be new, unused, and of the most recent or current models, and that they incorporate all recent improvements in design and materials unless provided for otherwise in the contract.

- (a) The Standard Specifications of Indian Railways/South Western Railway/K-RIDE and the list of codes and manuals given in the annexure thereof shall be prime governing.
- (b) Where there is conflict between provisions in IRS & IS specifications, provisions in IRS specifications shall prevail.
- (c) 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.
- (d) For items not covered in IRS/IS/IRC specifications, BS-5400 Part 1 to 10 may also be considered.
- (e) The decision of Engineer 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.

## 9.8 Survey and fixing working bench marks and alignment markers

- 9.8.1 The work of conducting survey and fixing bench marks and alignment markers before the start of any work on this tender is included in the works covered by the present Tender.

## 9.9 Bench marks

**DELETED**

## 9.10 Alignment

**DELETED**

## 9.11 Responsibility for establishing and maintaining working bench marks and alignment markers

- 9.11.1 The Engineer, when necessary, will provide the contractor with the data necessary for setting out of the centerline. All dimensions and levels shown on the drawing or mentioned in the documents forming part of or issued under the contract shall be verified by the contractor on the site; he shall immediately inform the Engineer of any apparent errors or discrepancies noticed in such dimensions or levels. In consultation with the Engineer, the noticed mistakes should be corrected. These corrections should have the approval of the Engineer.
- 9.11.2 The contractor will be entirely responsible for accurate setting out of the works and safeguarding all survey monuments, bench marks, alignment references etc. The work of setting out shall be deemed

to be a part of the general works preparatory to the execution of work and no separate payment shall be made for the same.

**9.11.3** The above-mentioned points have been repeated in the respective sections dealing with specifications for different works for laying emphasis on these items.

**9.11.4** The contractor will be entirely responsible for accurate setting out of the works and safeguarding all survey monuments, bench marks, alignment references etc. The work of setting out shall be deemed to be a part of the general works preparatory to the execution of work and no separate payment shall be made for the same.

## **9.12 Issue of materials by Employer**

9.12.1 The issue of materials by the Employer to contractor shall be governed by the following change.

**9.12.1** The materials to be issued by the Employer to Contractor will be handed over at any convenient locations within Railway Land in the contract section. The contractor should collect the same from these locations and transport them to the work site as found necessary. He shall use only mechanical means for handling in all stages of work to avoid any damages.

## **9.13 Interfacing and Integrations of Works**

**9.13.1** The contractor shall take full responsibility in terms of organizing, managing, coordinating and administrating the interfacing of all components of works including all issues related to and arising out of such tasks and responsibility. The contractor shall interface with all concerned authorities and other contractors as required to complete the work satisfactorily within the stipulated period.

**9.13.2** Under consideration and application of the above clause, the contractor shall and has also the obligation to liaise with the other contractors and Authorities to obtain all necessary technical information, all necessary information concerning organization of works, coordinating the works etc. which are necessary to assess, mitigate, take care of contractual obligations, risks, liabilities and whatsoever arising out of interfacing, engineering issues, organization of the works etc. The employer/engineer shall not be held liable in any way, throughout the preparation of the offer and/or execution of the works and/or maintenance period and/or defects liability period for any omissions, misunderstanding, negligence etc. arising out of interfacing, coordinating, organizing etc. of the works. The employer will not entertain any claim arising out of misunderstanding, miscommunication, omission, withholding of necessary/required information or whatsoever between the concerned contractors/Authorities concerning interfacing, organizing etc. of works. In case of any claim arising from any of the contractors, as aforesaid, referring to interfacing and/or interfacing related issues; the Employer will hold the concerned contractors liable for not taking care of their contractual obligation concerning interfacing, organizing, co-ordination etc. of the related works.

**9.13.3** Needless to say, that commissioning of this double line project requires close coordination among various agencies executing the works in this section, Engineer, Employer and the Railway authorities. The contractor shall therefore plan all his works requiring interfacing, like works in mid-section, station yards, with other agencies, meticulously, in consultation and coordination with all concerned parties, in advance, for expeditious execution, without causing any delay either to his works or those of others.

- 9.13.4** If, in the opinion of Engineer, any delay in execution of any part of the Project requiring interfacing is attributable to the failures of the contractor to take adequate steps for smooth execution of such works, then the Engineer shall have the right to take necessary steps to organize and streamline such works, including excluding the requisite portion of work from the scope of the Contractor and getting the same executed by other agencies, at the risk and cost of the contractor.

## **10. DAMAGE TO PROPERTY**

The contractor shall organize all his activities so as not to cause any damage to the property of Railway or that of other agencies or any third party. In spite of taking all precautions, in the unfortunate event of any damage to the property, then the contractor shall not only indemnify the Employer of the claims made by the affected parties but also settle the matters with the affected parties as per law. If the nature of damage is one of that affecting the train movements or causing a safety hazard to the public, then the situation will be treated as an emergency and the Engineer reserves the right to take all necessary steps as deemed necessary to restore train operations or to remove the hazardous situation or to mitigate the damage, at the risk and cost of the contractor.

### **10.1 Survey Equipment**

The contractor should provide the survey equipment and other accessories as per the instructions of Engineer as and when required. He should also provide all necessary help as required by the Engineer for checking the works, whenever required.

- 10.2** All power requirements for execution of works shall be arranged by the Contractor from his own resources. Subject to availability of power, the Employer/Engineer will recommend to the Railway Authorities for providing power connection. The Contractor shall bear the cost of installation and payment of necessary charges for providing such power connections as per the Terms and Conditions of the Railway.

### **10.3 Structural elements, shape and form: DELETED**

### **10.4 Stability of the elements: DELETED**

### **10.5 Stability of the Structure: DELETED**

### **10.6 Temporary Works**

Traffic barricade with reflective tapes and other necessary traffic signages should be provided wherever required so that safety is ensured during day and night continuously. The actual scope of temporary works shall be as specified in the concerned document and/or as specified or directed by the Engineer.

### **10.7 Design for Temporary Works**

- a) The Design should cover all the items pertaining to all temporary works, traffic diversion scheme, form work, casting and Sand core Grouting, launching scheme for Masts / Portal Structure / beams and/or transportation scheme for various structural elements and materials to be transported to and from site during construction period.

- b) The Contractor shall himself formulate a practical and viable scheme for design/ fabrication of shuttering, casting, curing, testing and launching/erection of Masts / Portal Structure / beams/ and all other structures. The bidder should, along with the bid, specify the scheme that he proposes to adopt for carrying out all the works including fabrication, transportation, stacking and erection of steel structure and casting, curing, stressing, testing and launching/erection of Masts / Portal Structure / beams.
- c) The contractor shall formulate the erection scheme, design the staging, including all necessary temporary structure, prepare fabrication drawings in accordance with relevant provision of applicable IRC standards and submit the same to the Engineer for approval with third party certificates. These works will be executed only after the approval has been obtained from Engineer.

**11. SITE FACILITIES FOR THE EMPLOYER AND THE ENGINEER**

**A. SITE OFFICES: DELETED**

**B. FURNITURE AND OTHER OFFICE EQUIPMENT: DELETED**

**C. TRANSPORT:**

**PROVISION OF MULTI UTILITY ROAD VEHICLES:**

**The contractor at his own cost shall provide one Multi Utility Road Vehicles similar to Bolero in good condition with Driver, fuel etc., for the use of K-RIDE officials during the currency of the work including extended completion period.**

**D. OFFICE MAINTENANCE: DELETED**

**E. EQUIPMENT FOR USE OF THE ENGINEER:**

The Contractor shall provide new equipment and software as listed below and maintain them for the exclusive use of the Employer and the Engineer.

The Contractor shall provide and maintain the following equipment for the use of the Engineer and the Employer within one month from the date of commencement of the works until the work is completed. On completion of work, the equipment shall be property of the Contractor.

(a)	Desktop Computer <b>One Nos.</b>	With minimum specification of Intel Core i7, 3.4 GHz, 3 MB Cache, 8 GB DDR3 RAM, 500 GB Hard Disk Drive, DVD Writer, 18.5" colour TFT monitor, 10/100 LAN Card, Modem Card,  Operating System - Windows 10 Professional or higher preloaded with media and documentation and certificate of authenticity and Microsoft Security Essentials preloaded antivirus software.
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(b)	Laptop rugged – <b>One Nos.</b>	With minimum specification of Intel Core i5, 8 GB RAM, 500 GB Hard Disk Drive, 15" color display, 2xUSB-2.0, standard keyboard  Weight - not more than 2.5 kg,  Battery backup - minimum 4 hrs  Operating System - Windows 10 or higher preloaded with media and documentation and certificate of authenticity and Microsoft Security Essentials preloaded antivirus software.  A laptop bag and Adapter/Battery charger shall also be provided with the laptop.
(c)	Printers – 2 nos. (A4 size – 1 No. and A3 size – 1 No.)	The A4 size colour printer cum scanner cum copier shall be all in one officejet having features of Fax, Scanner and Printer, A3 size printer cum scanner cum copier shall be Colour Officejet with a print speed of up to 8 pages at 800 dpi or More The A4 size printer shall be all in one office jet having features of Fax, Scanner and Printer, A3 size printer shall be Colour Office jet with a print speed of up to 8 pages at 800 dpi or More..
(d)	Application Software	(i) Microsoft Office Latest release (ii) AUTOCAD 3D 2015 (iii) M.S. PROJECT /Sure Track (iv) PDF Converter/Professional
(e)	UPS system with sufficient power backup (with minimum backup time of 30 minute) to meet the sufficient power load in case of power disruption.	
(f)	Surge Protection Devices (one for each computer and printer as given above)	
(g)	Power supply for the systems is to be AC 240 volts, 50 Hz from normal building wiring circuit mains, power regulator, stabilizer or transformer should be supplied by the Contractor for the computer systems such that the systems can function efficiently.	
(h)	At least 20 MBPS internet connection with wifi facility so that multiple devices can be connected.	

**Note: In case of failure to provide the equipment including original software & internet connectivity within one month, penalty @ Rs 25000/- Per week or part thereof will be imposed**

## 12. Drawings:

### 12.1 Requirement.

The LOP/SED/CSD requirement shall be submitted to engineer in Advance by the contractor based on his Three-month Casting Programme. The work shall start after the approval of drawings by engineer in charge.

#### 12.2 Errors, Omissions and Discrepancies in Specifications and Drawings:

- a. It shall be the responsibility of the Contractor to promptly bring to the notice of Engineer any error, omission fault, defects or discrepancy in the contract documents, specifications and drawings for the work which are discovered while reviewing the contract documents or in the process of execution of the works and obtain his orders thereon. In case any feature of the work is not fully described and set forth in the drawings and specifications, the Contractor shall forthwith apply to the Engineer for further instructions, drawings or specifications.
- b. Only stated dimensions are to be taken and not those obtained from scaling drawings.
- c. In case of errors, omissions, faults, defects and/or disagreement on the drawings or between the drawings and specifications the following principles shall be followed
  - i. As between the written description or written dimensions on the drawing and the corresponding one in the specifications, the former shall apply.
  - ii. The drawings on a large scale shall take precedence over those on a smaller scale; and
  - iii. Drawings approved from time to time shall supersede corresponding drawings previously approved.

Decision by K-RIDE shall be final on this matter.

#### 12.2 Meaning and intent of specifications and Drawings:

If any ambiguity arises as to the meaning and intent of any portion of the specifications and drawing or as to execution or quality of any work or material, or as to the measurement of the works, the decision of the Engineer thereon shall be final subject to the appeal (within 7 days of such decision being intimated to the Contractor) to Engineer/Employer who shall have the power to correct any errors, omissions, or discrepancies in the specifications, drawings, classifications of works or materials and whose decision in the matter in dispute or doubt shall be final and conclusive.

#### 12.3 Responsibility for Specifications, Design and Drawings

##### a) Specifications

RDSO/ CORE specification / other Specifications / Codes viz. IS, IRS, IRC, DSR etc. shall be procured by the Contractor from the market. One set of these specifications shall always be kept at contractor's site office for reference.

Standards guaranteeing a level of quality or performance equivalent or superior to those indicated will also be accepted. Reference to trademarks or other specific designations that is necessary to explain the nature of the products required means that any other product of equal or superior quality or performance is also acceptable, subject to prior approval of the ENGINEER to be obtained in writing for adopting the new standards which are not provided in the contract.

**b) Drawings for Electrification Works:**

- (a) Based on ESP/L-Section drawings issued by the Contractor, the Contractor shall prepare Lay out plan, Cross Section Drawing, structure erected drawings to scale as specified, indicating the required details. The Cross Section drawings shall be prepared before execution of work, after taking actual site dimensions and all existing and proposed services/structures etc.
- (b) LOP/SED/CSD drawings submitted by the Contractor shall be in sufficient detail to indicate the type of Foundation, Mast, Chainage, Span, Mast Length required, the dimensions required for installation and interconnections with other equipment and materials, clearances and spaces required between various portions and any other information specifically called for.
  - a) All drawings shall show the following particulars in the lower right-hand corner in addition to the Contractor's name.
    - i. Project Title
    - ii. Name of the Employer
    - iii. Name of Consultant
    - iv. Contract No.
    - v. Title of Drawing.
    - vi. Scale
    - vii. Date of Drawing.
    - viii. Contractor's Drawing Number.
    - ix. Space for the Engineer's drawing number.
    - x. Name of the Engineer.
    - xi. Name of Review Consultant.
    - xii. This drawing is based on Drawing No. (s).
    - xiii. Further detail is given on Drawing No. (s).
  - b) Each drawing shall carry a revision number, date of revision and brief details of revisions carried out. Whenever any revision is carried out, the revision number must be updated. The revisions carried out on the drawing shall be clearly marked by clouding and each cloud revision numbered by marking the revision number in triangle.
  - c) All dimensions on drawings shall be meters, unless otherwise specified.
  - d) A template with the above information shall be got approved from K-RIDE before start of the work.

- e) All LOP/SED/CSD drawings shall be prepared on CAD using AUTO-CAD Version 2010 or higher.

Cross Section drawings & SED shall be prepared for the followings:

- i. Location Number
- ii. Type of Mast
- iii. Mast Length
- iv. Soil Pressure
- v. Type of Foundation
- vi. Wind Pressure
- vii. Span
- viii. Track Centre
- ix. Nature of Soil.

- f) Drawing Management at Site

- i. The Contractor shall ensure that all drawings (to be laminated at contractors' cost) meant for further engineering, fabrication, erection and field work are issued to his personnel in a controlled manner - a proper record shall be maintained to show to whom the drawing is issued and to ensure that the latest revisions of the drawing is being followed for further work. All superseded drawings shall be promptly withdrawn from the personnel to whom they are issued and stamped "SUPERSEDED" in RED. The Contractor shall maintain a register of drawings, with their revision/issue number, as received from the Engineer and a record of their distribution to the designated personnel within their organization. A certificate to that effect along with list of drawings withdrawn during the month will be incorporated in the monthly progress report.
- ii. The Contractor shall maintain at Site a set of the drawings issued by the Engineer on which changes shall be progressively marked and initialed by the Engineer so that "As-Erected" drawings can be made correctly and expeditiously at the end of their Work at Site.
- iii. Revision of Approved Drawings if, at any time before the completion of the Work, changes are made necessitating revision of approved drawings. The Contractor shall make such revisions and proceed in the same manner and observe procedure for obtaining approval of the Engineer as for the approval of the original drawings.
- iv. Documents by Contractor  

The contractor shall submit to the Engineer, for approval, Quality Assurance plans, design calculations, material specifications for each item and system, samples, as may be called for in the Specifications or as the Engineer may reasonably require. Wherever necessary the Contractor shall provide as built dimensions to facilitate proper Layout Plan drawings being prepared for various construction detailing.
- v. Number of Copies of Drawings



All drawings / Documents, Schedules etc. shall be submitted by the Contractor to the Engineer in 6 copies. Copies required in excess of these shall also be borne by the Contractor at his own cost.

**c) Design, Drawings and Specifications for Temporary/ Ancillary works.**

The contractor would design all the Ancillary and Temporary works Like Temporary mast supporting, temporary OHE supports, false work, etc. and will submit the same and related working drawings to the Engineer for approval, designer.

**d) Completion Drawings**

—On completion of the work in all respects the contractor shall submit the following

- i. Six sets of "As Erected Drawings" in the standard sizes of Plotter paper-A4 Roll each containing complete set of drawings for every component of work on approved scale indicating the work "As Erected ". Each set shall also contain technical literature.
- ii. These drawings shall be prepared on CAD using Auto-Cad version (latest/as directed by Engineer) and shall be recorded on writable CDs and one set of these CDs shall also be submitted.
- iii. **DELETED**
- iv. The Contractor shall also submit one set of original "As Erected" drawings on polyester film or as directed by Engineer of quality as approved by Engineer/ Engineer's Representative.

The Certificate of Completion of Works as per the provisions in the General Conditions of Contract shall not be issued by the Engineer in the event of Contractor's failure to furnish aforesaid "As Erected " drawings for the entire works.

**e) Plans and Drawings for Layout of OHE Store Office and Equipment**

The Contractor shall submit the following information, in triplicate, to the Engineer, for approval, within the time stipulated against each item given below:

- i. A general layout plan for construction OHE Store office and equipment required for execution of work, within thirty days from the date of issue of "Letter of Acceptance".
- ii. Drawings or prints showing the locations of major facilities which he proposes to put up at site, at least fourteen days prior to the commencement of the respective work; and
- iii. Any other details and drawings as required under the contract, within the time as specified in the contract.

Cost of all the above activities shall be deemed to be included in the quoted rates of various items of the Price schedule and nothing extra shall be paid for on this account.

**13. TRAFFIC MANAGEMENT : DELETED**

**14. LIGHTING AND FIRE PREVENTION**

- a) Wherever night working is carried out by Contractor, temporary lighting arrangements as per approved layout shall be provided, installed, maintained for the duration of the contract and removed after completion of work by and at the expense of the Contractor.
- b) **DELETED**
- c) Contractor shall provide and maintain adequate firefighting equipment and take adequate fire precautions for the safety of all personnel, plant, and material including temporary and permanent works and shall take action to prevent damage to or destruction by fire of trees, shrubs and grasses.
- d) No extra payment will be made for the provision of temporary lighting, flashing lights and fire prevention measures and entire cost of all such work shall be deemed to have been included in the quoted rates.

**14 UTILITIES : DELETED**

**14.1 Damage to Utilities**

The contractor shall be responsible for any theft, damage and / or protection of all the existing utilities within the site of work during currency of the Contract. In case of any theft/ damage occurring to these utilities while working or otherwise, the contractor shall immediately inform the Engineer's representative as well the utility owning agency and restore the same immediately to the entire satisfaction of the utility owning agency. Any damage due to working / negligence / fault of the Contractor (decision of Engineer in this regard shall be final and binding), the same shall be repaired / made good by the Contractor at his own cost. Any damage/ compensation / penalty etc. if charged by the utility owning agency in this regard shall also be payable by the Contractor and no claim in this regard shall be entertained by the Employer. Contractor shall always keep indemnified the Engineer / Employer against this.

**15.BARRICADING OF SITE AND WORK AREAS**

The contractor shall provide temporary barricade during construction at site, work areas (i.e., Construction Depot, store, site office, casting yard etc.)

**16.INTERFACE WORKS : DELETED**

**17.RESPONSIBILITIES OF CONTRACTOR : DELETED**

## 18.ASSOCIATED WORKS DEEMED INCLUDED IN LUMP SUM COST OF OHE WORKS

### 18.1 Contractor's Organization and Plant & Equipment

#### Project Organization Plan

1. The Contractor's Personnel shall be deployed & maintained in consultation with Engineer and as per the requirements. The Contractor's Superintendence shall be also properly deployed and maintained to carry out the construction activities as described in the relevant General Conditions of Contract (GCC) clause.
2. The Contractor shall submit an updated Project Organization Plan which includes complete project organization chart during the Construction Phase adding functions and personnel necessary to perform the Works during the Construction Phase in accordance with the conditions of the Contract. This plan shall be updated and resubmitted whenever there are changes to the staff and / or the organizational structure. The plan shall show the management structure and state clearly the duties, responsibilities and authority of key staff member.
3. The contractor shall deploy the key personnel of requisite qualification and experiences. In case Engineer instructs (in writing) the Contractor to remove a person of his work force stating the reasons, the Contractor shall ensure that the person leaves the Work Area within seven days and shall have no further connection with the Works in the Contract. The Engineer shall also seek prior consent of the Employer in this regard.
4. During the Construction Phase, the Contractor shall maintain the Design Team in his organization independent of the Construction Team to deal with temporary works design and working drawings.
5. The minimum requirements for man-power are attached as **Appendix 4 [Organization charts and key positions]** to the Employer's Requirement.

#### Plant and Equipment

- a) The minimum Plant and equipment as shall be maintained in consultation with Engineer and as per the requirements.
- b) The minimum requirements for plant & equipment are attached as **Appendix 5 [Plant and Equipment]** to the Employer's Requirement.

## 19.PENALTY FOR NON-COMPLIANCE

Notwithstanding the provisions elsewhere in the bid documents, the Contractor shall be penalized as detailed below:

## a) Correction of Defects

If the Engineer determines that any item or part of it was constructed with bad workmanship and / or using ~~————~~ sub-standard construction materials,

SI. No.	Nature of Defects(Indicative only)	Penalty (Rs.)
1.	Not adhering safety guidelines as mentioned in the tender document	10,000/- each case
2.	Usage of unapproved / sub-standard materials/quality	25,000/- each case

The above said penalty is envisaged to act as deterrent against bad workmanship and usage of sub-standard construction materials by the Contractor and shall be imposed for every occurrence. These penalties are non-refundable.

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## Appendix 01

### 1. PROGRAMME REQUIREMENTS

The Contractor shall submit a detailed time programme to the Engineer within 28 days after receiving the notice [Commencement of Works]. The program shall include the physical and Financial Progress vis-à-vis program and forecast cash flow adopting Project Management Software Primavera/Sure Track/MS Project or as mutually agreed. The program must identify the milestones, interface requirements and program reporting elements. The Contractor shall supply, free of cost one set of authorized software to the Engineer and the soft copy of structured program for the project. This shall be updated every month. The Contractor shall also submit a revised programme whenever the previous programme is inconsistent with actual progress or with the Contractor's obligations. Each programme shall include

- a) the order in which the Contractor intends to carry out the Works, including the anticipated timing of each stage of design (if any), Contractor's Documents, procurement, manufacture of Plant, delivery to Site, construction, erection and testing,
- b) each of these stages for work by each nominated Subcontractor [Nominated Subcontractors]
- c) the sequence and timing of inspections and tests specified in the Contract, and
- d) a supporting report which includes:
  - i. a general description of the methods which the Contractor intends to adopt, and of the major stages, in the execution of the Works, and
  - ii. details showing the Contractor's reasonable estimate of the number of each class of Contractor's Personnel and of each type of Contractor's Equipment, required on the Site for each major stage.

Unless the Engineer, within 21 days after receiving a programme, gives notice to the Contractor stating the extent to which it does not comply with the Contract, the Contractor shall proceed in accordance with the programme, subject to his other obligations under the Contract. The Employer's Personnel shall be entitled to rely upon the programme when planning their activities.

The Contractor shall promptly give notice to the Engineer of specific probable future events or circumstances which may adversely affect the work, increase the Contract Price or delay the execution of the Works. The Engineer may require the Contractor to submit an estimate of the anticipated effect of the future event or circumstances

If, at any time, the Engineer gives notice to the Contractor that a programme fails (to the extent stated) to comply with the Contract or to be consistent with actual progress and the

Contractor's stated intentions, the Contractor shall submit a revised programme to the Engineer within 15 days in accordance with this Sub-Clause.

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**Appendix-02**

**METHOD OF MEASUREMENTS FOR RAILWAY ELECTRIFICATION WORKS**

**DELETED**

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### Appendix-03

#### **Quality Assurance Materials**

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

#### **(b) Erection**

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

#### **(c) Expenses of Purchaser's Representative**

All the expenses of Purchaser's representative shall be borne by the Purchaser whether the inspected material is finally utilized in work or not drawings, specification, the contractor shall adopt a suitable quality assurance.

(d) The decision of the Purchaser or his representative 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, ensure quality at all necessary points, whether at manufacturer's works, or in his depot or at work site as well as during erection. Such quality assurance programme shall also meet the requirement of the Purchaser's Prescribed Quality Assurance Standards. This programme of the Contractor shall generally cover the following:-

1. The 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 ' the Contractor shall submit along with the invoice, the documents indicated in the Prescribed Quality Assurance Standard which should inter-alia cover the following as may be applicable in each case.
  - i) Material test reports on raw materials used.
  - ii) Material type and routine test report on components specification.
  - iii) Inspection plan with reports of the Inspection plan check points.
  - iv) Routine test report.
  - v) Factory test results as required under the specification.
  - vi) Quality audit report including test check report of Purchaser's representative if any.

**NOTE:**

**Inspection charges of RDSO and RITES will be borne by the Contractor. In case of change of inspection from RDSO/RITES to K-RIDE/Consignee, 1% of cost of material to be deducted by K-RIDE, as inspection charges.**

### Appendix-04

#### ORGANISATION CHART AND KEY POSITIONS

The Contractor shall provide the following organization chart for the Works as follows:

##### Head office Organization Chart

One organization chart shall be provided for the Contractor head office indicating the management and staff structure, with responsible personnel/departments described for all aspects of the work.

##### Site organization Chart

The Contractor shall provide the proposed site organization indicating the proposed structure, staff partners and positions necessary to adequately manage and control the Works.

The Contractor shall have a competent team of Managers, Engineers, Technical staff etc. so as to complete the work satisfactorily as per various requirements of the contract.

**The Key Positions not limited to and corresponding qualification and experience are as under:**

Sl. No.	Designation	Qualification	Experience level (For similar works)	Min. No. Required
1	Project Manager (Team Leader)	Bachelor's Degree/Post Graduate Degree in Electrical Engineering	Minimum 10 years total experience and 5-year experience in the role of Project Manager in the execution of similar type of work	1
2	Design manager	Post Graduate Degree/ Bachelor's Degree in Electrical Engineering	Minimum 10 years total experience and 07-year experience in the role of Design Manager in the execution of similar type of work	As reqd.
3	QA & QC Supervisor	Bachelor's Degree in Civil Engineering	Minimum 5 years total experience and 2-year experience in the role of QA & QC Supervisor in the execution of similar type of work	1
4	Chief Safety and Health officer	Bachelor's Degree / Diploma in Safety Course.	Minimum 5 years total experience and 3-year experience in the role of Chief Safety and Health officer in the execution of similar type of work.	As reqd.
5	Traffic Coordinator	Diploma in Electrical /Transportation Engineering or Retired Railway personnel with	Minimum 5 years total experience and 3-year experience in the role of Traffic Coordinator in the execution of similar type of work.	2

Sl. No.	Designation	Qualification	Experience level (For similar works)	Min. No. Required
		high school graduation		
6	OHE Engineer	Bachelor's Degree/Diploma in Electrical Engineering	Minimum 3 Years for graduate & 5 years for Diploma in relevant field.	4

**NOTES:**

1. The above categories of key positions shall be minimum required for successful completion of the work which shall be deployed at different points of time as per the progress and requirement of work and may not be required to deploy simultaneously and continuously. However, these personnel shall be deployed at site in advance as per requirement and as directed by the Engineer and the decision of Engineer in this regard shall be final and binding.
2. The Contractor shall submit the CVs of the above key positions to Engineer for his approval within 28 days of issue of letter of Acceptance (LOA).
3. The contractor shall deploy resources as per the above-mentioned minimum requirement and also confirm to deploy manpower over and above the minimum numbers indicated above, if the work requires so.
4. The performance of project personnel deployed will be evaluated periodically by Employer during the contract period. In case the performance of any of the project personnel is not satisfactory, the Contractor shall replace them with better or equivalent personnel immediately as per directions of the Engineer.
5. Tenderer may propose any number of names of Personnel for each Key Position. Any of the proposed personnel as approved by the Employer for each key position have to be mandatorily deployed in case of award of work.
6. Non-deployment of the Key personnel sl.no 1,2,4,5 & 6 leads to imposition of Penalty of Rs 25,000 /- Per Key personnel per month.
7. The proposed Key personnel are not to be changed till the completion of the work. Under emergent circumstances, in case they are required to be changed, the new incumbent should have similar or better experience and qualification than as required above. These changes are permitted only with the approval of the Employer.
8. All Key Personnel must be permanently stationed at Bangalore till the completion of the work.
9. The penalties imposed are non-refundable.

**Appendix-05**

**DELETED**

**Appendix-06**

**OFFICE ACCOMMODATION, EQUIPMENT AND TRANSPORT**

**DELETED**

**APPENDIX 7: DOCUMENT SUBMISSION AND RESPONSE –PROCEDURE**

**DELETED**

**ANNEXURE 1**

The Contractor shall prepare and submit his detailed Programme of Work so as to achieve key dates of various activities on time. The Contractor shall complete the work in a phased manner by fixing priorities to different stretches of work to give access to the other interfacing contractors as per the requirement of project from time to time and as per the key dates (mile stones) indicated below: **DELETED**

**SECTION-8B**

**TECHNICAL SPECIFICATIONS**

**Section 8B**  
**TECHNICAL SPECIFICATIONS**

<b>Sl. No.</b>	<b>Section No.</b>	<b>Description</b>	<b>Page No.</b>
1	CHAPTER- 01	GENERAL	294-299
2	CHAPTER- 02	FOUNDATION	300-309
3	CHAPTER- 03	STRUCTURES	310-322
4	CHAPTER- 04	EQUIPMENTS,COMPONENTS AND MATERIALS	323-337
5	CHAPTER- 05	DESIGNS AND DRAWINGS	338-358
6	CHAPTER- 06	ERECTION AND INSTALLATION OF EQUIPMENT	359-377
7	CHAPTER- 07	INSPECTIONS AND TESTING	378-382
8	CHAPTER- 08	SAFETY AND SECURITY AT WORK	383-401
9	CHAPTER- 09	ANNEXURES	402-425

# CHAPTER – 1

## GENERAL

## 1. GENERAL

### 1.1 General

- 1.1.1 These Specifications contained herein shall be read in conjunction with other tender documents.
- 1.1.2 The Work shall be carried out in accordance with the "Good for Construction" drawings and designs as would be submitted by the contractor and approved by the Engineer duly signed and stamped or issued to the Contractor by the Engineer duly signed and stamped by him as the case may be. The Contractor shall not take cognisance of any drawings, designs, specifications, etc. not bearing Engineer's signature and stamp. Similarly, the Contractor shall not take cognisance of instructions given by any other Authority except the instructions given by the Engineer in writing.
- 1.1.3 **Measurements and arithmetic conventions:** All measurements and calculations shall be in the metric system and calculations done to 2 (two) decimal places, with the third digit of 5 (five) or above being rounded up and below 5 (five) being rounded down.
- 1.1.4 Absence of terms such as providing, supplying, laying, installing, fixing etc. in the descriptions does not even remotely suggest that the Contractor is absolved of such providing, supplying etc. unless an explicit stipulation is made in this contract.
- 1.1.5 The specifications have been divided into different sections / sub-heads for convenience only. They do not restrict any cross-references. The Contractor shall take into account inter-relations between various parts of works/trades. No claim shall be entertained on the basis of compartmental interpretations.
- 1.1.6 The classification of various items of works for purposes of measurements and payments shall be as per Schedule.
- 1.1.7 Reference to the Standard Codes of Practice. **DELETED**
- 1.1.8 **Other Publications: DELETED**
- 1.1.9 **Contractor to Provide**

**Note:** All the equipments and apparatus shall be calibrated at the time of setting up and at specified intervals by NABL accredited agency.

#### 1.1.10 Quality Assurance & Quality Control



1. The work shall conform to high standards of design and workmanship, shall be structurally sound and aesthetically pleasing. The Contractor shall conform to the Quality standards prescribed, which shall form the backbone for the Quality Assurance and Quality Control system.
2. At the site, the Contractor shall arrange the materials, their stacking/storage in as per proper manner to ensure the quality. The Contractor shall provide all the necessary equipment and qualified manpower to test the quality of materials, assemblies etc., as directed by the Engineer. The tests shall be conducted at specified intervals and the results of tests properly documented. The cost of all such testing shall be included in the quoted rates and nothing extra shall be paid for in this regard. In addition, the Contractor shall keep appropriate tools and equipment for checking alignments, levels, slopes and evenness of the surfaces.
3. (a) The Engineer shall be free to carry out such tests as may be decided by him at his sole discretion, from time to time, in addition to those specified in this document as per provisions of General Conditions of Contract. The Contractor shall provide the samples and labour for collecting the samples. Nothing extra shall be payable to the Contractor for samples, or for the collection of the samples. The test shall be conducted at the Site laboratory that may be established by the Contractor or at any other Standard Laboratory having NABL certification.  
  
(b) The test shall be conducted at the Site laboratory that may (to) be established by the Contractor at his cost or at any other Standard Laboratory selected by the Engineer.  
  
(c) The Contractor shall transport the samples to the laboratory for which nothing extra shall be payable. In the event of the Contractor failing to arrange transportation of the samples in proper time the Engineer shall have them transported and recover two times the actual cost from the Contractor's bills.  
  
(d) All testing shall be performed in the presence of Engineer or his authorised representative. Testing may be witnessed by the Contractor or his authorised representative if permitted by the Test House. Whether witnessed by the Contractor or not, the test results shall be binding on the Contractor.
4. The Engineer shall have the right at all times to inspect all operations including the sources of materials, procurement, its transportation, layout and storage of materials, all equipment including the concrete batching and mixing equipment, and the quality control system. Such an inspection shall be arranged and the Engineer's approval obtained prior to starting of the particular item of work. This shall however, not relieve the Contractor of his responsibilities.
5. All materials which do not conform to these specifications shall be rejected. In the event of contractor not being able to arrange the material conforming to these specifications or in the event of failure of the contractor to get the sources approved within the agreed

schedule submitted by contractor, the Engineer shall have the powers to cause the Contractors to purchase and use such materials from any particular source, as may, in the Engineer's opinion, be necessary for the proper execution of work.

#### 1.1.11 Dimensions

1. Figured dimensions on drawings shall only be followed and drawings to a large scale shall take precedence over those to a smaller scale. Special dimensions or directions in the specifications shall supersede all others. All dimensions shall be checked on site prior to execution.
2. The dimensions where stated do not allow for waste, laps, joints, etc. but the Contractor shall provide at his own cost sufficient labour and materials to cover such waste, laps, joints, etc.
3. The levels, measurements and other information concerning the existing site as shown on the drawings are believed to be correct, but the Contractor should verify them for himself and also examine the nature of the ground as no claim or allowance whatsoever will be entertained on account of any errors or omissions in the levels or the description of the ground levels or strata turning out different from what was expected or shown on the drawings.

#### 1.1.12 Setting out of Works **DELETED**

#### 1.1.13 Materials

##### 1. Source of Materials

It shall be the responsibility of the contractor to procure all the materials required for construction and completion of the contract. The contractor shall indicate in writing the source of materials well in advance to the Engineer, after the award of the work and get it approved from the Engineer before commencing the work. If the material from any source is found to be unacceptable at any time, it shall be rejected by the Engineer.

##### 2. Quality

All materials used in the works shall be of the best quality of their respective kinds as specified herein, obtained from sources and suppliers approved by the RDSO/CORE and shall comply strictly with the tests prescribed hereafter, or where tests are not laid down in the specifications, with the requirements of the latest issues of the relevant Indian & other Standards.

##### 3. Sampling and Testing

All materials used in the works shall be subjected to inspection and test in addition to test certificates.

Samples provided to the Engineer for their retention are to be labeled in boxes suitable for storage.

Materials shall be tested before leaving the manufacturer's premises, quarry or source. Materials shall also be tested at site and they may be rejected if not found suitable or in accordance with the specifications, notwithstanding the results of the tests at the manufacturer's works or elsewhere or test certificates or any approval given earlier.

The contractor will bear all expenses for sampling and testing, whether at the manufacturer's premises at source, at site or at any testing laboratory or institution as directed by the Engineer subject to the provisions of No extra payment shall be made on this account.

#### **4. Dispatch of materials**

Materials shall not be dispatched from the manufacturer's works to the site without written authority from the Engineer.

#### **5. Test certificates**

All manufacturer's certificates of test, proof sheets, etc showing that the materials have been tested in accordance with the requirement of these specifications and of the appropriate Indian Standards are to be supplied free of charge to the Engineer.

#### **6. Rejection**

Any materials that have not been found to conform to the specifications or otherwise not acceptable to the Engineer will be rejected forthwith and shall be removed from the site by the Contractor at his own cost within three days or as instructed by the Engineer.

#### **1.1.14 Storing of Materials at site**

All materials used in the works shall be stored on racks, supports, in bins, silos, go-downs, under cover etc. as appropriate to prevent deterioration or damage from any cause whatsoever to the entire satisfaction of the Engineer.

The storage of materials shall be in accordance with IS 4082 "Recommendation on stacking and storage of construction materials on site" and as per IS 7969 "Safety code for handling and storage of building materials".

The materials shall be stored in a proper manner at places at site approved by the Engineer. Should the place, where material is stored by the Contractor, be required by the Employer for

any other purpose, the Contractor shall forthwith remove the material from that place at his own cost and clear the place for the use of the Employer within the time as communicated by the Engineer and at no extra cost to the Employer.

#### 1.1.15 Water

##### 1. Water from approved source:

Potable water only shall be used for the works. Contractor shall have his own source of water duly tested and approved by Engineer. The water shall be free from any deleterious matter in solution or in suspension and be obtained from an approved source. The quality of water shall conform to IS 456.

##### 2. Storage:

The Contractor shall make his own arrangements for storing water, if necessary, in drums or tanks or cisterns, to the approval of the Engineer. Care shall be exercised to see that water is not contaminated in any way.

##### 3. Testing:

Before starting any concreting work and wherever the source of water changes, the water shall be tested for its chemical and other impurities to ascertain its suitability for use in concrete for approval of the Engineer. No water shall be used until tested and found satisfactory. Cost of all such Tests shall be borne by the contractor.

#### 1.1.16 Workmanship

1. All works shall be true to level, plumb and square and the corners, edges and rises in all cases shall be unbroken and neat.
2. Any work not to the satisfaction of the Engineer or his representative will be rejected and the same shall be rectified, or removed and replaced with work of the required standard of workmanship at no extra cost.

#### 1.1.17 Load Testing On Completed Structures **DELETED**

**CHAPTER – 2**  
**FOUNDATIONS**

**DESIGN OF FOUNDATION:****(a) SOIL PRESSURE**

For design of foundations for traction structures carrying overhead equipment, the Contractor shall determine the type and allowable bearing pressure of soil at suitable intervals and adopt the type and size of foundations, suitable for particular locations with the help of the approved employment schedules. In cases of particularly weak soil, the bearing pressure may have to be determined for each location where so advised by the Purchaser. Soil bearing pressure, using SPT (falling weight equipment) should be determined generally for every 5 kilometer interval or less wherever change of soil is encountered. In general IS code of practice (IS 6403:1981) should be followed. In addition, at every 250 m the soil bearing pressure should be determined by dial gauge type penetrometers. Dial gauge type penetrometers shall also be made available by the Contractor at each foundation site so as to facilitate cross check at each individual location.

For design of foundation for masts and gantries at switching stations and booster stations, the Contractor shall determine the type and allowable bearing pressure of soil at the locations of such stations and shall prepare designs for the foundations suitable for each location to suit the bearing pressure of the soil in consultation with the Purchaser.

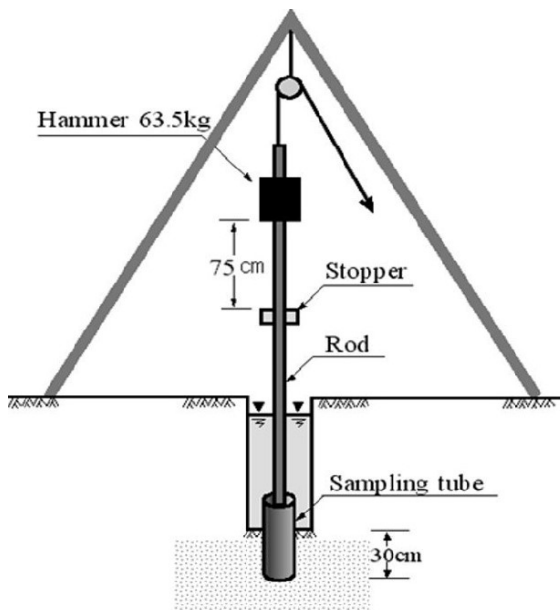


Figure 3: Standard Penetration Test (SPT)

**(b) STRUCTURES CARRYING OVER-HEAD EQUIPMENT**

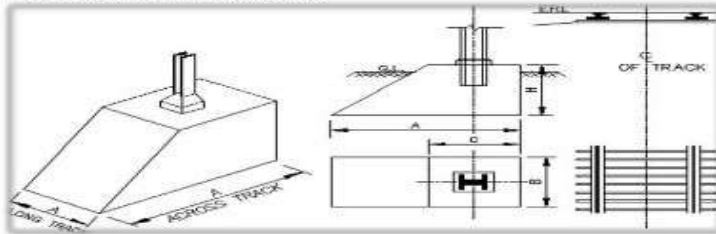
Foundations for traction structures carrying overhead equipment shall be either of the side bearing side gravity or new pure gravity type according to their location, formation of the sub-grade and bearing pressure of the soil. In new filled up soil or cinder formation, pure gravity sand-filled core foundations, or foundations

with cast-in-site reinforced concrete piles, or cantilever types foundation with counter-weights or guyed foundations may be adopted.

## OHE FOUNDATIONS

### TYPES OF FOUNDATIONS

b) Side gravity foundations or "BG" type foundations may be used for masts where soil bearing capacity is 8000 and 11000 kgf/m<sup>2</sup>, or adequate shoulder width is not available i.e less than 300mm beyond the edge of foundation.



### (c) ON BRIDGE PIERS

Complete design of foundations for traction structure on bridges to suit different locations and local conditions will be furnished by the Purchaser.



**(d) MASTS & FABRICATED STRUCTURES AT SWITCHING STATIONS/TSS**

Foundations for the masts of gantries at switching stations and TSS shall be of the pure gravity type, the base of which shall rest on consolidated soil.

**e) FENCING POSTS**

Foundation for fencing posts shall rest on consolidated soil if the depth of unconsolidated soil is less than 1.5 m below the datum level and shall be rectangular parallel piped in shape. If the depth of unconsolidated soil is more than 1.5 m the foundation block shall rest on reinforced concrete piles cast-in-site or reinforced concrete foundation may be adopted as desired by the Purchaser.



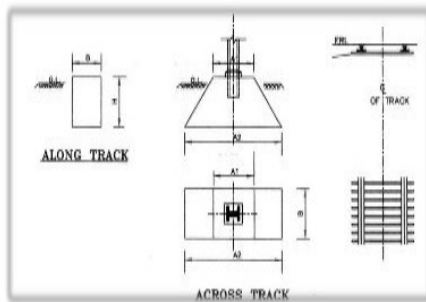


**(f) TYPICAL DESIGN**

Typical design and drawings of side bearing and new pure gravity and side gravity type foundations are included in the drawings listed in Annexure-1. Employment schedules for standard foundations for traction structures for various locations and types are also included in the drawings listed in Annexure-1, Part E.

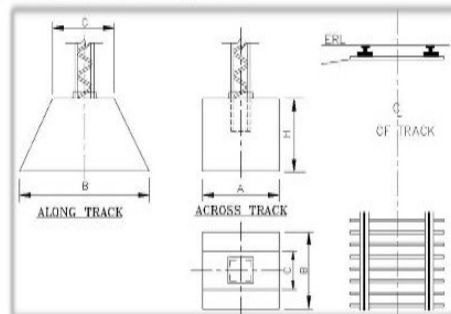
## TYPES OF FOUNDATIONS

d) New pure gravity foundations or "MG" type foundations may be used for masts where soil bearing capacity is 5500, 8000 and 11000 kgf/m<sup>2</sup> or where adequate shoulder width is not available. In such cases, it should be ensured that foundation is not exposed.

**OHE FOUNDATIONS**

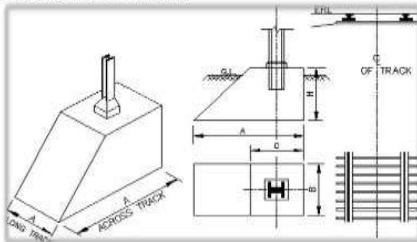
## TYPES OF FOUNDATIONS

c) Pure gravity foundations or "P" type foundations - are used for portals and are designed for soil bearing capacity of 8000 and 11000 kgf/m<sup>2</sup>.

**OHE FOUNDATIONS**

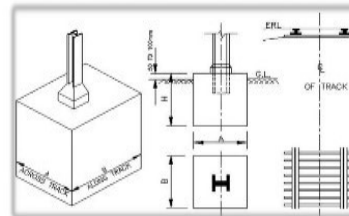
## TYPES OF FOUNDATIONS

b) Side gravity foundations or "BG" type foundations may be used for masts where soil bearing capacity is 8000 and 11000 kgf/m<sup>2</sup>, or adequate shoulder width is not available i.e. less than 300mm beyond the edge of foundation.

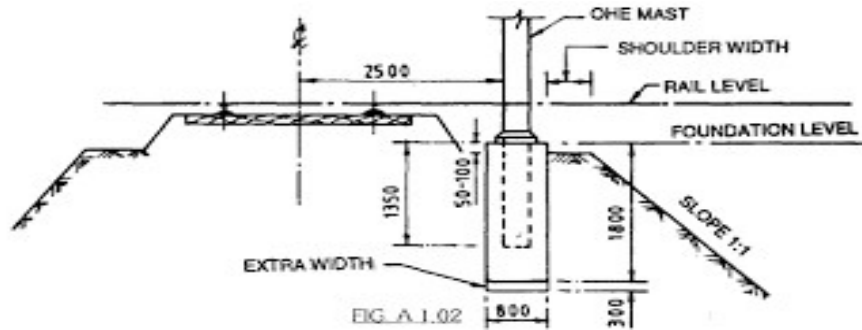
**OHE FOUNDATIONS**

## TYPES OF FOUNDATIONS

a) Side bearing foundations or "B" type foundations - are used for masts where earth is normal and fully consolidated, the soil bearing capacity is 11,000 or 21,500 kgf/m<sup>2</sup> and 300mm wide shoulder is available beyond the outer edge on the foundation on banks.

**(g) SPECIAL FOUNDATIONS**

In the case of foundations at locations not covered by the employment schedules furnished by the Purchaser, the Contractor shall prepare special designs and furnish full design calculations justifying the choice of the type of foundations for such locations. In black cotton soil 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.



(i) **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 E) of tender Document.

The decision of the Purchaser with regard to feasibility and suitability of adoption of the alternative design for each type of foundation will be final.



(h) **EQUIPMENT PEDESTALS**

Pedestals for interrupters and L.T. supply transformers where required, shall be of mass concrete with the base resting on consolidated soil. Pedestal for Power transformers shall be made of mass concrete with base resting on consolidated soil. Foundation for circuit breakers supported on steel structures and for other items of equipments such as isolator, instruments transformers, bus bar support insulators etc. shall be of the pure gravity type, the base of which shall rest on consolidated soil, and shall be left with core holes into which the legs of the supporting structures shall be suitably fixed by grouting.



### (j) CABLE TRENCHES

The cable trench shall rest on original ground if the depth of unconsolidated soil is less than 0.5 m. If the depth of the unconsolidated soil is more than 0.5 m., the cable trench shall be made of reinforced cement concrete of approved design supported at suitable intervals on concrete pillars.



### BEARING PRESSURE:

#### (a) GUIDING INFORMATION

Subject to above para, the following allowable bearing pressures may generally be expected for various kinds of soil. The information is given for general guidance only.

- |       |  |                     |
|-------|--|---------------------|
| (i)   | Average good soil in banks and cutting     | ... 11,000 kg/sq.m. |
| (ii)  | Moorum soil in cutting                     | ... 22,000 kg/sq.m. |
| (iii) | New banks & bad soils in banks and cutting | ... 5,500 kg/sq.m.  |

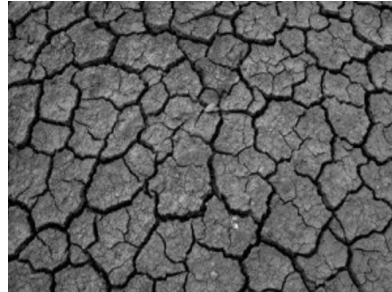
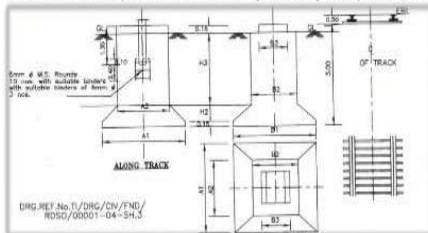


(iv) Black cotton soil-pure gravity foundation shall normally be adopted. However, under reamed pile foundations may be adopted at the option of the Purchaser in limited locations for trial purpose. In the case of dry black cotton soil, the soil should be subjected to a bearing pressure as close as possible but not exceeding 16,500 kg/sq.m. the depth of the foundation block being not less than 2.8m. In the case of wet black cotton soil, the soil should be subjected to a bearing pressure as close as possible but not exceeding 8,000 kg/sq.m.

*In the case of hard rock, a hole should be blasted in the rock, or by means of any other drilling and pneumatic method and the mast sealed into it with concrete.*

#### TYPES OF FOUNDATIONS

e)WBC and NBC type of foundations are used in Black cotton soil. Primarily WBC foundations are to be adopted where swelling / shrinkage is not expected to take place at the founding level and NBC foundations have to be provided where swelling / shrinkage is expected to occur.



#### CONCRETE:

Concrete for foundations shall be nominal mix / Ready mix of grade 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 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.

\* Specification for coarse and fine aggregates from natural sources for concrete (second revision).

"Volume batching may be allowed only where weigh-batching is not practical and provided accurate bulk densities of materials to be actually used in concrete have earlier been established. Allowance for bulking shall be made in accordance with IS: 2386 (Part-3) (Latest version as indicated in Annexure-1). The mass volume relationship should be checked as frequently as necessary, the frequency of the given job being determined by Engineer – In charge to ensure that the specified grading is maintained."

In judging the acceptability of the materials, quality of concrete and the method of work, the Purchaser will generally observe the provisions of the "Indian Standard code of Practice for Plain and Reinforced Concrete, IS:456 (Latest version as indicated in Annexure-1). The crushing strength of concrete shall not be less than the limits given below:-

**Specified characteristic Compressive strength of 15 cm cubes at 28 days.**

Grade of Concrete	At 28 days age
(a) M. 10	10 N/mm <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.

(a) Age is reckoned from the day of casting.

**SIZE AND GRADING OF AGGREGATES :**

The graded coarse aggregate 20 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 (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.

**Size of Aggregate for different Grade of concrete**

Grade of Concrete	Mix of (Cement:Sand:Aggregate)	Size of Coarse Aggregates
M20	1:1.5:3	20 mm
M15	1:2:4	12.5 mm, 20 mm,
M10	1:3:6	20 mm, 40 mm, 60 mm,
M7.5	1:4:8	40 mm, 63 mm
M5	1:5:10	40 mm, 63 mm
Low Grade	1:6:12	40 mm, 63 mm

**SAND CORED FOUNDATIONS :**

After erection of masts in sand-cored foundations, the core hole of the foundation blocks shall be filled with dried sand and covered with a layer of bitumen of 80 mm thickness below 30 mm from top level of the block.. A hemispherical shaped muff shall be provided on such foundations in lieu of standard type.

**SINKING OF CONCRETE SHELLS:**

Where the water-table is high, one or more sections of reinforced concrete shells may have to be sunk before casting concrete. The size of each of shell shall be 1,200 mm outside dia x 50 mm thick x 600 mm 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 :**

The foundations in dry black cotton soil should be of type BC or NBC or any other type as approved by the Purchaser.

**CEMENT:**

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).

**VIBRATOR:**

Vibrator shall be used to ensure proper compaction and avoid honeycomb in concrete.

**CHAPTER- 03**  
**STRUCTURES**

**TYPES :**

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

- (i) Broad flange beams.
- (ii) Rolled steel joists (I section).
- (iii) Fabricated steel Structures (welded/bolted).



Structure/uprights shall generally be embedded in concrete foundation blocks in special cases Structures may be secured by means of holding down bolts. Limited quantity (approx. 700 nos.) of circular spun prestressed concrete masts may also be used at the sole discretion of the Purchaser.

**DESIGN :****FOR OHE :****(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 galvanized 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 :**

**(a) GENERAL**

The steel structures may be of riveted, bolted or welded construction as convenient for installation. The thickness of smallest steel section used shall not be less than 6 mm (or 1/4"). Legs of gantry structures/portals and supporting steel work and uprights or busbar supports shall generally be embedded in concrete foundation blocks and for equipment and in special cases secured by means of holding down bolts.

**(b) DESIGN**

a) All the steel structures like gantries/portals, other supporting members, small part steel work etc. shall be 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 Purchaser. Designs for steel structures shall except where otherwise provided, comply with the "Indian Standard Code of Practice for use of Structural steel in General Building Construction" - IS : 800 - 1984, other relevant IS Specifications and statutory regulations.

c) For purposes of design, all possible loads which may occur in the worst combination shall be considered.

**d) Steel Structures**

For calculation of wind load on structures, conductors and equipment, the basic wind pressure shall be taken as 112.5 Kg/sq.m.

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

f) **Uprights and fencing posts.**

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



g) Notwithstanding the provisions contained in I.S. and other regulations 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:**

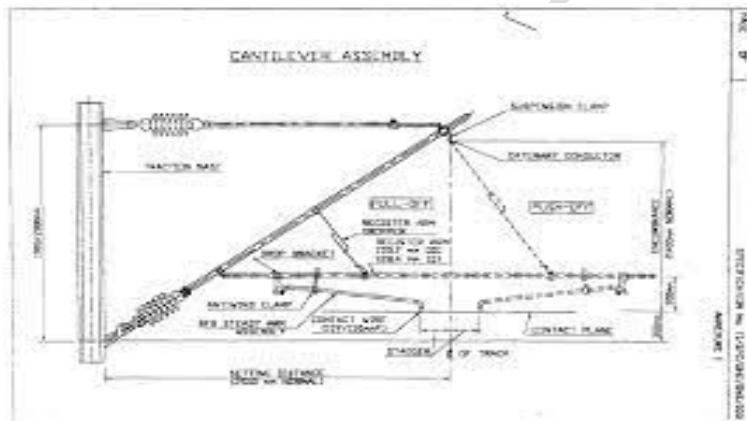
**(a) LOAD**

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 Annexure-1) referred to in para 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

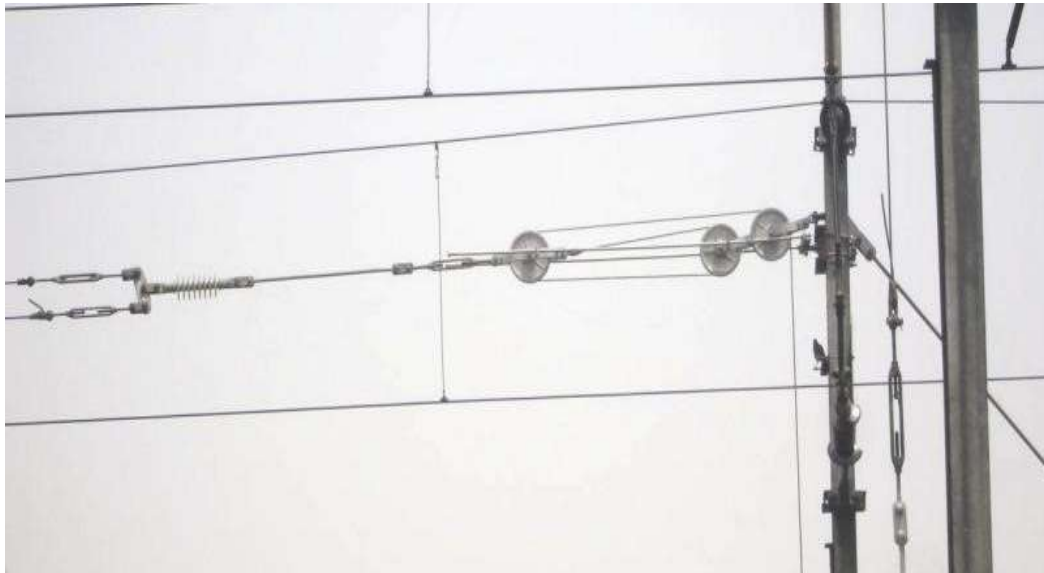
The torsional rotation of the mast due to permanent loads shall not exceed 0.1 radian.

**(d) TYPICAL DESIGN**

The typical design of a traction mast is included in the set of standard drawings listed in Annexure-1. Employment schedules for standard masts for various locations and types are included in the standard drawings listed in Annexure-1, to enable selection of suitable type for different locations and local conditions.

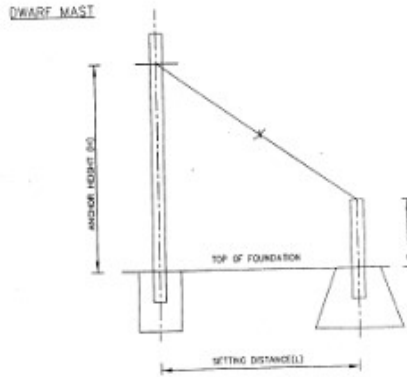
**ANCHOR MASTS:**

- (a) Masts at which overhead equipment will be anchored shall also normally be of the same type as those in other locations. Anchor masts shall normally be provided with suitable guys but struts may be permitted in special cases.



**(b) DWARF MASTS**

At certain locations where due to local conditions it is not feasible to anchor the guy rod on a foundation block in the ground, a dwarf mast shall be used in accordance with approved designs.



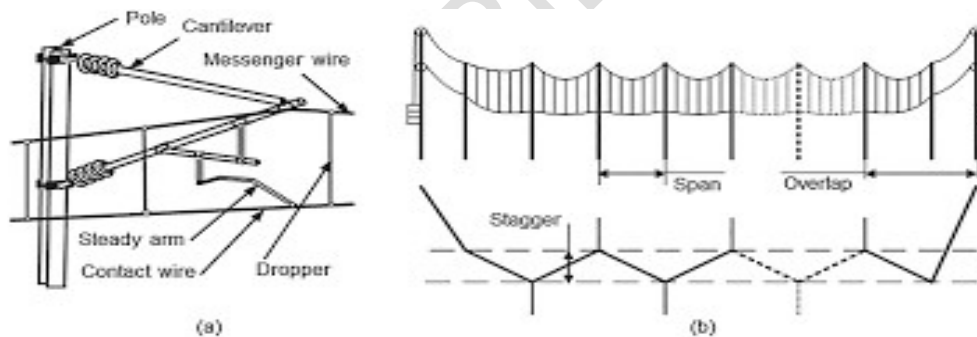
## HEAD SPANS :

### (a) LOAD

The loads to be considered shall be as detailed in para above as far as applicable and at their worst combination.

### (b) SAG FOR HEAD SPAN WIRE

The sag of the head span wire shall be approx. one-tenth (1/10) of the span.



### (c) MINIMUM TENSION IN CROSS SPAN & STEADY SPAN WIRES -

For purpose of design, a minimum tension of 200 kg, shall be ensured in the span wires for worst combination of temperature and wind load.

### (d) DEFLECTION OF MAST

Deflection at the top of the mast or Structure shall be limited to one-eightieth (1/80th) of its height above foundation.

### (e) TYPICAL DESIGN

Typical design for head span mast carrying overhead equipment for 4 tracks will be furnished to the contractor.

#### **PORTALS :**

##### **(a) GENERAL**

Portals shall be of fabricated steel of standard types of purchaser's designs. The most important designs are covered by Drawings listed in Annexure-1.

##### **(b) LOAD**

The load shall be as detailed in para above as applicable.

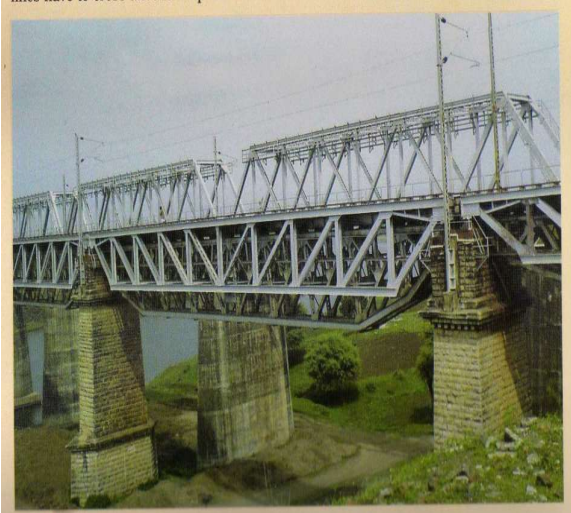


#### **STRUCTURES ON BRIDGES:**

(a) The structure may be either cantilever masts or portals (hinged or fixed at base) depending on the type and condition of bridge pier capping. As far as possible cantilever masts grouted in foundations blocks on pier will be used. Where this is not possible cantilever masts with holding down bolts or suitable portals (hinged or fixed at the base) may be adopted.

(b) Designs of structures on bridges to suit different locations and local conditions will be furnished to the contractor by the Purchaser.





### **SPECIAL STRUCTURES :**

In the case of structures at locations not covered by the employment schedules furnished by the Purchaser, the contractor shall furnish complete design calculations justifying the choice of the type of structures for such locations.

### **SETTING OF STRUCTURES:**

(a) The setting is the distance from the 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. Minimum setting of structures shall be 2.8 M plus curve allowance as required. Whenever this distance can not be provided, specific approval of Purchaser shall be obtained before erection. Setting of portal upright overlap/ turn-out structures, anchoring structures and other masts carrying more than one OHE will be 3.0 m wherever possible.

### **(c) EXTRA CLEARANCE ON CURVES**

The minimum setting of structures on curves shall be determined by adding to the above minimum figures an extra clearance indicated in the table included in the set of standard drawings listed in Annexure-1.

### **(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.

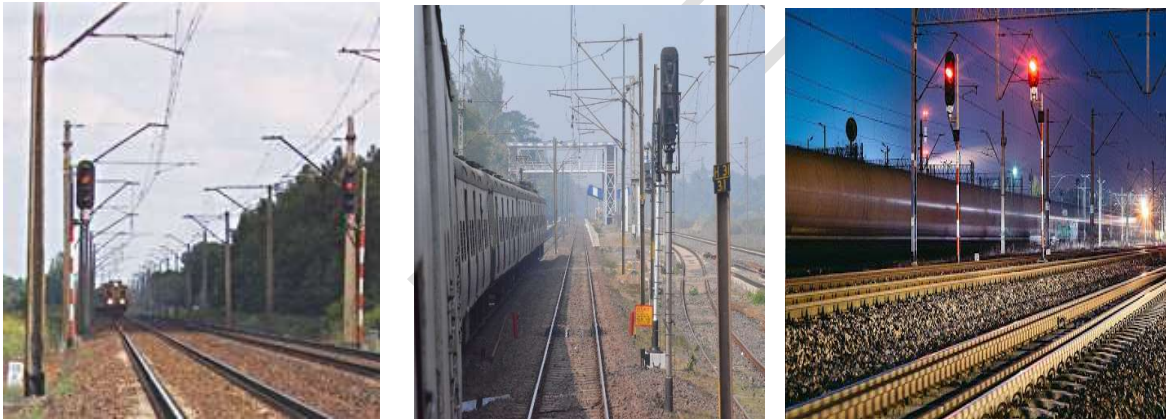
### **(e) STRUCTURES ON PLATFORM**

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



**(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 black colour with yellow colour 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 :**

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).





### STEEL WORK FOR SWITCHING STATIONS AND GANTRIES:

#### (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 indicated.
- (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) 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.
- (ii) Maximum tension in longitudinal feeders running parallel to the track at the switching stations under worst conditions. 1500 kgf.
- (iii) Tension in anchored overhead equipment in case of sectioning and paralleling stations 2,000 kgf.

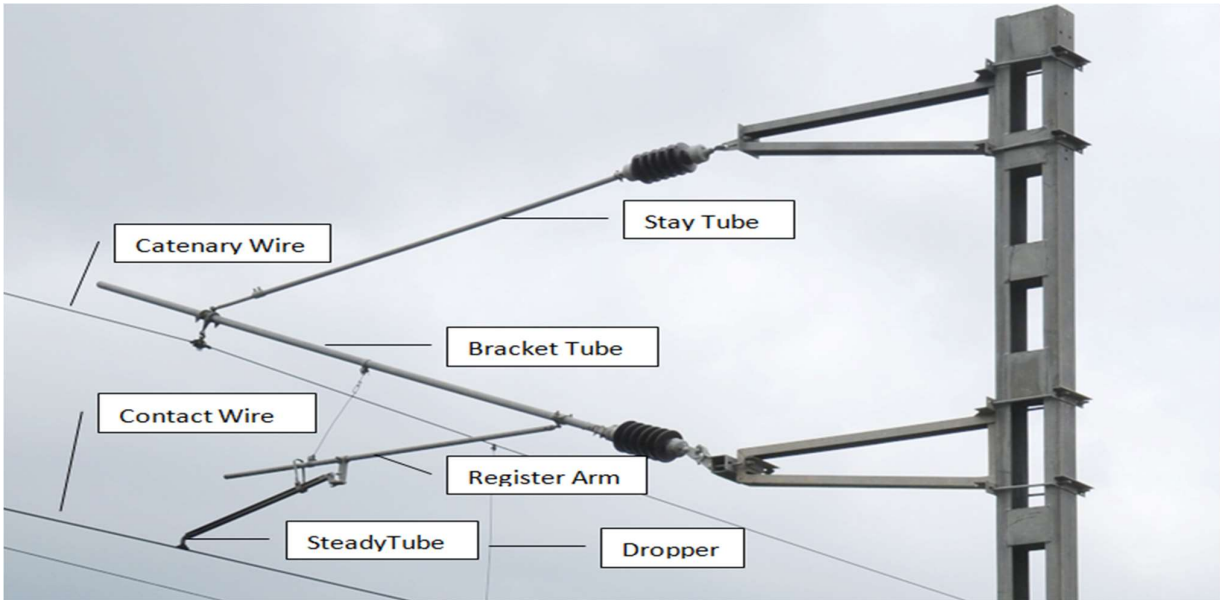
**(d) DEFLECTION OF GANTRY MASTS**

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:**

Steel conforming to IS: 2062 (Latest version as indicated in Annexure-1) shall be used for all fabricated steel work.

**CHAPTER- 04**  
**EQUIPMENTS, COMPONENTS AND**  
**MATERIALS**

**COMPLIANCE WITH STANDARD SPECIFICATION :**

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

- (i) International Electro Technical Commission (abbreviated as IEC) publications.
- (ii) British Standards (abbreviated as BS)
- (iii) 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, in that case firm should submit English rendering of the text and illustrations of the national standard specifications and British or Bureau of Indian Standards in question, in the relevant Annexures. In case of doubt, the Purchaser shall decide the clause and specification applicable and the contents of the specification and standard mentioned above shall guide such decisions.

**PROTO TYPE TESTS :****(a) FITTINGS, COMPONENTS AND MATERIALS**

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

**(b) EQUIPMENTS**

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

**(c) RESPONSIBILITY**

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

**(d) EXEMPTION FROM PROTOTYPE TESTS**

If prototype samples of equipments, components or fittings of any manufacturer have already been approved in connection with the electrification of other sections of Indian Railways, on the 25 KV 50 HZ single phase A.C. system prototype samples of such equipments, components or fittings will be exempted from the tests.

Supply of bulk quantities shall, however, be effected only after the Purchaser's prior approval is obtained in writing.

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

#### **INSPECTION AND TESTS:**

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

#### **TEST CERTIFICATES:**

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

#### **BULK MANUFACTURE:**

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

#### **INTER CHANGEABILITY :**

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

#### **TECHNICAL SPECIFICATIONS:**

Please see at **Anexure-1**). 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).

#### **NOMENCLATURE AND MARKING:**

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

(b) In case of insulators, galvanized 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 :****(a) GALVANISING**

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

**(b) PAINTING**

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

**(c) RECTIFICATION AT SITE**

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

**BRACKET ASSEMBLY COMPONENTS :****(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. 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 their is a free length of about 200 mm beyond the catenary suspension bracket. To facilitate adjustment during track maintenance.

**(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 directions.

#### (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 off solid galvanized 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.



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 :

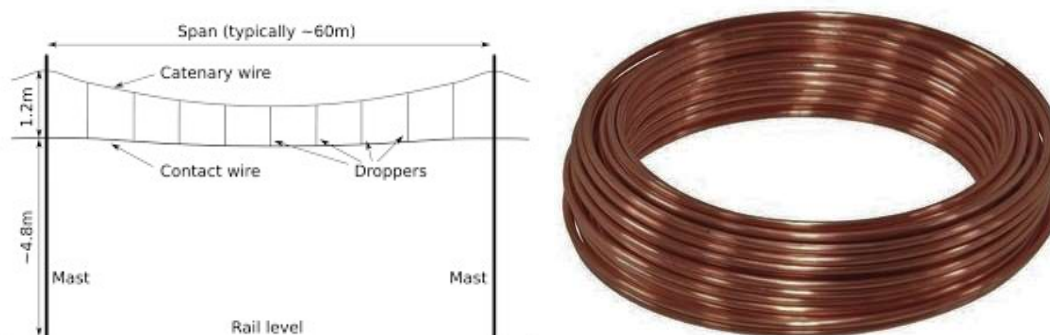


**(a) GENERAL DESIGNS**

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 :**

(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 Purchaser. 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:

##### (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 Purchaser.



**(b) LOADING**

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

**(c) RESTRICTED USE OF SPLICES**

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 Purchaser. 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.

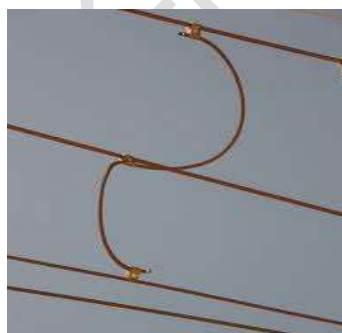
**ELECTRICAL CONNECTIONS FOR OHE:****(a) GENERAL DESIGNS**

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.

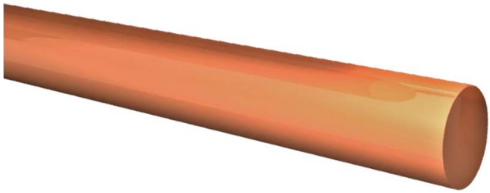
**(b) JUMPERS**

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).

**(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 150 sq.mm Copper conductor.

**(e) RETURN CONDUCTOR**

The return conductor shall be of 150 sq.mm Copper Conductor. The arrangement of return conductor carried on traction structures is shown in a drawings listed in Annexure-1, Part E.

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

(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 Annexure-1).

**TERMINAL CONNECTORS FOR EQUIPMENTS:**

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

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 :****(a) GENERAL**

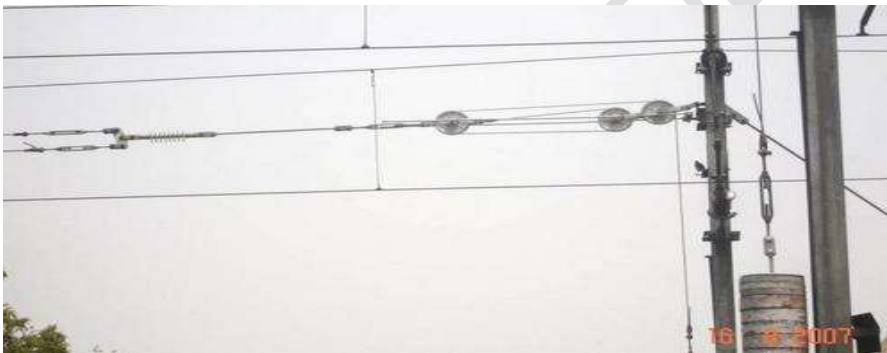
A general arrangement is shown in the standard drawings listed in Annexure-1. The regulating equipment should have a minimum adjustment range of 950 mm. Stainless steel wire rope in accordance with TI/SPC/OHE/WR/1060 (Latest version as indicated in Annexure-1) shall be used in these equipments and these 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:****(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:

25 kV Isolator switches shall comply with Railway specifications.

### INSULATION LEVEL :

(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:

(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 degree centigrade for a max. ambient temp. of 45 degree centigrade.

### CABLING:

#### (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 Anexure-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 Anexure-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	From each transformer to control	110 V DC	4x4.0	One cable for each bushing CT to be used.



transformer to current transformer connections)	board.			
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 a typical switching stations is shown in the relevant drawing already included in Annexure-1.

**LITERATURE FOR EQUIPMENT:**

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 equipments 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.

**CHAPTER- 05**  
**DESIGNS AND DRAWINGS**

**CONTRACTOR'S DRAWINGS :**

(a) The Contractor shall submit to the Purchaser for approval except where otherwise specified below, all detailed designs and drawings which are necessary to ensure correct supply of equipments, components and materials and to enable correct and complete erection of overhead equipment, switching stations, booster transformer stations 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 Purchaser's approval will be based on these considerations and notwithstanding the Purchaser's acceptance; the ultimate responsibility for the correct design and execution of the work shall rest with the Contractor in terms of the conditions of Contract.

**STANDARDS FOR DRAWINGS :**

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

**BASIC DESIGNS :****(a) STANDARD DESIGNS**

Where the Contractor adopts designs and drawings conforming to the standard designs, drawings, and specifications of the Research, Designs and Standards Organisation. Manak Nagar, Lucknow-226 011 (RDSO) for basic arrangements, equipments, 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 Purchaser, he shall verify such designs, drawings and employment schedules and satisfy himself that these are correct before use. Within two months of the issue of letter of Acceptance of Tender the contractor shall indicate to the Purchaser, the list of standard basic arrangements, components and fittings drawings and employment schedules, which he will adopt for the purpose of the work. The contractor for his use and reference shall obtain copy each of such standard basic arrangement, component and fittings drawings and employment schedules from GM/Electrical/K-RIDE office.

**(b) DEVIATIONS**

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



**(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 drawings 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 proforma, separately for each Railway line for special foundation drawings with all necessary details shall be submitted to the Purchaser. 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 finalized 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 of the bracket assembly, mast extensions, isolator mounting frame and anchorage of overhead equipment, feeder or return conductors proposed for each structure together with all particulars necessary for the correct erection of overhead equipment at the structure. For structure with isolators, the details of electrical connections shall also be incorporated. 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.

Sl.No.	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	± 5 mm



	from Support)	
(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 Contact Wire at Support.	50 mm (minimum)

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

**FOR TSS:**

a) **Purchaser's location plans**

(A) **FOR TRACTION SUB-STATIONS**

The location plans and schematic diagram of connections for each of the traction sub-stations will be furnished by the Purchaser to the Contractor. These will indicate.

- i) Position of incoming lines on the gantries to be erected inside the traction sub-station.
- ii) Location of switching station gantry showing where the 25kV outgoing feeders will be terminated.
- iii) Schematic diagram of connections of Transformers, Circuit breakers Isolators etc.
- iv) Position of the control room with respect to the traction sub-station.
- v) Fencing outline with gates.

(B) **FOR FEEDING STATIONS**

The location plans and schematic diagrams of connections for all the feeding stations will be furnished by the Purchaser to the Contractor. These will indicate the following as applicable:-

- i) Overhead equipment layout in the vicinity of feeding stations.

- ii) Location of main masts.
- iii) Arrangement of cross feeders and longitudinal feeders to be anchored on the gantry if any, including jumper connections to the overhead equipment.
- iv) Scheme of connections of interrupters.
- v) Position of the remote control cubicle with respect to the feeding stations.

C) **SHUNT CAPACITOR BANK**

The location plans and schematic diagram of connections for capacitor bank installation at each of the traction sub-stations will be furnished by the Purchaser to the Contractor. These will indicate.

- i) Schematic diagram of connections of circuit breakers, isolators, L.As etc.
  - ii) Position of the control room with respect of the traction sub-station.
  - iii) Fencing outline with gates.
- b) Contractor's responsibility.

The Contractor shall satisfy himself about the correctness and applicability of the location plans given by the Purchaser before adopting them for detailed designs.

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

(a) **PURCHASER'S LOCATION PLAN ETC.**

The location plans and schematic diagrams of connections for all the switching stations, booster transformer stations and L.T. supply transformer stations will be furnished by the Purchaser to the Contractor. These will indicate the following as applicable:-

- i) Overhead equipment layout in the vicinity of switching or other stations.
- ii) Location of main masts.
- iii) Arrangement of cross feeders and longitudinal feeders to be anchored on the gantry if any, including jumper connections to the overhead equipment.
- iv) Scheme of connections of interrupters.
- v) Position of the remote control cubicle with respect to the switching stations.

- vi) Fencing outline at the switching stations.

The Contractor shall satisfy himself about the correctness and applicability of the location plans given by the Purchaser before adopting them for detailed designs.

**(b) DETAILED DRAWINGS**

**(A) OHE WORKS :**

The Contractor shall submit for approval of the Purchaser 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 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.

**(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 equipments, indoor and outdoor, along with schematic arrangements and physical disposition of equipments, 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 Purchaser. Drawings should be dimensioned and should indicate:-

1. Fixing or mounting hole dimensions and arrangement:
- 2.
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 equipments and "U" bolts for cable mounting, caution or instruction boards, outriggers for busbar 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 equipments, run of busbars, position of pedestal insulators and steel frame work. 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 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 Purchaser'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 Purchaser'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 Purchaser. The Contractor shall submit 6 copies for distribution to field office and one transparent print for the equipments 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 Purchaser, 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 equipments, caution or instruction boards, non-standard busbar 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

**(C) FOR FEEDING STATIONS**

The Contractor shall submit for approval of the Purchaser 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 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 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 equipments required at the feeding station alongwith 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 along with 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 insulator 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 equipments, indoor and outdoor, along with schematic arrangements and physical disposition of equipments, 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 equipments to be supplied by the Purchaser. 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 equipments and "U" bolts for cable mounting, caution or instruction boards, outriggers for busbar supports and non-standard busbar 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

(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 centre 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, 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 Purchaser'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 Purchaser'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 Purchaser. 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 Purchaser, 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 equipments, caution or instruction boards, non standard busbar connectors, clamps and U-bolts for cable mounting etc.

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

The Contractor shall submit for approval to the purchaser L.T. supply transformer stations, similar to those detailed for switching stations. 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:**

(a) Within five months of issue of Letter of Acceptance of Tender, the Contractor shall assess the quantities of various items of work including various components and fittings as covered in Schedule 1 and submit Schedule 1 (Assess.1) along with the corresponding quantity of various fittings and components included in Schedule 3 for approval of the Purchaser. Such an assessment shall be revised at suitable intervals after the first assessment is approved till the work is completed. Such re-assessments denominated as Schedule 1 (Assess. 2) (Assess. 3) etc., shall also be submitted for approval of the purchaser. On receipt of approval of each final layout plan from the Purchaser, the followings Schedules of quantities relating to each layout plan shall be submitted within a fortnight.

- i) Schedules of number of masts, types, weight of different masts and total weight of masts;
- ii) Schedules of number of foundation, types, volume of different foundations and total volume;
- iii) Schedule of quantities of various items of work other than masts and foundation
- iv) Schedule of net tension lengths of contact, catenary and feeder wires and lengths required to be ordered;
- v) Schedule of lengths of other wires and conductors required to be ordered;
- and**
- vi) Schedules of small parts steel work to be supplied; either by the Contractor or the Purchaser.

**(b) SWITCHING/BOOSTER STATIONS**

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

- i) Schedule of number of foundations, types, volume of different foundation and total volume. Overlapping 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 schedule1 not included in Item (i), (ii), and (iii) above.

**(c ) TRACTION Sub-Stations:**

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 not included in item (i) and (ii) above.

**SUBMISSION OF DRAWINGS & SCHEDULES:**

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

**(b) DEVIATION FROM STANDARD DESIGN**

In case of deviation from standard designs and drawings, copies of correspondence and drawings shall be sent in duplicate to the GM/Electrical/K-RIDE or his successor/nominee (whose address will be intimated in due course). In the particular case of deviations in the design of fittings the drawings submitted by the Contractor shall be actual manufacturing drawings complete with tolerances and full specifications of the materials used. In addition, four samples of the modified fittings shall also be submitted, after the drawings are approved.

**(c) SPECIAL DESIGNS**

Special designs to meet the requirement of particular locations and local conditions shall be submitted in due time in duplicate for approval.

**(d) PURCHASER'S PEGGING PLANS**

Two copies of the purchaser's pegging plans shall be sent back after verification if found correct. If modifications are required, fresh pegging plans incorporating the modifications shall be submitted in two copies for approval.

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

When the Contractor is called upon to survey and prepare pegging Plans, he shall send three copies of such plans, while submitting them for approval.

**(f) CROSS-SECTION DRAWINGS**

Cross-section drawings shall be submitted for approval in two copies for a convenient section at a time separately for sections within station limits and section outside station limits. Such drawings shall be submitted progressively and as far as possible without gaps.

**(g) OHE LAYOUT PLANS AND PROFILE DRAWINGS**

Overhead equipment layout plans, provisional and final and profile drawings shall be submitted for approval in three copies.

**(h) STRUCTURE ERECTION DRAWINGS**

Structure erection drawings shall be submitted for approval in two copies for a section at a time separately for sections within station limits and sections outside station limits, progressively and without gaps.

**(j) SCHEDULE OF QUANTITIES**

Schedules of quantities for each approved layout plan/switching station shall be submitted for approval in two copies.

**(k)** All drawings for switching stations, booster transformer stations and L. T. supply transformer stations shall be submitted for approval in three copies.

**(l) DISTRIBUTION COPIES**

On receipt of purchaser's unqualified approval to the Contractor's Drawings, Schedule of quantities, the Contractor shall submit original tracings of those drawings and schedules for the signature of the purchaser in token of approval within seven days of the receipt of approval and the purchaser shall as far as possible return the same to the Contractor within 7 working days thereafter. On receipt of these tracings from the purchaser, the Contractor shall submit copies for distribution to field officers and other departments as indicated below within 7 days of receipt of approved tracings:

- |  |          |
|--|----------|
| i) Standard designs including fittings drawings) | 8 copies |
|--|----------|

ii) Special designs	8 copies
iii) Final peggings plans	6 copies
iv) Structure Cross-section drawings	6 copies
v) OHE layout plans	6 copies
vi) OHE profile drawings	6 copies
vii) Structure erection drawings	6 copies
viii) Stations Rules Diagrams	20 copies
ix) Stations working Instructions	20 copies
x) Drawings for switching stations, booster transformer stations & L.T. transformer stations.	6 copies
xi) Schedule of quantities	3 copies

#### **COMPLETION DRAWINGS & SCHEDULES:**

After completion of works, all drawings and designs submitted by the Contractor for OHE, TSS & SCADA works and approved by the purchaser shall be made upto date incorporation actual supply and erection particulars including the name and make of insulators, galvanised 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 purchaser'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 purchaser. 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 purchaser.

**CHAPTER- 06**  
**ERECTION AND**  
**INSTALLATION OF**  
**EQUIPMENT**



## **PRINCIPLES**

### **METHODS OF ERECTION :**

All work shall be done in accordance with methods of erection and installation of equipment approved by the Purchaser. In the case of 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**

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

### **INSPECTION**

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

### **MEASUREMENTS**

All measurements for location of structures and foundations shall be made with the aid of steel tapes. On curves, these measurements shall be taken on the outer rail of the middle track in the case of odd number of tracks and on the inner rail of the first outer track from the centre 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 .**

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 purchaser for inspection and testing. No bolts may project more than 10mm beyond the nut/locknut after full tightening.

### **DAMAGE TO GALVANISING PAINTING :**

In loading, transport and erection, all galvanized/ painted materials shall be handled with care to avoid damage to galvanising/painting. If galvanising/painting is damaged inspite of all care taken, the damaged part of component shall be put up for inspection, to obtain permission from the purchaser to carry out repairs.

### **FOUNDATIONS :**

(a) The Contractor shall carry out soil pressure tests in accordance with methods approved by the purchaser to determine permissible bearing pressure of various representative types of soils in the presence of the purchaser's representative during the pegging out of site inspection. He shall adopt only those values as accepted by the purchaser 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 Purchaser'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 Electrification 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 colour 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 purchaser.

**(d) EXCAVATION**

Normally, excavation of soil for foundations or anchor blocks along side 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 tamped. 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 purchaser's representative to be safe and concrete is cast on the same day. Shoring shall be done to the satisfaction of the purchaser's representative, 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 purchaser. Shoring/ shuttering of the pits should be provided effectively to the satisfaction of the purchaser. 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 above para ( Foundations) with ballast graded for the purpose specified. The concrete shall be poured and temped properly in accordance with the method approved by the purchaser. The Contractor shall arrange to provide concrete testing samples for tests once every week or as and when required by the Purchaser, to determine crushing strength after 7 days or 28 days curing as required. Testing shall be arranged by the Purchaser 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 Purchaser's representative with regard to fixed datum level.

**MASTS AND STRUCTURES****(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 Purchaser. 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 Purchaser for approval.

**(c) INFRINGEMENT TO STANDARD DIMENSIONS**

In erection, care shall be taken to ensure that no part of the traction mast, structure or any fitting located on such mast or structure 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 :**

(a) A suggested method for erection of traction overhead equipment would ensure good speed and quality erection. The Contractor may, however, follow other methods which they consider would speed up and ensure good quality work, subject to the approval of the Purchaser. Any wiring method should take into consideration appreciable stretch of the catenary and contact wires in the initial days after they are 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 are capable of adjustments of minimum of 90 mm in either direction except as otherwise relaxed.

**(d) INSULATORS**

Before insulators are used in bracket assemblies or dispatched to work site for erection from 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. Soldered catenary wire should not be used. 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 Purchaser for approval. After initial stringing of the catenary, it shall be maintained at the 'no load tension' for a minimum duration of 48 hours before the pulley blocks are removed and the catenary is clamped to suspension clamps of bracket assemblies. Shorter periods may, however, be allowed by the Purchaser.



#### **(f) STRINGING 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.

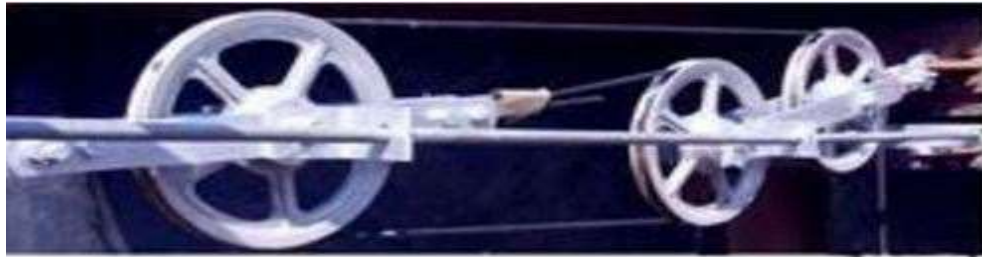


**(h) CLIPPING DROPPERS**

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 Purchaser.

**(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**

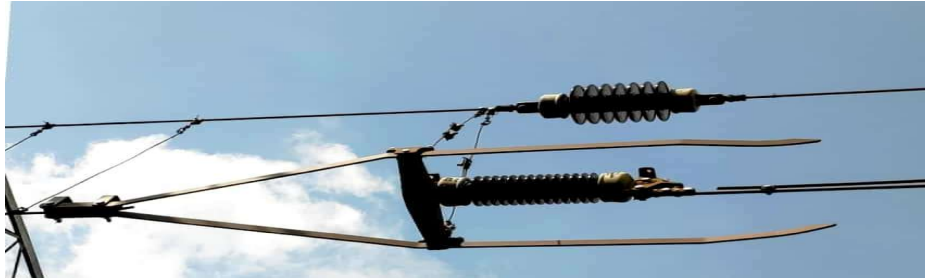
All insulators in out of run shall be so positioned that they are away from the swept zone of the pantographs and will not foul with them. The live parts of these insulators shall also be so located that they are at least 2 m away from Structures other than those supporting traction overhead equipment.

**(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.



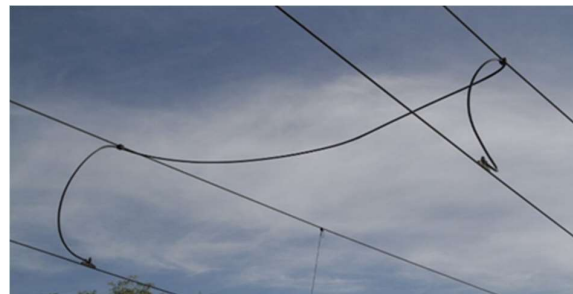
#### (m) ANTI -WIND CLAMP

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 equipments 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 Purchaser's 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 :**

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 :**

- 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 Aluminium busbars 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 busbars 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 Purchaser. 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 :****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 equipments shall be made with galvanised 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 galvanised steel bolts (12mm dia), nuts with lock-nuts or spring washers, as required, at suitable intervals.

#### **TOLERANCE :**

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

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  $\pm 200$  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 :**

Further working instructions will be issued if considered necessary by the Purchaser should be considered that the standard of work of the Contractor requires to be improved.

#### **EQUIPMENT :**

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 :**

##### 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 Purchaser. 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.

### WIRING PROCEDURE

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 energisation and commissioning is virtually eliminated.

### GENERAL :

In the case of regulated overhead equipment when the regulating equipments 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 procedure 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 kgf, 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 kgf, 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 :**

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 :**

The anti-creep of the tension length is then installed in its final positions.

#### **LOCKING THE REGULATING EQUIPMENT :**

In the case of regulated overhead equipment, the regulating equipments 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 degree centigrade.

#### **TEMPORARY ARRANGEMENT :**

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 :**

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 wiring trolley and run-on pulley blocks hung from the suspension clamp eyes of brackets until the terminating point at the other end of the tension length is reached.

**TENSIONING OF CATENARY :**

The catenary is strained 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, in the first block, the catenary is strained to the stringing tension with the aid of dynamometers and the catenary is terminated. In a subsequent block, the sag is checked and the tension readjusted with ladders, if necessary.

**CLAMPING THE CATENARY :**

The catenary is clamped on the brackets placed at right angles to the track "

**DROPPERING :**

Droppers are fitted to the catenary at the correct locations. At the contact wire ends these droppers may be provided with small pulleys or hooks to 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 :**

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 wiring trolley and supported on the pulleys hung from droppers or on hooks until the terminating point at the other end of the tension length is reached. In curves, the contact wire shall be registered 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 :**

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 :**

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 :**

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

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

(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 kgf. 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 .

(4) When the contact wire is under tension, creep takes place which results in a increase in the length of wire and, consequently, the droppers and the equaliser 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 equaliser plates, all in the vertical position, and the necessity for any further adjustments before energisation and commissioning of the OHE may be reduced to a great extent. If this precaution is not taken, at the time of energisation 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 ensure that two marks are in the same relative longitudinal position as they were before the removal of the temporary arrangement.

**CHAPTER- 07**  
**INSPECTIONS AND TESTING**

**OVERALL PERFORMANCE :**

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

**RESPONSIBILITY**

The general tests of overall performance stipulated below are only supplementary to other tests on structures, foundations, equipment, components and fittings as specified in the tender document. Any testing and acceptance by the Purchaser of overall performance shall be subject to the general terms of guarantee which shall continue to be valid as provided.

**TESTS OF OHE :****(a) GENERAL**

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

**(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 existance 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 Purchaser, the movement of which will follow the track levels as closely as possible. Tolerance that will be permitted on the dimensions indicated in the approved drawings

The actual position of the two contact wires, relative to each other, at overlaps and turnouts shall also be checked. Special attention shall be paid to a smooth movement of Pantographs 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 energising the overhead equipment.

**(i) ENERGISING**

If the overhead equipment, after being subjected to the above tests in an un-energised condition, is found to be satisfactory, it will be energised 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.:**

**(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 Purchaser in writing. Testing will be carried out by the Purchaser at his cost jointly with the Contractor. These shall include the tests which the Purchaser may like to conduct with a view to assure himself of the soundness of the equipments and their erection in compliance with these specification. 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 Annexure-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 functioning 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-energised.

**(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 recognised 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 Purchaser.

**(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-energised. 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 :**

- (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 :**

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 Purchaser, in quadruplicate.

# **CHAPTER-8**

## **SAFETY AND SECURITY AT WORK**

1.1 The works included in this contract are to be carried out close to the running tracks and public utilities, therefore, safety of running trains and the public is paramount. Therefore, all activities undertaken by the Contractor/his Sub-contractors shall ensure safety at all times. The contractor shall comply with the instructions issued by the Railway/ Engineer/Employer from time to time to ensure safe running of trains while carrying out works. The rates quoted by the Contractor shall be deemed to include all expenditure incurred in compliance with the same.

1.2 Before starting any excavation work adjacent to existing track, the contractor shall ensure that necessary permissions has been obtained and required precautions have been taken for doing such work in terms Joint Procedure Order (JPO). The penalties mentioned in the following JPO shall be levied on the contractor if such event occur. The JPO is reproduced below:

“JOINT PROCEDURE ORDER FOR UNDERTAKING DIGGING WORK IN THE VICINITY OF UNDERGROUND SIGNALING, ELECTRICAL AND TELECOMMUNICATION CABLES”

(A) A Number of Engineering works in connection with gauge conversion/doubling/third line are in progress on various railways, which require extensive digging work near the running track, in close vicinity of the working S&T cables carrying vital safety circuits as well as electrical cables feeding the power supply to cabins. ASM room, RRI Cabin, Intermediate Block Huts (IBH) etc. Similarly, S&T organization under open line or construction units under CAO/C, are executing various Signaling and Telecom works requiring digging of earth for laying of cables or casting of foundations for the erection of signal posts etc. Rail-Tel is also executing the work of laying of quad cable and OFC on various Railways as a part of sanctioned works for exclusive use of Railways for carrying voice and data i.e. administrative and control communication, PRS, FOIS etc. or shared by RailTel Corporation of India Ltd. On certain sections, digging is also required for laying of electrical cable and casting of foundation for the erection of OHE masts by Electrical Dept. Generally, these works are executed by contractors employed by these organizations.

(B) However, while carrying out these works in the vicinity of working signaling, telecommunication and electrical cables, at times, cable cuts take place due to JCB machines working along the track or during the digging work being done by contractors carrying out the Civil Engineering Works. Similarly, such cable cut are also resulting due to works undertaken by S&T or Electrical departments. Such cable faults results in the failure of vital signaling and telecommunication circuits & electrical installations.

(C) Henceforth, the following joint procedure shall be followed by Engineering, Electrical and S&T (and Rail Tel organization, wherever such works are being done by them) officers of the respective divisions and by the construction organization, while carrying out any digging work near to existing signaling & telecommunication and electrical cables, so that the instances of cable cut dueto execution of works, can be controlled and minimized.

1. S&T Department (and Rail Tel, where they have laid the cables) and Electrical department shall provide a detailed cable route plan showing exact location of cable at an interval of 200m or wherever there is change in alignment so that the same is located easily by the Engineering official/contractor. In addition, S&T department and Electrical department shall also provide cable markers along the alignment of the cable. These cable route plans shall be made available to the Sr.DEN/DEN or Dy. CE/C, as the case may be, by



Sr. DSTE/DSTE or Sr. DEE/DEE of the divisions or Dy. CSTE/C or Dy.CEE/C within 15 days in duplicate. Sr.DEN/DEN or Dy. CE/C will send copies to their field unit i.e. AEN/SE/P. Way & Works.

2. Before taking up any digging activity on a particular work by any agency, Sr. DSTE/DSTE or Sr.DEE/DEE of the section shall be approached in writing by the concerned Engg. or S&T or Electrical officer for permitting to undertake the work. Sr. DSTE/DSTE or Sr.DEE/DEE, after ensuring that the concerned executing agencies including the contractor have fully understood the S&T and Electrical cable route plan shall permit the work in writing within 7 days of the request by concerned department.
3. After getting the permission from S&T or Electrical department as the case may be, the relevant portion of the cable route plan shall be attached to the letter through which permission is issued to the contractor by concerned Engg. official for commencement of work and ensuring that the contractors have fully understood the cable route plan and precautions to be taken to prevent damage to the underground cables. The contractor shall be asked to study the cable plan and follow it meticulously to ensure that the safety of the cable is not endangered. Such a provision, including any penalty for default, should form part of agreement also. It is advisable that a suitable post of SE/Sig or SE/Tele or SE/Electrical(TRD or G) shall be created chargeable to the estimates of doubling/gauge conversion, who can help Engg. agencies in the execution of the work. However basic responsibility will be of the department executing the work and the Contractor. Creation of posts is not mandatory.
4. The SE/P. Way or SE/Works shall pass on the information to the concerned SE/Sig SE/Tele or SE/Electrical(TRD or G) about the works being taken up by the contractors in their sections at least 3 days in advance of the day of the work. In addition Engineering control shall also be informed by SE/P. Way or SE/Works, who in turn shall pass on the information to the test room/network operation centre of Rail Tel/TPC/Electrical control.
5. On receiving the above information, SE/Sig or SE/Tele or SE/Electrical (TRD or G) shall visit the site on or before the date of taking up the work and issue permission to the contractor to commence the work after checking that adequate precautions have been taken to avoid the damage to the cables. The permission shall be granted within 3 days of submission of such requests.
6. The name of the contractor, his contact telephone number, the nature of the work shall be notified in the Engineering control as soon as the concerned Engineering officials issue the letter authorizing commencement of work to the contractor. Test room shall be given copies. Test room shall collect any further details from the Engineering Control and shall pass it on to S&T/Rail Tel & Electrical officials regularly. In case the supervisors of concerned departments do not turn up on the day as advised in terms of Para 4 and 5 above, the works of contractor should not be stopped on this account.
7. In case of works being taken up by the State Government, National Highway Authority etc., the details of the permission given i.e. the nature the work, kilometer etc. be given to the Engineering control including the contact person's number so that the work can be done in a planned manner. The permission letter shall indicate the contact numbers of Test room/network Operating Centre of Rail Tel/TPC/Elect. Control.
8. Where the nature of the work taken up by the Engineering department is such that the OFC or other S&T

cables or Electrical cables is to be shifted and relocated, notice of minimum one week shall be given so that the Division/Rail Tel/Construction can plan the works properly for shifting. Such shifting works shall in addition, for security and integrity of the cables, be supervised by S&T supervisors/Rail Tel supervisors/Electrical Supervisors.

9. The concerned SE/P.Way/SE/Works/SE/Sig/SE/Tele/SE/Electrical (TRD or G) or Rail Tel supervisors supervising the work of the contractor shall ensure that the existing emergency sockets are not damaged in view of their importance in providing communication during accident/emergency.
10. In case of minor nature of works where shifting of cable is not required, in order to prevent damage to the cable, the Engineering contractor shall take out the S&T or optical fiber cable or Electrical cable carefully from the trench and place it properly alongside at a safe location before starting the earthwork under the supervision of SE/Sig or SE/Tele or SE/Electrical(TRD or G). The cable shall be reburied soon after completion of excavation with proper care including placement of the brick over the cable under the supervision of S&T or Electrical supervisors. However, the work will be charged to the concerned engineering works. The responsibility for ensuring availability of SE (Signal), SE (Electrical) as per Para 4 and 5 above lies with the respective department. The contractor will go ahead with the shifting of cables as per the program decided and he will not be held responsible for any cable cut.
11. In all the sections where major project are to be taken up/going on Rail Tel/S&T department shall deploy their official to take preventive/corrective action at site of work. As regards Electrical Department, the official may be deputed on need basis.
12. No new OFC or quad cable shall be laid close to existing track. It shall be laid close to the Railway boundary on one side of the Railway track to the extent possible to avoid any interference with the future works (doubling etc.). It shall be ensured in the new works of cable laying that the cable route is properly identified with electronic or concrete markers. Wherever multiple cables are laid in a trench, RFID markers may be provided for easy identification of the cable. Henceforth, wherever cable laying is planned, before undertaking the cable laying work, the cable route plan of the same shall be prepared by the Dy. CSTE/A or Dy.CEE/C and shall be got approved from the concerned Sr. DSTE/DSTE or Sr.DEE/DEE and also from the concerned Dy. CE/C for new lines and from the concerned Sr.DEN for all other projects including GC etc., to avoid possible damages in future. Such approvals shall be granted within 15 days of the submission of the request.
13. The works of excavating the trench and laying of the cable should proceed in quick succession, leaving a minimum time between the two activities.
14. In case damage caused to OFC/Quad cable or Electrical cable during execution of the work, the contractor is liable to pay a penalty for damaging the cable. Penalty shall not be levied in case of the following:-
  - i. Detailed cable route plan as per clause C-1 not provided by concerned department or cable is not protected as per laid down procedures.
  - ii. The alignment of the cable does not tally with the information provided to the contractor.
  - iii. The cable depth is found to be less than 800 mm from normal ground level.

- iv. No representative of S&T department/Rail Tel was available at site guarding the cables on the fixed pre determined date and time.

15. Penalty to be imposed for damages to cable shall be as under:-

Cable damaged	Penalty per location
Only Quad cable or Signaling cable	Rs.1.0 Lakh
Only OFC	Rs.1.25 Lakh
Both OFC & Quad	Rs.1.5 Lakh
Electrical Cable	Rs.1.0 Lakh

Necessary debit in this regard shall be raised on the department undertaking the work who shall in turn levy the penalty on the defaulting contractor. S&T department shall raise the debits in case of damage to OFC or Quad or Signaling cable and Electrical department shall raise the debits in case of damage to Electrical cable.

16. Railways will not lodge FIR with RPF in case of works being executed by authorized contractors of Railways who have been duly permitted to execute the works in accordance with this JPO. Joint note by the supervisors of the concerned department shall be prepared and the responsibility of the cable cut should be decided without involving RPF. The joint note deciding the fact whether the contractor should be penalized shall be completed in a day's time from the occurrence of cable cut. In all other cases, when the cable is cut by an agency that was not permitted to execute any work, FIR should be lodged with RPF.
17. While giving permission for taking up the works, concerned departments may note that earthwork by engineering contractors will normally be done by machines except in a few isolated locations where the quantity of earth work is very less.
- I. Railways shall make necessary correction in their future contract so that this JPO can also be enforced contractually.
  - II. In case of damages to OFC, Rail Tel should be paid 5/6th of the penalty recovered. Rail Tel shall raise demands on the S&T department in this regard.
  - III. All types of signaling & OHE bonds i.e. rail bond, cross bond and structure bond shall be restored by the contractor with a view to keep rail voltage low to ensure safety of personnel.
18. Above joint circular shall be applicable for construction as well as open line organization of Engineering, S&T and Electrical.
19. S&T cable and electrical cable route plan should be prepared by the concerned S&T and Electrical officers respectively and got approved as stipulated in Para C-12 before undertaking the work. The completion cable route plan should be finalized block section by block section as soon as the work is completed.
20. All cable laying works shall be executed as per laid down technical specifications, such as protection measures/protective cover, compaction of refilled material etc.

- 1.3. Working near running line

- 1.3.1 The contractor shall not allow any road vehicle belonging to him or his suppliers etc. to ply in railway land next to the running line. If for execution of certain works viz. earth work for parallel railway line and supply of ballast for new or existing rail line, gauge conversion etc, road vehicles are necessary to be used in railway land next to the railway line, the contractor shall apply to the Engineer for permission giving the type & no. of individual vehicles, names & license particulars of the drivers, location, duration & timings for such work/movement. The Railways/Employer/Engineer or his authorized representative will personally counsel, examine & certify, the road vehicle drivers, contractor's flag men & supervisor and will give written permission giving names of road vehicle drivers, contractor's flag men and supervisor to be deployed on the work, location, period and timing of the work. This permission will be subject to the following obligatory conditions:
- 1.3.2 Road vehicles can ply along the track after suitable cordoning of track with minimum distance of 6 meters from the centre of the nearest track. For working of machinery close to the running tracks or plying of road vehicles during night hours, the contractor shall apply to the Engineer in writing for permission, duly indicating the site details in a neat sketch and safety measures proposed to be taken. Subject to the approval of concerned Railway authorities, the Engineer or his authorized representative will communicate permission to the contractor/contractor's representative. The contractor and his men shall strictly adhere to the instructions given along with such permissions.
- 1.3.3 Nominated vehicles and drivers shall be utilized for work in the presence of at least one flag man and one supervisor certified for such work. In order to monitor the activities during night hours, additional staff may have to be posted based on the need of the individual site.
- 1.3.4. The Contractor' machinery, equipment and vehicles shall normally operate 6 m clear of track. Any movement/work at less than 6m and upto a minimum of 3.5m clear of track centre, shall be carried out only in the presence of a person (including any railway employee) authorized by the Engineer. No part of the road vehicle shall be allowed at less than 3.5m from track centre.
- 1.3.5 The Contractor's machinery and equipment are required to operate close to the existing line carrying traffic. Contractor is fully responsible for operating these machineries without endangering the safety of the running line and traffic.
- a) The "look out and whistle" caution orders shall be issued to the trains and speed restrictions imposed where considered necessary. Suitable flag men/detonators shall be provided where necessary for protection of trains.
  - b) The supervisors/workmen should be counseled about safety measures. A competency certificate to the contractor's supervisor as per proforma annexed shall be issued by Manager/Electrical which will be valid only for the work for which it has been issued.
  - c) The unloaded masts, portals, copper drums, cement/ sand bags, cut pieces of steel and other such materials after unloading along track should be kept clear off moving dimensions and stacked as per the specified heights and distance from the running track.
  - d) Supplementary site-specific instructions, wherever considered necessary, shall be issued by the Engineer.

### COMPETENCY CERTIFICATE

“Certified that Shri \_\_\_\_\_ TRD supervisor of M/S \_\_\_\_\_  
\_\_\_\_\_ has been examined regarding OHE working on \_\_\_\_\_ work. His  
knowledge has been found satisfactory and he is capable of supervising the work safely.

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Authorized Representative / South Western Railway

**1.4** The contractor shall provide at site at his own cost, all protection measures including exhibition and lighting of all Temporary Engineering Signals as per Railway rules, instructions and norms. All lights provided by the contractor shall be screened so as not to interfere with any signal light on the Railways or with any traffic or signal lights of any local or other authority.

**1.5 Ancillary and Temporary works**

- a) The Contractor's proposals for erection of all ancillary and temporary works shall be in conformity with the proposals submitted along with the tender and modifications thereto as approved by the Engineer.
- b) The Contractor shall submit drawings, supporting design calculations where called for by the Engineer and other relevant details of all such works to the Engineer for approval at least one month before he desires to commence such works. Approval by the Engineer of any such proposal shall not relieve the contractor of his responsibility for the sufficiency of such works.
- c) The contractor shall, at his own cost, design and provide any temporary arrangements including modifications required in connection with the above said works and remove the old lines/masts/portals etc., when no longer required. These arrangements shall conform to Railway norms. The contractor shall obtain all necessary approvals and sanctions of the concerned Railway / K RIDE authorities including Commissioner of Railway Safety through the Engineer/ Employer in advance and well in time.
- d) *The contractor shall ensure and be entirely responsible for proper design, fabrication, provision and upkeep of all temporary arrangements and all associated activities so as not to endanger safety of any assets, running track, traffic and traveling public*
- e) Notwithstanding the above, the contractor shall not, however, be relieved of his responsibility and obligation as aforesaid.
- f) Save as provided in Para 1.5(e) above, the contractor shall bear the cost of complying with all safety requirements. No extra payment will be made for complying with the safety provisions under this chapter and the cost of all such elements to meet the safety requirements shall be deemed to be included in the price schedule.
- g) The contractor remains fully responsible for ensuring safety. In case of any accident, the Contractor shall bear cost of all damages to his equipment and men and also damages to Railway and its passengers.

**As OHE voltage is 25 KV, following precautions should be taken by staff while working on OHE.**

1. No work shall be done above or with in a distance of 2 meters from the live OHE without a "Permit to Work".
2. Inductive effects occur on large metallic structures such as fencings, structural steel of platforms running parallel to the track. They will have to be earthed suitably to afford safety.
3. Each working party shall be protected by at least two independent earths, one on each side of a working party.
4. If the distance between the working parties exceeds 100 meters, intermediate earth shall be provided in such a manner as to ensure that the distance between earths does not exceed 100 meters.
5. Men shall be posted on both sides of the site of work to warn the working party of any approaching train on the same track and adjacent track.
6. For providing earth on the OHE, fix the earthing clamp securely to a mast at least one span away after making sure that the mast to earth rail bond of this mast is intact.
7. Earthing clamps should always be fixed to the traction rail or mast first and then the top clamp should be hooked to the OHE to be earthed.
8. For removing the earthing, first remove the hook on the OHE and then the clamp fixed to the rail or mast
9. Two sections of conductors or ends of conductors which may have snapped should be separately earthed at two points after switching off supply to both parts of the OHE. This precaution should also be observed when working or in the vicinity of a sectioning point and cut in insulators.
10. Neutral sections should be treated as live equipment and earthed separately at two points on either side of the work party before commencing work.
11. When work is to be carried out on an isolator, both sides of the isolator should be earthed at two points.
12. No fallen wires shall be touched unless power is switched off and the wire suitably earthed.
13. In electrified track, steel tape or metallic tape or tape with woven metal reinforcement should not be used.
14. Ropes, come along clamps, tirfor should be tested once in a month in the presence of K-Ride/Representative
15. All the staff should wear helmets to protect their heads against any tools or equipment which may drop down accidentally.
16. Staff should protect themselves against an inadvertent fall by wearing a safety belt for supporting themselves by a rope sling.
17. Ropes used with ladders should be cotton or jute. Use of metallic ropes is prohibited. A ladder should be held by one person on the ground to prevent slipping, while the top end should be tied to the supporting structure or conductor to keep it in position and prevent it sliding away.
18. Ladders should never be allowed to fall on or rest against the contact wire.
19. More than one person shall not normally be allowed on a ladder as far as possible.
20. Climbing on a ladder with wet or slippery foot wear is forbidden.
21. A rope should be used to pass tools or any equipment to the men working on a ladder.

22. No one should stand directly below a work spot under a ladder.
23. The strength of the anchoring rope should not be less than of the cable to be anchored.
24. It is important that staff who ask for power block should know the correct method of identifying and describing any section of OHE where shutdown is required.
25. Whenever there is a doubt in the description, the person asking for power block shall state clearly the track and OHE structure numbers between which work is to be done.
26. All messages relating to shut down and restoration of power supply, permits to work, etc. issued over the telephone shall invariably be supported by exchange of private numbers and repeated twice.
27. Do not tie the rope on rail without taking traffic block.
28. It is necessary to take traffic block while working on tunnel or bridge.

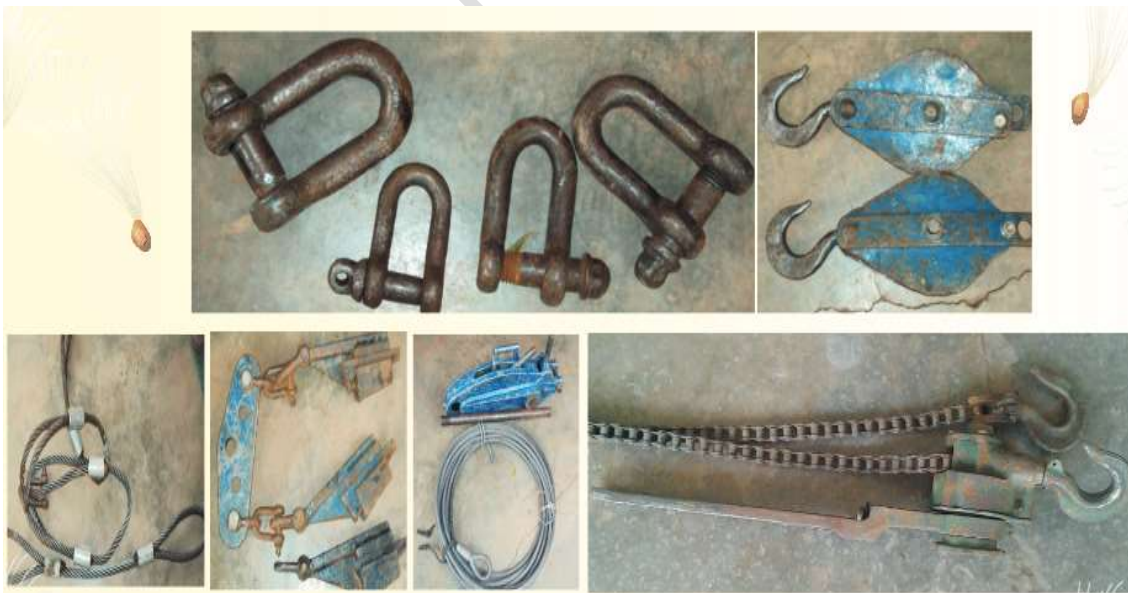
K-RIDE

## SAFETY RULES FOR 25KV, 50HZ, OVER HEAD EQUIPMENT.

1. Staff Should neither sit nor stand under the **ATD** Balance weight.



2. Ropes, Pulleys, Pull-Lifts, come along clamps 'D' shakels and tiffors etc. should be tested once in six months and keep record.





3. No fallen wires shall be touched unless power is switched off and the wire suitably earthed



4. Do not wear loose cloths such as kurta pazama, lungi, safi etc. while working.



5. Do not stand on bracket tube insulator, while maintenance of OHE



**The following rules are supplementary to the General and Subsidiary Rules.**

1. Printed boards containing instructions regarding treatment of persons suffering from electric shock should be exhibited in every OHE maintenance depot, equipment room, switching station, cabin, OHE Inspection Car shed, loco shed, OHE Inspection Car and wiring train and also in offices of SM, ASM, CYM, AYM and HTXR.
2. First Aid Boxes should be kept at every switching station, maintenance depot, in OHE Inspection Car, breakdown vehicle and wiring train.
3. Ropes, come-along clamps, Tirfor etc. should be tested once in six months at least, in the presence of an Kride representative, and record of such tests maintained in each depot

### **Permit to Work**

1. Before commencing work on any part of the dead OHE or within 2m of live OHE, a permit-to-work shall be obtained from TPC or other authorized person.

### **Protection of Staff against Traffic Movements and Protection of Trains**

1. The supervisory official in-charge of work on OHE shall observe relevant provisions of GR and SR for protection of trains before work on OHE is commenced and for the whole time the work is in progress.

2.Measures shall be observed by all concerned to prevent accidental energization of the section under power block on account of electric train movements.

### Earthing before Commencement of Work .

- 1.All metallic parts within reach (either directly or through tools etc.) shall be earthed, after they are made dead.
- 2.Each working party shall be protected by at least two independent earths, one on each side of a working party.
- 3.If the distance between the working parties exceeds 1000m intermediate earths shall be provided in such a manner as to ensure that the distance between earths does not exceed 1000m.
- 4.Even when earthing is provided by isolator switches with earthing heels, additional temporary earths as above shall also be provided.

### Procedure for Providing Temporary Earths

The following sequence of operations shall be carried out while providing temporary earths on OHE.

- 1.Men shall be posted on both sides of the site of work to warn the working party of any approaching train on the same track and adjacent track(s).
- 2.The permit-to-work shall be obtained prior to commencing work to make sure that power supply has been switched off.



First fix earthing clamp of discharge rod to rail/ mast

Hook top clamp on contact wire



Test top clamp on RT/ BT

3. For providing temporary earth on the OHE or other equipment after it has been made dead, only discharge/ earthing pole assembly specially designed for this purpose alone should be used. The cable shall be flexible and should have adequate cross-section (40 sq.mm) to be able to withstand short circuit currents.

4. Fix the earthing-clamp securely to a mast at least one span away on one side of the work site after making sure that the mast-to-earth rail bond of this mast is intact. Alternatively, the clamp may be fixed to the bottom flange of one of the traction rails, taking the cable under the rails.

- In single-rail track-circuited sections, the earthing clamp should be fixed to the traction rail i.e. non-track-circuit rail; on double-rail track-circuited sections the earthing clamp should be fixed to the mast.
- The mast-end or rail-end clamp of the discharge /earthing pole assembly should be checked for tightness just before connecting the top clamp on to the OHE as the earthing clamp fixed to the rail or mast in advance could have worked loose.

5. Hook securely with a snap action the top clamp of discharge/ earthing pole assembly to the OHE conductor close to the mast/structure and tie the earthing pole to the mast/structure. Never hook on the top hook of the earthing cable to the OHE, till the other end has been first connected to earth.

6. The earthing clamps should always be fixed to the traction rail or mast / structure first and then the top clamp should be hooked to the OHE to be earthed.

7. Repeat operations 4 and 5 for the second temporary earth on the other side of the working party.

8. After temporary earths have been fixed on the OHE on both sides of the work site, staff may proceed with the maintenance work.

9. After work is completed and men, materials and tools have been removed and the OHE is clear, the above earthing rods may be removed in the reverse order i.e., first remove the hook on the OHE and then the clamp fixed to the rail or mast/ structure. After warning all staff that supply will be restored and that they should keep away from live equipment, the permit-to-work may be returned and supply restored.

## Precautions in Regard to Discharge/ Earthing Pole Assembly

1.The continuity of the cable connection between the top clamp and the earthing clamp should be checked once a fortnight.

- Cable should be renewed if more than 20% strands are broken. During use, cable should be continually examined for fraying and breakage of strands.
- Discharge/Earthing pole assembly should be inspected by K-Ride/representative once a month.

2.During accidents when slewing the OHE and in similar circumstances, the discharge/ earthing pole assembly should be provided at a location where it is not likely to be interfered with during crane working or due to work on the permanent way.

## Work on OHE or any Conductor having a Sectioning Point

***When work is to be carried out on OHE or conductors, which are not electrically bonded, following additional precautions are required.***

- The two sections of conductors or ends of conductor which may have snapped may be at different potentials. Each end should, therefore, be separately earthed at two points after switching off supply to both parts of the OHE or conductor.
- This precaution should also be observed when working on or in the vicinity of a sectioning point and cut-in insulators.
- Neutral Sections should be treated as live equipment and earthed separately at two points on either side of the work party before commencing work.
- When work is to be carried out on an isolator, both sides of the isolator should be earthed at two points or more conveniently, isolator jumpered temporarily.

Even when earthing is provided by isolator switches with earthing heels, additional temporary earths shall also be provided on both side of the isolator.



## Protective Helmets

1.At the work-site, staff are advised to wear helmets to protect their heads against any tools or equipment **which may** drop down accidentally, as well as to minimize head injury in case of accidental fall from a height.



Always Use Safety Belt and Helmet

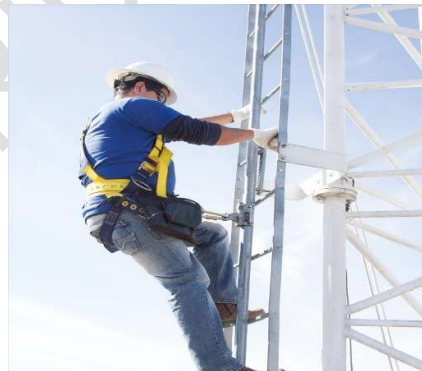


2. Wear helmet not only while working above ground level but wear helmet while working at ground level as well



### **Safety Belt:**

1. Staff working on structures or a ladder are advised to protect themselves against an inadvertent fall by wearing a safety belt for supporting themselves by a rope sling.

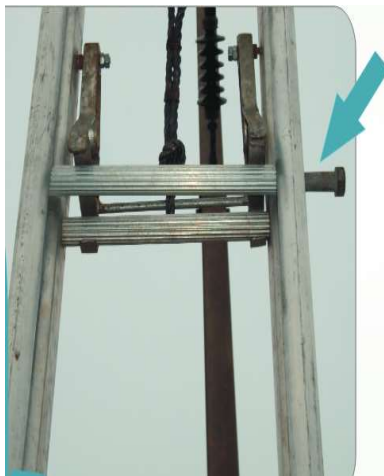


### **Rules for Use of Ladders**

- ❖ It shall be the responsibility of the supervisor to ensure that ladders are stored in a protected enclosure, properly maintained and reconditioned as often as required.
- ❖ A ladder should never be in such a position so as to likely to fall on a live part.



- ❖ Ladder should be held by one person on the ground, while the top end should be tied with the supporting structure/ rope.
- ❖ Ropes used with ladders should be of cotton or jute. Use of metallic ropes is prohibited. A ladder should be held by one person on the ground to prevent slipping, while the top end should be tied to the supporting structure or conductor to keep it in position and prevent it sliding away.
- ❖ Ladders should never be allowed to fall on or rest against the contact wire.



Always provide 20/16 dia G.I. bolt in step of ladder which is used for pull lift and extension step.

- ❖ If the nature of the work involves risk of the conductor breaking into two parts (due to opening out of sleeves or splices) the ladder shall not be rested against the conductor. Trolley ladders shall be used in such cases.
- ❖ More than one person shall not normally be allowed on a ladder as far as possible.
- ❖ Climbing on a ladder with wet or slippery foot-wear is forbidden
- ❖ Ladders should not be used for transporting materials.
- ❖ A rope should be used to pass tools or any equipment to the men working on a ladder.
- ❖ No one should stand directly below a work spot under a ladder.

### **Other Important Precautions to be Taken While Carrying out Works on OHE**

- 1.The useful cross section of a conductor shall not be reduced while making joints.
- 2.Any contact with conductors, which are not specifically earthed, is forbidden.
- 3.The strength of the anchoring rope should be not less than that of the cable to be anchored.

4. Temporary anchoring of conductors should only be done by using stranded flexible steel cable at least of the same tensile strength as the cable to be anchored.
5. Use of two cables of different strengths joined together is prohibited. Use of cotton, jute or other non-metallic ropes for anchoring is forbidden.
6. Structure bonds and cable connections of the structure to earth shall be maintained in proper condition. No heavy materials should be stacked on the rail bonds; transverse bonds between two rails of the same track as well as rails of different tracks shall also be maintained in proper condition.
7. Where rails to which structures are connected are replaced, the structure shall be connected to the new rail immediately after it has been laid.

### **Procedure for Effecting Shut-Down for Work on Auxiliary transformers**

1. Power supply to auxiliary transformers is effected through fuse-switches on the 25 kV side and the LT Side is controlled through fuses or double-pole iron-clad switch-fuses. Isolating fuse switches should be opened out and fuses removed both on the HT and LT sides and the transformer earthed before starting work.

### **Work on Overhead Lines Running Parallel to Electrified Tracks**

No work on any span of any overhead line (LT power line or other line) running parallel to an electrified track where the minimum distance between the nearest conductor of the overhead line and the centre-line of the nearest electrified track is less than 8m, should be done without switching off power from the 25 kV traction line. (In addition to making dead and earthing the overhead line on which work is to be carried out in the normal manner).

**Except for the following specific items for work :**

1. Replacement of lamps, if below line.
2. Painting of structures / poles upto a distance of 2m from the live wires of the power line.
3. Reinforcement of foundations where such reinforcement does not involve any prior weakening of the foundation at any time during the work.
4. Replacement of aerial fuses.

### **Isolation of Booster Transformers**

***To isolate a booster transformer for maintenance or other work, the following sequence of operations should be carried out***

1. Where no isolator is provided a permit-to-work should be obtained for both the elementary sections, the BT should be disconnected from the OHE and the OHE made through by jumpering.
2. When an isolator is provided to disconnect the BT primary winding from 25 kV lines, power must be switched off from both the elementary sections to which the BT is connected after which the isolator should be opened to disconnect the BT from the OHE and to make the OHE through.
3. The secondary winding of the BT should be disconnected from the return conductor and the return conductor made through by jumpering.
4. The return conductor should be earthed at the location where the BT has been disconnected; and the midpoint rail links on both sides of the BT should be opened so that booster cells on either side will extend over a longer section temporarily.
5. With the OHE and return conductors made through, 25 kV power supply may be restored



It should be noted that during the period when a BT has been disconnected from service, the interference on adjacent communication circuits will be enhanced. In view of this the defective BT should be replaced with a good BT with the least possible delay

## Isolators

- ❖ Isolating Switches on the 25 kV system shall not be opened or closed when current is passing through them. Normally, isolators should only be opened or closed, after power supply to the section has been switched off by opening the appropriate interruptor

## Petroleum Sidings

*The following arrangements/precautions would be necessary:*

### *Arrangements*

- I). An equipotential link between the petroleum sidings installation earth and the track via a switch
- II). Setting up of neutral zones (insulating joints) in the track to avoid any risk of propagating stray current.
- III). Setting up of neutral zones/sections in the contact wire similar to loco inspection pits.
- iv) The tracks must be provided with longitudinal bonds on both the rails as well as transverse bond (30 m intervals). All masts and metallic structures in the vicinity of the track/ sidings should be provided with structure bonds. Copper rivets should be used for bonding.
- v) 10 ohm earths must be connected to the petroleum siding on each side at the insulated joint.

### **Precautions**

- i). No oil tanker is permitted to stable under live OHE for inspection purpose.
- ii) Fuelling to be done by side filling arrangement only.
- iii) Pipe lines in the vicinity of the track should be properly earthed
- iv). Minimum 2 m electrical clearance from live OHE of the adjacent track or any other structure nearby must be maintained.
- v) During filling/loading and unloading of petroleum products the isolators at the neutral section of OHE should be kept open to ensure that the OHE is dead and earthed

# **CHAPTER-9** **ANNEXURES**

**ANNEXURE - 1**  
**ANNEXURE-I**

**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 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 kgf/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 curved tracks	ETI/OHE/G	02106 Sh.1	A

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 (a)	Details of OHE foundation in soft rock (Bearing capacity 45,000 Kgf/m <sup>2</sup> ).	ETI/C	0059	C
123 (b)	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 soil safe bearing capacity 16500 Kg/ M <sup>2</sup>	-do-	0063	B



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
161A	Counter weight assembly for Regulating Equipment (3:1 Ratio)	ETI/OHE/P	5090-5	E
161B	Trapezoidal weight assembly for Regulating Equipment (3:1 Ratio)	TI/DRG/OHE/ATD/RDSO/	00004/00/2	-
161C	Trapezoidal weight assembly	ETI/OHE/P/	5090-1	G
161D	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

1	2	3	4	5
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 & Regional language)	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/RDS O	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/RDS O	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
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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 for 25kv PT Type-II	ETI/PSI/P	11110	C

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
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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
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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 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/CROOM/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
368A	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
368B	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
368C	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
368D	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	-
368E	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	-
368G	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	-
368H	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
ii	155	47	169.2
iii	136	44	158.4
iv	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.	Galvanised 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 arrestor- 7.5 KV	ETI/PSI/3(8/75) with A&C slip No.1 of (2/91)
<b>1</b>	<b>2</b>	<b>3</b>
25.	220 KV or 132 KV or 110 KV or 66 KV or	TI/SPC/PSI/PTs/0990 with A&C slip No.1 to 5

	25 kV Potential transformers	(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 Auxiliary 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 Interruption (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-	ETI/PSI/90 (6/95) with A&C Slip No.1, 2,3,4,5,6,7 (08/2007) & 8 (April 2009).

	750/5A (for heavy haul duties) for Railway ac traction sub station.	
44	Technical specification for two zone static relay for 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)
<b>1</b>	<b>2</b>	<b>3</b>
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 Galvanised 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

**(G) LIST OF IS SPECIFICATION**

<b>S No.</b>	<b>IS Code No.</b>	<b>Descriptions</b>
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 upto 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	Galvanised 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 galvaised 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

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# **SECTION-8C**

## **Safety, Health and Environment (SHE) Manual**

## **A: Safety, Health, Environment (SHE) and Social Obligations of the Contractor**

### **1: Safety, Health, Environment (SHE) and Social Obligations of the Contractor**

#### **1.1 Governing Law:**

The contract compliance documents shall be governed by the laws and byelaws of the Union of India, the Karnataka Government and the subject local bodies. The competent courts of jurisdiction as mentioned in the Special Conditions of Contract shall have exclusive jurisdiction in all matters in connection with this contract.

#### **1.2 Statutory Compliance:**

The Contractor agrees to abide by all the existing laws of all the statutory authorities and bodies and further agrees that the prices quoted include all the costs for liabilities under the existing laws and acts, unless otherwise mentioned. All such laws may or may not have been explicitly stated in this contract document.

The Contractor shall be aware of all laws, ordinance, codes, rules and regulations in any manner affecting those employed on the Works or the materials used in the Works or in any way affecting the conduct of the Works and of all orders and declarations of bodies or tribunals having any jurisdiction or authority over the Work.

- The Contractor shall at all times himself give all notices, observe and comply with and shall require all his its supervisors employees, subcontractors, to observe and comply with all such applicable laws, ordinances, rules, regulations, orders and decrees in effect or which may become effective before completion and acceptance of the Works, and shall protect and indemnify the Authority against any claim of liability arising from or based upon the violation of any such law, ordinance, code, rule, regulation, order or declaration, whether by himself, his its employees or his its subcontractors or any other person or organization employed for or upon the Work.
- In case the Contractor observes that any requirement of the contract documents varies with such laws, ordinances, codes, rules, regulations, orders or declarations, he shall promptly notify the Authority in writing and shall not proceed with any Work affected by such variance without written instructions;
- The contractor shall prepare a register of applicable requirement and status of EHS legal compliances considering proposed construction activities and site-specific conditions before commencement of activity (ies) for necessary actions to comply with.

#### **1.3 Permits and fees:**

Unless otherwise provided in the contract documents, the Contractor shall secure and pay for all permits, government fees, and licenses necessary for the execution and completion of the Works and requisite certificates. The required permits will be secured by the Contractor prior to commencing the works and a copy of all such documents shall be submitted to the Authority.

#### **1.4 Safety, Health and Environment (SHE)**

1. The contractor shall, throughout the duration of the contract, be responsible for management of safety, health and environment (SHE) and deploy qualified personnel and management committee to manage these aspects;

2. The Contractor shall at all times comply with provisions of the EHS management plan (EMP) which includes the following but not limited to;
- a) All the workers must use adequate personal protective equipment's (PPEs) such as safety helmet, safety shoes, safety glasses, safety harness and gloves etc. as required for different construction activities.
  - b) Tool-box talks should be undertaken daily before starting the routine construction activities. A suitable format for recording the tool-box talk should be filled and maintained at a construction site by the site safety in-charge or site manager.
  - c) Areas being used for activities such as welding, bar cutting, bending, excavated areas and material stacking areas should be barricaded with a barricading tape.
  - d) Adequate safety signages indicating use of PPEs, different hazards etc. should be conspicuously displayed in local language (hindi) at adequate locations within a construction site.
  - e) Walking pathways for the workers and the drive-ways for the construction vehicles should be kept separate and properly marked.
  - f) At areas in a construction site, where work such as welding, cutting is carried out with aid of electrical power, proper care should be taken so that electrical wire with open joints are not spread on ground in haywire condition posing risk of electrocution and trip hazard to workers.
  - g) Vehicle parking areas should be maintained outside the areas of construction activities and should be conspicuously marked.
  - h) Adequate lighting arrangements should be made within the construction area if construction activities are undertaken after sun set or in absence of day light.
  - i) Heavy equipment's or other earthmover equipment's must be equipped with alert siren for reverse gear.
  - j) Flammable materials such as diesel if stored in bulk quantities should not exceed 900 liters. Drums used for diesel storage should not be placed on unpaved area and open to sky condition. Smoking, lighting or burning activities must be completely prohibited within the radius of 25 m from the location of diesel storage or other highly flammable materials;
  - k) CO<sub>2</sub> fire extinguishers and buckets filled with dry sand should be maintained at appropriate locations at a construction site.
  - l) At least 2 first aid kits should be maintained at any construction site and workers should be made aware of whom to contact in case of injuries requiring first aid. First aid kit should be kept in charge of a responsible person who shall be readily available during the working hours. Supervisors at site should have obtained a formal first aid training.
  - m) The contractor shall prepare an emergency response plan and train all workers on the appropriate actions to be undertaken during emergency situations (e.g. earthquake, fire)
  - n) A site-specific emergency contact numbers which should include, nearest police station, hospital, fire station and the site in-charge should be conspicuously displayed.
  - o) An ambulance van or an arrangement with a nearby hospital should be made for transportation of serious cases of accidents or sickness of any worker/s.
  - p) Relevant documents should be maintained by the site managers at a construction site as required under Building and other Construction Workers (Regulation of Employment and Conditions of Services) Act, 1996.
  - q) No worker employed at a construction site shall be required or allowed to work continuously for more than fifteen hours a day inclusive of intervals of rest or sixty hours in a week.

- r) No worker shall be required or allowed to work for more than fourteen consecutive days unless a rest of twenty-four hours is given for rest to such worker.
- s) Standard operating/working procedures with respect to safety should be implementing for undertaking works such as working in confined spaces, working at heights, lifting of heavy parts with cranes and other lifting equipment's.
- t) Lifting equipment's (like cranes, slings etc) should be inspected thoroughly as per standard inspection procedures. Copy of such inspection records should be kept readily available for review with the respective equipment's.
- u) In addition to the aforementioned construction activities, adequate safety measures, as required, during different phases of project development shall be implemented;
- v) Conduct safety audit at periodic intervals and submit the report to the Authority. The report shall outline key findings and corrective actions (if any);
- w) Ensure that hazardous material (paints, lubricants and oils etc) which are brought to the Project site and hazardous wastes (used/waste/left over paint, paint and oil soaked rags/material, empty oil/paint drums/carbuoys, filters, batteries, used hydraulic oil etc.) generated at site (both during construction and operation) are: stored under segregation and containment; handled/used with appropriate care and personal protective equipment; and disposed off through entities authorized to handle and dispose hazardous wastes;
- x) Where applicable and relevant implement the condition for Forest Clearance (FC), NOC from National Board for Wild Life (NBWL), respective CRZ management authority and respective State Pollution Control Board, permission of tree(s) removal from non forest area and other provisions of the environment management plan (EMP) which includes the following but not limited to: (a) provision of slope protection of open and excavated areas; (b) provision of storm water runoff drainage; (c) stockpiling of construction materials shall not impact or obstruct the water drainage; (d) stockpiles shall be covered/protected to prevent dust generation and erosion; (e) construction activities near sensitive receptors shall be limited during daytime; (h) provided dust suppression system in applicable areas;(f) ensure that all equipment, vehicles and other sources of fuels and lubricants will be collected and contained to avoid groundwater contamination; (g) source construction and domestic water requirement from third party, if the available sources will result to water competition with nearby communities.
- y) Contractor shall conduct environment monitoring (ambient air, noise etc) on periodic basis.
- z) The contractor will put in place a grievance management system to address any community grievances/concerns linked to the project and construction activities. This will be documented on the site.

**1.5 Accident/Incident Reporting for SHE:** The contractor shall inform the Authority in writing, immediately and no later than 24 (twenty four) hours of an incident (including any major environmental hazards) or accident occurring (including, without limitation, any fatality, lost time incident, medical treatment case, first aid case etc) in anyway connected with the Work. The contractor shall also maintain and submit a monthly report of all such incidents/accidents. In addition to this, the contractor shall promptly conduct incident investigations on all fatalities and major accidents/incidents and submit a report with findings/recommendations and actions taken/planned within 15 days from the date of occurrence of the accident/incident. The authority shall be entitled to join the contractor in its investigation or carry out its own.

**1.4.1.6 Labour Laws:**

- During continuation of the contract, the Contractor and his sub- contractors shall abide at all times by all existing labour enactments and rules made there under, regulations, notifications and byelaws of State /Central Government or local authorities and any other labour law (including rules), regulations, bye-laws that may passed or notified under any labour law by the state / central government or the local authorities during execution of the Work. The Contractor shall keep the company indemnified in case any action is taken against the Authority by the competent authority on account of contravention of any of the provisions of any act or rules made under these regulations or notifications including amendments;
- In case the Authority is caused to pay or reimburse such amounts as may be necessary to cause or observe or for non-observance of the provisions stipulated in the notifications/bye-laws/acts/rules/regulations including amendments, if any, on the part of the Contractor, the Authority shall also have right to recover from the Contractor any sum required or estimated to be required for making good the loss or damage suffered by the Authority;
- The Contractor shall carry out its activities consistent with the intent of ensuring legally permissible equal opportunity, fair treatment and non-discrimination in relation to recruitment and hiring, compensation, working conditions and terms of employment for its workers (including prohibiting any form of discrimination against women during hiring and providing equal work for equal pay for men and women) and minimizing potential labor retrenchment;
- The Contractor shall not restrict its workers from developing a legally permissible means of expressing their grievances and protecting their rights regarding working conditions and terms of employment.
- The Contractor shall engage contractors and other providers of goods and services a) who do not employ child labour, defined as employment of children whose age is below the statutory minimum age of employment; and b) who do not employ forced labour defined as all work or services not voluntarily performed, that is, extracted from individuals under threat of force or penalty; c) who have appropriate management systems that will allow them to operate in a manner which is consistent with the intent of (a) ensuring legally permissible equal opportunity and fair treatment and non-discrimination for their workers, and (b) not restricting their workers from developing a legally permissible means of expressing their grievances and protecting their rights regarding working conditions and terms of employment.

**1.7 Labour Camps:**

1. Labour camp should be adequately fenced and isolated from a construction area and should be livable (sufficient space, lighting, toilets, electricity, cooking area etc)
2. Sufficient supply of drinking water should be maintained at a labour camp.
3. In case of construction sites where 100 or more workers are likely to work for 6 months then an adequate canteen consisting of at least a dining hall, kitchen, store room, pantry and washing places separately for workers and utensils should be maintained.
4. To avoid spread of infections and diseases, proliferation of mosquitoes, flies, rodents and other pests, wastewater generated from domestic activities such as bathing, and washing should not be allowed to flow in open and should be channelized to the nearest municipality drain. In absence of municipality drain, a septic tank and a soak pit system of adequate capacity should be constructed.
5. Containers for collection of food waste, kitchen waste should be provided in labour camp. These containers should be emptied on regular basis.

**1.8 Penalty Clause**

SN	Item	Penalty
1	Violation of any of the SHE condition(s) and social obligations of the contractor given under the heading Safety, Health, Environment (SHE) and Social Obligations of the Contractor	Rs.5,000/- for single violation, compounded to a maximum of Rs.25,000/- at any single instance
2	Fatal Accident at the work site of the contractor due to negligence of contractor or its personnel.	Rs.5,00,000/- for first fatality & Rs.10,00,000/- for subsequent fatality.
3	Grievous Injury Accident at the work site of the contractor due to negligence of contractor or its personnel	Rs.1,00,000/- for first grievously injured person and Rs.2,00,000/- for every subsequent grievously injured person

# **SECTION – 9**

## **BILL OF QUANTITIES**

**(FINANCIAL BID)**



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### Section 9: PART- A: Bill of Quantities (Financial Bid)

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**DOUBLING PROJECT (DL)****BILL OF QUANTITIES (FINANCIAL BID)****Tender No: KRIDE/2023-24/EL/WORK INDENT14**

“Design, Supply, Erection, Testing & Commissioning of 25kV, AC, 50Hz, Single phase, Traction Over Head Equipment for doubling of 1. Banaswadi (Incl) (211/090) - Baiyyappanahalli A Cabin (Excl) (205/378 in BAND-BYPL line) Section (10 TKM approx.) 2.a Baiyyappanahalli A Cabin (incl) (205/378 in BAND-BYPL line & 205/650 in BYPL-SBC line) - Bellandur Road (Excl.) (197/600) Section 2.b Anekal Road (Excl.) (171/600)- Hosur (Excl.) (159/750) Section (25.5 TKM approx.) Overall TKM of 35.5 approximately and including any modification in existing OHE/PSI if required in Bangalore division of South Western Railway”.

1. The Bill of quantities shall be read in conjunction with the Instructions to Tenderers, Conditions of Contract, Notice Inviting Tender, Technical Specifications, Tender Drawings, Schedule, Annexures and Addendums.
2. The Percentage/Amount are to be quoted in each section of the Bill of quantities (i.e. Schedule-A, B, C, D, E, F, G & H)
  - I. The Contractor should quote percentage for each schedule.
    - Schedule -A :Non-Ferrous Items
    - Schedule -B : Ferrous Items
    - Schedule -C : Concrete
    - Schedule -D : Other Items
    - Schedule -E : Supply of Contact Wire
    - Schedule -F : Supply of Contact Wire
    - Schedule -G : Miscellaneous Items
    - Schedule -H : Tools & Plants
  - II. The quoted Percentage/Amount are for completed and finished items of work and complete in all respects. Which shall be inclusive of constructional plant, tools, machinery, labour, supervision, materials, fuel, oil, consumables, electric power, water, transportation, all leads and lifts, dewatering, all temporary works and false works, construction of temporary stores and buildings, fencing, watering, lighting, erection maintenance, night working, inspection facilities, safety measures at work sites/casting yard for workmen and road users, preparation of design and drawings etc. establishment and overhead charges, labour camps, insurance costs for labour and works, contractor's profit, all taxes, royalties, duties, cess, octroi, GST and other levies and other charges together with all general risks, liabilities and obligations set out or implied in the contract and including remedy of any defects during the Defect Liability Period, unless otherwise provided in Bill of quantities.
3. Providing concrete for all works deemed to be inclusive of the cost towards production of concrete by batching plant, transit mixer, transportation of concrete with all leads and lifts, form work, shuttering including staging as required, pouring of concrete by pump/tower crane to all heights /depths, compaction by vibrators, curing by approved means such as water, steam or curing compound and all labour, tools, plants, machinery required for execution of work complete in all respects including de shuttering after completion of work.
4. The Percentage/amount for various Schedules and Summary of Bill of quantities shall be quoted in Indian Rupees both in figures and in words.
5. The whole cost of complying with the provisions of the Contract shall be deemed to have been included in the quoted Amount/Percentage.

6. All columns in the "Summary of Bill of quantities"- shall be filled in ink or typewritten and the total tender amount shown in the bottom. The person authorized to sign on behalf of the Tenderer shall digitally sign on E-proc.
7. General directions and description of works and materials are not necessarily repeated or summarized in the Bill of quantities.
8. The method of measurement of completed work for payment shall be in accordance with the requirements as stated in the individual sections of the Technical Specifications and Conditions of Contract.
9. Shuttering required for concrete work shall be of steel except wherever there are site constraints as decided by Engineer.
10. In the defined grade of concrete mix, the first figure defines the strength of concrete and second figure defines the maximum size of coarse aggregates to be used for production of particular concrete mix, E.g. M 15/20 means "M-15" is the grade of concrete and "20" is the maximum size of coarse aggregate in mm to be used.
11. Tenderer may please note that to perform this contract, nothing extra shall be payable on account of field constraints, availability of front, preparation of detailed scheme for taking necessary clearance and approval from the concerned authority and other local bodies etc.
12. If work is stopped due to non-shifting of utilities, no claim shall be entertained on this account.
13. The Tenderer's offer shall be inclusive of all taxes and duties payable by them. Income Tax and any other statutory taxes to be deducted at source, if any, will be deducted by the Employer in accordance with the Income Tax Act and any other acts in force and in accordance with instructions issued by the Authorities on this behalf, from time to time.
14. The Tenderer is required to furnish the PAN for all members of Group.
15. Replace CA audit with Statutory Auditor wherever applicable, except in qualification of experts.

**Important Notice:**

**THE TENDERER SHOULD QUOTE SINGLE PERCENTAGE AGAINST BILL OF QUANTITY.**

**Note:-**

- 1) The above quoted Percentage / cost covers all items of the work as detailed in the "Employer's Requirement" contained in Section 8A as well as conforming to all Technical Specifications in Section 8B and stipulations laid down in the Bid Document including all addenda/corrigenda thereof till the date of submission of Bids.
- 2) It is inclusive of all costs on Design, Drawings, Reports, Survey, Site Facilities, Construction, Equipment, Plants, Instruments, Labour, Supervision, Materials, Supply, Erection, Testing, Commissioning, Modification, Maintenance, Temporary Works, Site Access, Safety, Security, Defect Rectification, Insurance, Profit duties, Taxes, Levies, Royalties as per applicable law together with all general risks, liabilities and obligations set out or implied in the contract.
- 3) Total section length is 35.5 Tkm (approximate)
- 4) Schedule for which no rate or price has been entered in will not be paid for by the Employer when executed and shall be deemed covered by the other rates and prices in the Bill of quantities (refer:

ITB Clause 11.2 and CC Clause 37.2).

- 5) Unit rate(Percentage) shall be quoted by the Tenderer in Indian Rupees.
- 6) Where there is a discrepancy between the rate in figures and words, the lower of the two will govern. [ITT Clause 24.1]
- 7) **No Tower Car, BRN Wagon, Crane etc, shall be provided for Mast Erection, Wiring & Adjustment of OHE. Tower Car shall provide for only joint checking with Railway Officials.**

**Note:**

- a) For all foundation works in OHE/Feeder/PSI works – M-15 concrete shall be used and for core – M – 20 concrete shall be used with 20mm ballast for both the concrete.
- b) For every 50 m3 of concrete casted, three samples of test cubes of size 15x15x15 cm shall be made and tested for crushing strength after 28 days at any government approved agency/colleges. If any sample test cube fails, the performance of the foundations will be observed for a period of one year from the date of casting for any crack or disintegration; if found satisfactory, payment for that batch will be made after the observation period.
- c) Muffing of OHE mast/structures should be done along with grouting in order to ensure homogeneous bonding between Muffing and grouting concretes.
- d) All bolts and nuts below 14 mm dia on current carrying parts of OHE shall be stainless steel.
- e) All type of insulators shall be tested at site for Mechanical Proven test in the presence of TRD Staff before execution of work.
- f) Proper soldering should be required both sides of the jumper ends (H, G, C, F, Anti theft jumpers) etc.
- g) Contractor should be provide PACKING SADDLE each and every Cantilever.
- h) The contractor shall provide composite insulator in the vandal prone area/polluted areas instead of porcelain insulator as directed by engineer in-charge.
- i) While doing power block works proper bonding is required for OHE structure.
- j) The Contractor should provide heat shrinkable PVC sleeve of minimum length of 40cm for structure bond under track circuited rail.
- k) The OHE traction bonds should be fixed to the rail and connected in such a way that they do not interfere with tamping machine during tamping.
- l) Drilling of holes in the rails shall be done only with prior approval of authorized Railway official and drilling should be done in the presence of nominated Railway official.
- m) All the released equipment, fittings, SPS Steel works shall be returned to the OHE Depot.

- n) While releasing OHE Structures (Masts, Boom, Up-Rights, TTU's, Gantry mast etc.) proper care shall be taken.
- o) The contractor shall provide only copper wires for anti creep, feeder wire, large span wires and jumpers.

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**BOQ**

<b>Schedule-A</b>				
<b>item_code</b>	<b>description</b>	<b>uom_name</b>	<b>quantity</b>	<b>rate</b>
A1-1	Supply (excluding supply of copper contact wire and catenary wire) of over head equipment.	KM	51.1	72291.7
A1-2	Erection (excluding supply of copper contact wire and catenary wire) of over head equipment.	KM	51.1	56702.2
A2-1	Supply (excluding supply of copper contact) of contact wire only(regulated with bridle wire)	KM	2	82421.82
A2-2	Erection (excluding supply of copper contact) of contact wire only(regulated with bridle wire)	KM	2	47162.67
A3-1	Supply of 25 kV Feeder wire.(Including 150 sq.mm Copper wire).	KM	3.5	1764133.07
A3-2	Erection of 25 kV Feeder wire.(Including 150 sq.mm Copper wire).	KM	3.5	30353.17
A4-1	Supply (excluding supply of copper conductor ) of anti creep with cadmium Copper Catenary Wire	EACH	37	12230.55
A4-2	Erection (excluding supply of copper conductor ) of anti creep with cadmium Copper Catenary Wire	EACH	37	2935.17

<b>Schedule-B</b>				
<b>item_code</b>	<b>description</b>	<b>uom_name</b>	<b>quantity</b>	<b>rate</b>
B1-1	Supply of fabricated mast K,B,S, series etc.	MT	260.0000	132142.88
B1-2	Erection of fabricated mast K,B,S, series etc.	MT	260.0000	5566.13
B2-1	Supply of 8"x8", 8"x6", 6"x6" mast and S1 to S8	MT	10.0000	132142.88
B2-2	Erection of 8"x8", 8"x6", 6"x6" mast and S1 to S8	MT	10.0000	5566.13
B3-1	Supply of fabricated steel work other than masts by manual/crane	MT	275.0000	137635.88
B3-2	Erection of fabricated steel work other than masts by manual/crane	MT	275.0000	9127.13
B4-1	Supply of fabricated & galvanised small part steel steel work(SPS).	MT	95.0000	134889.65
B4-2	Erection of fabricated & galvanised small part steel steel work(SPS).	MT	95.0000	7599.35

<b>Schedule-C</b>				
<b>item_code</b>	<b>description</b>	<b>uom_name</b>	<b>quantity</b>	<b>rate</b>

## Section 9: Part A: Bill of Quantities

C1-1	For Foundation and Plinth - Concrete in hard soil -Supply	CUM	300.0000	8050.04
C1-2	For Foundation and Plinth - Concrete in hard soil -Erection	CUM	300.0000	1837.77
C2-1	Concrete in rocky soil - Supply	CUM	300.0000	8300.23
C2-2	Concrete in rocky soil - Erection	CUM	300.0000	2436.55
C3-1	Concrete in other than hard soil and rock - Supply	CUM	2670.0000	8378.80
C3-2	Concrete in other than hard soil and rock - Erection	CUM	2670.0000	1420.49
C4-1	Reinforced concrete- Supply	CUM	80.0000	11166.47
C4-2	Reinforced concrete- Erection	CUM	80.0000	6380.76

<b>Schedule-D</b>				
D1-2	Preparation of designs and drawings for over head equipment complete. - Erection only	KM	35.50	14952.50
D2-2	Preparation of designs and drawings for Switching station - Erection only	Each	2.00	24774.94
D3-2	Supply of Preparation of station working rule diagram and working instruction	Each	7.00	10522.13
D4-1	Supply of a Guy rod assembly	Each	193.00	13793.90
D4-2	Erection of a Guy rod assembly	Each	193.00	789.01
D5-1	Supply of a single bracket assembly including stay and bracket insulator	Each	1470.00	28351.62
D5-2	Erection of a single bracket assembly including stay and bracket insulator	Each	1470.00	1464.88
D6-1	Extra on D5 for supply of additional fittings on a single bracket assembly for supporting two OHES	Each	70.00	4188.99
D6-2	Extra on D5 for Erection of additional fittings on a single bracket assembly for supporting two OHES	Each	70.00	270.94
D7-1	Supply of single bracket assembly suitable for tramway type OHE (Regulated).	Each	50.00	28327.57
D7-2	Erection of single bracket assembly suitable for tramway type OHE (Regulated).	Each	50.00	914.06
D8-1	Supply of a pull off arrangement for one OHE	Each	10.00	16524.41
D8-2	Erection of a pull off arrangement for one OHE	Each	10.00	976.59
D9-1	Extra for Each additional equipment pulled - Supply only	Each	10.00	5265.56
D9-2	Extra for Each additional equipment pulled - Erection only	Each	10.00	589.52
D10-1	Supply of a pull - off arrangement for Regulated Tramway type OHE.	Each	4.00	11189.69
D10-2	Erection of a pull - off arrangement for Regulated Tramway type OHE.	Each	4.00	917.04
D11-1	Supply of mounting arrangement for span wire	Each	50.00	18677.55

## Section 9: Part A: Bill of Quantities

D11-2	Erection of mounting arrangement for span wire	Each	50.00	1271.35
D12-1	Supply of span wire	Mtr	2000.00	854.04
D12-2	Erection of span wire	Mtr	2000.00	220.33
D14-1	Suspension / Registration for contact wire only - Supply only	Each	15.00	7039.79
D14-2	Suspension / Registration for contact wire only - Erection only	Each	15.00	10200.57
D16-1	Supply of regulating equipment (3 pulley type) with counter-weight assembly for conventional OHE	Each	115.00	109945.24
D16-2	Erection of regulating equipment (3 pulley type) with counter-weight assembly for conventional OHE	Each	115.00	4022.47
D17-1	Supply of regulating equipment (3 pulley type) with counter weight assembly for tramway type OHE (Regulated).	Each	5.00	79115.71
D17-2	Erection of regulating equipment (3 pulley type) with counter weight assembly for tramway type OHE (Regulated).	Each	5.00	4224.93
D18-1	Supply of materials for termination of Single conductor of overhead equipment or terminating wire	Each	25.00	9725.20
D18-2	Erection of materials for termination of Single conductor of overhead equipment or terminating wire	Each	25.00	1447.02
D19-1	Supply of materials for termination of Double conductor	Each	130.00	16488.33
D19-2	Erection of materials for termination of Double conductor	Each	130.00	1033.16
D22-1	Supply of materials for termination of tramway type OHE	Each	5.00	9842.48
D22-2	Erection of materials for termination of tramway type OHE	Each	5.00	1375.56
D23-1	Supply of materials/termination of 25 kV terminating wire (150 sq mm)copper cross track / along track feeder	Each	24.00	9806.39
D23-2	Erection of materials/termination of 25 kV terminating wire (150 sq mm)copper cross track / along track feeder	Each	24.00	1447.02
D24-1	Extra on item A1 for supply of additional fittings at a turnout, diamond crossing or overlap	Each	95.00	11273.34
D24-2	Extra on item A1 for Erection of additional fittings at a turnout, diamond crossing or overlap	Each	95.00	1158.21
D25-1	Extra on item A2 for supply of additional fittings required at a turnout/diamond crossing or over lap	Each	3.00	9063.62
D25-2	Extra on item A2 for Erection of additional fittings required at a turnout/diamond crossing or over lap	Each	3.00	1083.77
D26-1	Supply of Porcelain cut-in-insulator	Each	95.00	7352.54
D26-2	Erection of Porcelain cut-in-insulator	Each	95.00	783.06



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D27-1	Supply of a Porcelain suspension insulator	Each	47.00	7175.11
D27-2	Erection of a Porcelain suspension insulator	Each	47.00	723.51
D28-1	Supply of 25kV Post insulator	Each	90.00	8558.41
D28-2	Erection of 25kV Post insulator	Each	90.00	678.85
D29-1	Supply of a section insulator assembly	Each	30.00	51440.70
D29-2	Erection of a section insulator assembly	Each	30.00	4361.89
D30-1	Supply of a section insulator assembly for tramway type OHE( Regulated )	Each	2.00	47832.09
D30-2	Erection of a section insulator assembly for tramway type OHE( Regulated )	Each	2.00	3730.68
D31-2	Erection of PTFE Type short neutral section assembly	Each	3.00	4793.61
D32-1	Supply of 25 kV single pole Isolator	Each	2.00	50782.13
D32-2	Supply of 25 kV single pole Isolator	Each	2.00	5523.07
D33-1	Supply of 25 kV double pole Isolator	Each	36.00	91824.02
D33-2	Erection of 25 kV double pole Isolator	Each	36.00	8393.29
D34-1	Provision of interlocking device on 25kV Single/Double Pole isolator with or without earth contact assembly.-Supply only	Each	36.00	3599.59
D34-2	Provision of interlocking device on 25kV Single/Double Pole isolator with or without earth contact assembly.-Erection only	Each	36.00	550.82
D35-1	Supply of a copper jumper	Each	105.00	4291.24
D35-2	Erection of a copper jumper	Each	105.00	264.99
D37-1	Supply of a structure bond / Interlock bond	Each	960.00	733.75
D37-2	Erection of a structure bond / Interlock bond	Each	960.00	291.79
D38-1	Supply of longitudinal bond / In-run bond	Each	215.00	324.77
D38-2	Erection of longitudinal bond / In-run bond	Each	215.00	366.22
D39-1	Supply of transverse and special bond	Each	120.00	670.60
D39-2	Erection of transverse and special bond	Each	120.00	470.43
D40-1	Supply of a single earth electrode	Each	120.00	3154.52
D40-2	Erection of a single earth electrode	Each	120.00	1104.61
D41-1	Supply of earth bus	Mtr	230.00	165.39
D41-2	Erection of earth bus	Mtr	230.00	77.41

## Section 9: Part A: Bill of Quantities

D42-1	Supply of copper strips for equipment earthing	Mtr	45.00	532.27
D42-2	Erection of copper strips for equipment earthing	Mtr	45.00	122.07
D43-1	Supply of 8 SWG GI wire for earthing	Mtr	170.00	36.09
D43-2	Erection of 8 SWG GI wire for earthing	Mtr	170.00	23.82
D44-1	Supply of Vacuum type 25KV Interruptor	Each	5.00	420315.55
D44-2	Erection of Vacuum type 25KV Interruptor	Each	5.00	6758.70
D45-1	Supply of 25 kV potential transformer	Each	4.00	125254.76
D45-2	Erection of 25 kV potential transformer	Each	4.00	1807.28
D46-1	Supply of 42 kV lightning arrestor	Each	4.00	55632.70
D46-2	Erection of 42 kV lightning arrestor	Each	4.00	1280.28
D50-1	Supply & Installation of cables control and Indication - Supply only	Mtr	310.00	315.75
D50-2	Supply & Installation of cables control and Indication - Erection only	Mtr	310.00	17.86
D51-1	Supply & Installation of cables Heater supply- Supply only	Mtr	280.00	96.23
D51-2	Supply & Installation of cables Heater supply- Erection only	Mtr	280.00	17.86
D52-1	Supply & Installation of cables Catenary indication-Supply only	Mtr	190.00	123.29
D52-2	Supply & Installation of cables Catenary indication- Erection only	Mtr	190.00	17.86
D54-1	Supply & Installation of cables 110 V.D.C supply -Supply only	Mtr	190.00	123.29
D54-2	Supply & Installation of cables 110 V.D.C supply - Erection only	Mtr	190.00	23.82
D55-1	Supply and laying of 70 sq mm XLPE insulated PVC sheathed Aluminium cable - Supply only	Mtr	4000.00	360.86
D55-2	Supply and laying of 70 sq mm XLPE insulated PVC sheathed Aluminium cable - Erection only	Mtr	4000.00	297.74
D56-2	Cable trench cutting -Erection only	Mtr	2700.00	369.20
D57-1	Supply of Aluminium bus bar 50mm/39mm	Mtr	210.00	604.44
D57-2	Erection of Aluminium bus bar 50mm/39mm	Mtr	210.00	65.50
D58-1	Supply of Solid copper bus bar 18 mm	Mtr	300.00	1521.63
D58-2	Erection of Solid copper bus bar 18 mm	Mtr	300.00	101.23
D59-1	Supply of Aluminium bus terminal	Each	65.00	1569.74
D59-2	Erection of Aluminium bus terminal	Each	65.00	449.59
D60-1	Supply of Aluminium bus splice	Each	20.00	1846.40
D60-2	Erection of Aluminium bus splice	Each	20.00	449.59

## Section 9: Part A: Bill of Quantities

D61-1	Supply of Aluminium bus tee connector	Each	20.00	1891.51
D61-2	Erection of Aluminium bus tee connector	Each	20.00	449.59
D62-1	Supply of Aluminium tap connector	Each	20.00	3386.08
D62-2	Erection of Aluminium tap connector	Each	20.00	38.71
D63-1	Supply of Aluminium terminal connector bolted type	Each	20.00	1596.81
D63-2	Erection of Aluminium terminal connector bolted type	Each	20.00	509.14
D64-1	Supply of solid copper bus bar connectors-Bus terminal (6310)	Each	170.00	2300.49
D64-2	Erection of solid copper bus bar connectors-Bus terminal (6310)	Each	170.00	449.59
D65-1	Supply of solid copper bus bar connectors-Bus splice (6320)	Each	30.00	2366.64
D65-2	Erection of solid copper bus bar connectors-Bus splice (6320)	Each	30.00	660.98
D66-1	Supply of solid copper bus bar connectors-Bus tee joint	Each	5.00	2234.33
D66-2	Erection of solid copper bus bar connectors-Bus tee joint	Each	5.00	449.59
D67-1	Supply of solid copper bus bar connectors-Bus terminating tee	Each	5.00	5506.13
D67-2	Erection of solid copper bus bar connectors-Bus terminating tee	Each	5.00	38.71
D68-1	Supply, Erection, oil filtration, testing and commissioning of 10 kVA capacity LT supply transformers - Supply only	Each	3.00	117478.21
D68-2	Supply, Erection, oil filtration, testing and commissioning of 10 kVA capacity LT supply transformers - Erection only	Each	3.00	9185.28
D69-1	LT control board for AT location as per RDSO spec. no.TI/SPC/PSI/CLS/0020 with A & C slip No.4.(7/2010) or latest - Supply only	Each	2.00	87361.38
D69-2	LT control board for AT location as per RDSO spec. no.TI/SPC/PSI/CLS/0020 with A & C slip No.4.(7/2010) or latest - Erection only	Each	2.00	2679.66
D70-1	Supply of 25 kV drop out fuse switch	Each	14.00	22099.71
D70-2	Erection of 25 kV drop out fuse switch	Each	14.00	2164.57
D71-1	Supply of Protective Screen for FOB/ROB	Each	60.00	27960.69
D71-2	Erection of Protective Screen for FOB/ROB	Each	60.00	2167.55

## Section 9: Part A: Bill of Quantities

D72-1	Supply of anti-climbing device,etc LT. Supply transformer stations	Each	14.00	1804.30
D72-2	Erection of anti-climbing device,etc LT. Supply transformer stations	Each	14.00	333.47
D73-1	Supply of Fixing of caution boards	LS	4.00	42100.42
D73-2	Erection of Fixing of caution boards	LS	4.00	3114.36
D74-2	Modification to erected equipment Transfer of equipment from one mast or support to another- Erection only	Each	250.00	2599.27
D75-2	Provision of an additional bracket assembly / assemblies on a mast or support - Erection only	Each	130.00	2304.51
D76-2	Dismantling of overhead equipment - Erection only	KMS	8.00	53402.62
D77-2	Dismantling of feeder / return conductor.- Erection only	KMS	3.00	17843.55
D78-1	Splicing and extension of an anchored over head equipment - Supply only	Each	15.00	2083.97
D78-2	Splicing and extension of an anchored over head equipment - Erection only	Each	15.00	8961.97
D79-1	Dismantling of a section insulator - Supply only	Each	12.00	4173.96
D79-2	Dismantling of a section insulator - Erection only	Each	12.00	6145.35
D80-2	Slewing of equipment - Erection only	span	150.00	2072.27
D81-2	Dismantling of an isolator. - Erection only	Each	17.00	1378.54
D82-2	Dismantling of pin/pedestal insulators - Erection only	Each	18.00	452.56
D83-2	Dismantlement of OHE mast / structure by cutting - Erection only	Each	130.00	5201.52
D84-2	Dismantlement of OHE mast structure of breaking the foundation -Erection only	Each	80.00	7419.68
D85-2	Dismantling of guy rod - Erection only	Each	45.00	3358.51
D86-2	Erection of Temp, mast including cantilever assembly transfer of OHE to New mast and releasing the temp mast under power / non power block	Each	8.00	16319.12
D87-2	Releasing of portal Boom under power/non power block - Erection only	Each	30.00	22232.24
D88-1	Splicing and extension of RC wire/feeder wire- Supply only	Each	6.00	2829.75
D88-2	Splicing and extension of RC wire/feeder wire- Erection only	Each	6.00	7559.62
D89-2	Releasing of plinth/ pole mounted AT along with drop out fuse,fencing panels and Las etc.- Erection only	Each	5.00	8027.07
D91-1	Spreading of 20 mm Ballast in the SSP/SP Switch Yard.- Supply only	Cum	40.00	1115.66
D91-2	Spreading of 20 mm Ballast in the SSP/SP Switch Yard.- Erection only	Cum	40.00	86.34

Schedule-E				
item_code	description	uom_name	quantity	rate
E1-1	Supply of Jointless Hard Drawn Grooved Copper Contact Wire, 107 sqmm made out of continous cast copper wire rod as per RDSO 2019 specification No. ETI/OHE/76(6/97) with A&C slips no 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10	KM	53.1000	991921.94

Schedule-F				
item_code	description	uom_name	quantity	rate
F1-1	Cadmium Copper Catenary Wire, 19/2.10 mm 65 sq mm for overhead Railway Traction as per RDSO 2019 specification No.ETI/OHE/50(6/97) with A&C slip Nos. 1, 2, 3, 4 and 5	KM	57.0000	631957.90

Schedule-G				
item_code	description	uom_name	quantity	rate
G1-2	Transporting of OHE Materials	MT / KM	4000.0000	79.3700
G2-1	Supply of Schematic diagram and shock treatment board	SET	20.0000	907.0900
G2-2	Erection of Schematic diagram and shock treatment board	SET	20.0000	56.6900
G3-2	Manning Arrangements	Day	730.0000	1076.1800
G4-1	Supply of 5 kVA capacity LT supply transformers	EACH	8.0000	56327.7700
G4-2	Erection, oil filtration, testing and commissioning of 5 kVA capacity LT supply transformers	EACH	8.0000	9185.2800
G5-1	Supply of PTFE Type short neutral section assembly	EACH	3.0000	1100475.2600
G6-1	Fabrication and supply of heavy duty emergency OHE mast made of MS Raw materials complete as per SCR/SC Sketch No. TRD/SC/SO14289( Section weight Approx weight (1 set 650 kgs ) with enclosed Drawing Accepted Offer . As above, Make/Brand OEM.	EACH	1.0000	114198.1600

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G7-1	Supply of Disconnecter Assembly suitable for 42 KV Surge Arrestor as per RDSO specification for Lightning Arrestor Assembly No TI/SPC/PSI/MOGLA/0101(02/2015) with complete set and suitable hardwares for fixing.	EACH	4.0000	4780.2500
G8-1	Supply of neutral section warning board	SET	2.0000	10795.8000
G8-2	Erection of neutral section warning board	SET	2.0000	2676.9000
G9-1	Supply & Erection of MS flat 75x8mm to a depth of 500mm below existing ground level duly bolted with buried rail on either sides and connecting to nearest traction rail with tin plated copper bush and M12 bolts (Stainless steel) as per RDSO drawing.	MTR	120.0000	1607.7300
G10-2	Erection of 13 mtr long buried rail including transportation of rail and excavation of buried rail pit of 0.75 mtr wide and 1mtr depth.	No	2.0000	24354.0000
G11-1	Supply of control and distribution panel for colour light signalling supply in 5 kVA AC traction system as per RDSO technical specifications No. TI/SPC/PSI/CLS/0020 (7/10) with A&C slips No.1 to 4 or latest,connections as required.	EACH	2.0000	27589.1400
G11-2	Erection, Testing & Commissioning of control and distribution panel for colour light signalling supply in 5 kVA AC traction system as per RDSO technical specifications No. TI/SPC/PSI/CLS/0020 (7/10) with A&C slips No.1 to 4 or latest,connections as required.	EACH	2.0000	2299.8500
G12-1	Supply of Motor Bike 150 CC or more as per relevant special conditions	month	72.0000	9625.9700
G13-1	Supply of 25 kVA capacity LT supply transformers	EACH	3.0000	147103.6400
G13-2	Erection, oil filtration, testing and commissioning of 25 kVA capacity LT supply transformers	EACH	3.0000	9185.2800
G14-1	Supply of control and distribution panel for colour light signalling supply in 25 KVA AC traction system as per RDSO technical specifications No. TI/SPC/PSI/CLS/0020 (12/02) with A&C slips No.1 to 4 or latest,connections as required.	EACH	3.0000	111029.0000
G14-2	Erection, Testing & Commissioning of control and distribution panel for colour light signalling supply in 25 KVA AC traction system as per RDSO technical specifications No. TI/SPC/PSI/CLS/0020 (12/02) with A&C slips No.1 to 4 or latest,connections as required.	EACH	3.0000	2679.6600
G15-2	Laying of UG Cables by Trenchless Technology by adopting Horizontal Boring & Drawing of cable including preparation at site in Normal soil 5/6" Bore with supply and erection of HDPE Pipe	MTR	600.0000	1682.20

## Section 9: Part A: Bill of Quantities

Schedule-H				
item_code	description	uom_name	quantity	rate
H-1	Tirfor 5.0 Tonne/ 3.0 Tonne with 20m steel rope	Set	3	22718.81
H-2	Pull - lift 3/4 Tonne (with loop type chain)	No	4	7805.32
H-3	Dropper making jig & wire straightener for 5 mm dropper wire	Set	1	11128.92
H-4	Come along clamps for catenary suitable for 19/2.108mm conductor	Set	12	1654.95
H-5	Come along clamps for contact wire 107 mm <sup>2</sup>	Set	12	1377.33
H-6	Earth Discharge rod complete (light weight 11 kgs (As per RDSO spec. ETI/OHE/51(9/87) Re. 1, Oct 92 to be supplied)	Set	10	10364.70
H-7	Aluminium Straight ladder (8m) with Hook on top	No	3	11637.01
H-8	Aluminium Straight ladder extensible (11m)	No	3	17988.00
H-9	Drilling machine (25mm) Motor Driven (radial or pillar)	No	1	141497.03
H-10	Bench Grinder (Double end) pedestal motor Driven (203 mm) disc	No	1	9551.06
H-11	1Ph portable welding machine only required	No	1	9117.80
H-12	Portable Diesel Generating set 3 KVA 240 V, 1Ph	No	1	145391.13
H-13	Contact wire Cutter 36 inch	No	3	2376.18
H-14	Dropper wire Cutting 12 inch	No	3	834.09
H-15	D shackles set of one each (1",3/4",5/8",1/2")	Set	16	886.06
H-16	Single Sleeve pully block 3 1/2" x 1/2" Groove steel	No	12	890.83
H-17	Single Sleeve pully block 3 1/2" x 1/2" Groove steel fiber for drawl of contact catenary wire	No	20	841.61
H-18	Single Sleeve pully block 6" x 1" Groove steel (with top eye to be supplied, cap 2T, asper IS: 13156 of 1991	No	8	1238.82
H-19	Contact wire twist cum bender 6 inch	No	6	784.88
H-20	Steel sling with eye end 19mm dia (a) 1 m Long	No	16	521.35
H-21	Steel sling with eye end 19mm dia (b) 2 m Long	No	16	863.37
H-22	Steel sling with eye end 19mm dia (c) 3 m Long	No	16	1051.67
H-23	Steel sling with eye end 19mm dia (d) 4 m Long	No	4	2068.89
H-24	Steel sling with eye end 19mm dia (e) 10 m Long	No	4	2643.44

## Section 9: Part A: Bill of Quantities

H-25	Contact wire Splicing jig	No	3	4390.16
H-26	Copper Hammer 2 kg	No	1	3714.71
H-27	Metric tape 30 m, 15m each (PVC tape only)	No	4	520.06
H-28	Light weight ladder trolley	No	2	96595.50
H-29	Engineering Ratchet	No	2	1579.60
H-30	LED Tri colour lamps	No	4	1416.49
H-31	Trifor 3 Tonner/2 Tonne	No	4	12908.00
H-32	Spring balance 25 kg capacity	No	2	600.61
H-33	Wire claws (Panja)	No	5	388.10
H-34	Crow bar	No	2	1153.91
H-35	Shovels	No	2	378.89
H-36	Sledge hammer 10 lb	No	1	1604.24
H-37	Tree pruner ( with telescopic handle & saw blade)	No	1	11898.38
H-38	3/4 inch Manila rope 100m	mtr	100	46.91
H-39	1/2 inch Manila rope 150m	mtr	150	24.05
H-40	1 inch Manila rope 50m long	mtr	50	74.51
H-41	Manual rail hole drilling Ratchet and clamp with chamfering tool	set	2	9735.00
H-42	Battery operated LED based flashing Tail lamp as per RDSO spec no. 2002/TR/281/TL(rev.0)	No	2	870.96
H-43	Dynamometer 10-Tonne capacity with carrying box with 150 mm dia with test certificate	No	1	65377.57
H-44	High focus LED rechargeable hand torch light.	No	4	1073.23
H-45	Walkie Talkiesets ( with 2 km range working on 'c' band)	No	4	11742.40
H-46	Megger 2500V	No	2	21107.91
H-47	Digital earth clamp megger to be supplied	No	1	5474.32
H-48	Light weight Tool Box	No	6	3491.19
H-49	Set of tools for Technicians a) DE Spanner set from 6 TO 32 (12 PIECES)	No	10	732.59
H-50	b) Ring Spanner set 16x17, 18x19, 20x22, 24x26, 30x32, 36x40	No	10	2202.83
H-51	c) Screw Driver 6 "	No	10	215.55
H-52	d) Screw Driver 12 "	No	10	215.55
H-53	e) Hammer 1/2 lb	No	10	197.21



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H-54	f) Cutting plier	No	10	323.14
H-55	g) Plumb bob	No	10	149.89
H-56	h) Hack saw	No	10	512.54
H-57	i) Spirit Level	No	5	105.73
H-58	j) Rechargeable 30-watt power LED Flood Lights	No	5	2152.82
H-59	Industrial Digital Thermometer	No	6	4000.80
H-60	Digital Crane weighing scale with remote display & printer 5 t	No	1	27907.00
H-61	Petrol Driven Light Weight Rail Drill machine with 52 kg & 60 kg Rail Adopter and 2 pairs of drills	No	1	44975.70
H-62	Portable cutting machine (Hand Held)	No	2	1703.90
H-63	Chain Saw 18" or 24" for tree cutting	No	2	17505.09
H-64	Come along clamp for 130 sq mm LS wire	Set	10	1253.65
H-65	Aluminium Ladder 15 mtrs for cross track feeder checking	No	2	23128.98
H-66	Oilver G Plus testing kit as per latest RDSO Specification	No	1	229008.80
H-67	Electronic Distance measuring equipment up to 500 m clear vision	No	2	8775.80

**Section-9  
PART-B  
EXPLANATORY NOTE**

Explanatory notes for various items of work in Schedule, is 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 shall be made on that account. In estimating the prices for various items of work, provision for loss and wastage in transit and erection should be provided for over and above the basic quantities of components and materials required to make up a unit of work, indicated herein, except where otherwise specified for materials supplied by the Purchaser.

In the explanatory notes given in 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.

In the explanatory notes given in 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.

Special notes for measurements are included in this chapter under various items, where necessary.

**Note: It is to note that the OHE structure of 25 kV feeding system is to be adopted as far as possible as per RDSO instruction No. TI/IN/0042.**

**Reconciliation of materials supplied by the Purchaser**

The following procedure shall be adopted for the final reconciliation of the various equipment's, materials, fittings and conductors supplied by the Purchaser in terms of para for OHE. All the materials supplied by the Purchaser shall be correctly accounted for and quantities reconciled on completion of the work by the Contractor. On completion of work, all surplus materials supplied by the Purchaser together with the ones found defective or that have become defective or broken on account of defective materials and/or workmanship shall be returned to him by the Contractor.

**ITEM NO. A1 SUPPLY (excluding supply of copper contact wire and catenary wire) AND ERECTION OF OVERHEAD EQUIPMENT ONLY BY MANUAL.**

The price for above shall cover erection of (19/2.5 sq.mm) 95 sq. mm pure copper/65 sq. mm cadmium copper Catenary , Hard drawn 107 sq. mm copper contact wire and 130 sq.mm feeder tail wire if any and supply and erection of 5 mm dropper wire, and components including dropper clips, parallel clamps for PH/F/H/C jumpering and splices (where their use is approved) dropper wire, PH/F/H/C jumper wire and terminating wire/s and including small parts steel works complete with bolts and nuts etc. for attachment of number plates to mast/ structure. The price shall cover erection of all components and wires and conductors including contact wire, catenary, droppers, PH/F/H/C jumpers and terminating wires including small parts steel work, if any.

The price shall cover adjustment of OHE height and stagger at the specified rail level and any further adjustment of OHE height and stagger along with track packing/ permanent way works as and when required till the final track position by Engineering branch and will be paid under item No. D74.

Rly Id No.	Description of components	Qty per Unit
1040-2	Contact wire parallel clamp small	As required
1180	Contact wire dropper clip (107)	- do -
1192	Catenary dropper clip complete with bolts, nuts etc.	- do -
	Retro reflective Structure no. plates complete with 2 S.S. bolts dia 10 x 35/30 nuts and rubber Washer for dia 10 bolts	-do-
ETI/OHE/7 6	Contact wire 107 Sq. mm	-do-
ETI/OHE /3 (2/94)	Annealed strandard Copper jumper wire for PH/F/H/C jumpers with PG clamps	-do-
ETI/OHE/5 0	Cadmium Catenary Wire 65 Sq. mm/95 sq. mm	-do-

**ITEM NO. A2 SUPPLY (excluding supply of copper contact wire) AND ERECTION OF TRAMWAY OHE WITH CONTACT WIRE ONLY (REGULATED WITH CATENARY WIRE BY MANUAL MEANS).**

The price shall cover erection of Tramway OHE with catenary and contact wire. The price shall exclude termination, which will be paid for under item D18. The price shall include provision of Catenary with clamps and two droppers including clips, Retro reflective number plates on traction masts/ structures. **The price shall also exclude the supply of Catenary wire, The price shall be inclusive of small part steel works complete with bolts and nuts for attachment of retro reflective number plates to masts/ structures.** The hard- drawn copper contact wire and bridle wire used shall conform to RDSO's latest specification.

Special Note for items under A1 & A2

1. All bolts and nuts below 14 mm dia. on current carrying parts of OHE shall be stainless steel.
2. The rate for supply and erection of all materials for providing a false catenary/Insulated catenary (in the conventional OHE as also in anti-creep wire) together with contact wire/Insulated Catenary, contact wire ending clamp, catenary ending clamp, double strap etc including profiling of OHE under ROBs, FOBs as prescribed by purchaser's Engineer shall be paid under Item No. D35, D74, D76 extra as required.
3. All type of insulators shall be tested at site for Mechanical Proven test before erection.
4. All sizes of contact wire shall be drawn out of continuous cast copper rods only shall be procured.
5. Jumpers like PH, H, C and F jumpers in the IOL's/NS included under this schedule of work, shall be of 50 sq. mm flexible jumper wire. 'G' jumper to be paid under item D24 & D25 which are not included in the scope.
6. Where proper bonding is not available, temporary bonding of mast/structures shall be done by means of two nos. 8 SWG GI wire, before wiring is done.
7. The rate also includes supply and erection of 25 kV restricted clearance and power block working limit caution boards as required by the purchaser. The rate includes supply and erection of fabricated/small parts steel required to erect the caution boards.
8. Insulated catenary wire shall be provided under the over line structures, where long time clearances is less than 320 mm.
9. **The number plate so provided under this schedule of work shall be all retro reflective type.**
10. **Pre sag of contact wire will be kept at 50 mm for 1.2 T load.**
11. **Gradient and relative gradient of contact wire will be reduced to 2 mm/m & 1mm/m.**

#### NOTE FOR MEASUREMENTS

For the purpose of measurement against Item A1 & A2 the length of over head equipment which shall include terminating wires shall be measured from the centre lines of the traction masts/ structures at which the two ends of each tension length of over head equipment are anchored.

The length shall be the difference between the actual chainages of the two traction masts/ structures which the ends of each tension lengths are anchored or by the sum of the actual spans between the same two points which ever is higher is include in the "as erected" layout plans. For purpose of progress payment reference to layout plans as approved shall be made. The price under items A1 & A2 does not cover the cost of supply and erection of insulator if any, which shall be paid for under item D26.

In the case of splicing and extension of anchored OHE / OHE, the actual length of wire used at site from ending clamp/splice to the splice/ending clamp will be reckoned for measurement purpose under item no. A1 & A2.

#### **ITEM NO. A3 SUPPLY AND ERECTION OF 25 KV FEEDER (INCLUDING 150 SQ. MM WIRE)**

The price shall cover supply and erection of a 25 kV feeder along or across track made of a 150 sq. mm copper wire (37/2.5 mm) Drop jumpers/Jumpers from this wire shall be of 160 sq.mm wire with 1050-3 PG clamps which will be paid under D35.

## NOTES FOR MEASUREMENTS

1. THE PRICE UNDER ITEMS A3 SHALL NOT INCLUDE Termination which will be paid for under item D18 The connection (a) between feeders, or return conductors and (b) of feeders or return conductors to a bus bar, overhead equipment or which will be paid for under item D35 and Cut-in-insulators and suspension insulators which shall be paid for under item D26.
2. For the purpose of payment against Item A3 the length of feeders shall be measured from the centre 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 feeder 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. For purposes of progress payment reference to "as approved drawings" shall be made.

**ITEM NO. A4 SUPPLY (excluding supply of copper conductor) AND ERECTION OF ANTICREEP WITH PURE/CADMIUM COPPER CATENARY WIRE**

The price shall cover the supply of all materials for anticreep including adjusters, mast anchor fittings at its terminations on either side of structure, ending clamps including 9 tonne porcelain insulator, mast anchor fitting and backing angle as required. The price shall cover erection of all materials including pure/cadmium copper catenary wire, 9 tonne porcelain insulators assembly and small parts, steel work if any.

Rly Id No.	Description of Components	Qty
per Unit	Pure/Cadmium copper catenary wire (65 sq. mm)	
As	Reqd	
6020-1	9 tonne insulator assembly	
6020-2	–Polluted zone	2 Nos.
6020-3	type for Polluted area	
1120	Catenary ending clamp (65)/ 1360	As
required		
5020	9 tonne adjusters	as
required		
5030	Anchor double strap assembly	As
required		
5040	Clevis assembly	2 Off
3231	Mast anchor fitting including suitable attachment for mast	2 Sets
	/structure with bolts nuts and backing angle	
1170	Double suspension clamp	1 Off
5183	Double eye distance rod	As Required

**Notes for Item No. A4:**

No extra rate is admissible for double eye distance rod provided if any. As per site requirement if the termination insulator is to be shifted in the same wire to any other place, no extra rate is admissible.

Wherever Portal structures are provided, the anti-creep wire shall be terminated on uprights crossing number of tracks as required.

In case the anti-creep extends beyond one span on either side of anti-creep center, payment for the extra spans shall be made on pro-rata basis.

Wherever anti-creep wire passes through underneath the over-line structures as desired by the purchaser, contact wire shall be provided in lieu of anti-creep wire for suitable length.

Anti-creep termination insulators shall be of normal porcelain type 9 – tonne insulators for normal zone and polluted 9 – tonne insulator for polluted and red zone areas.

Where 65 sq.mm cadmium copper catenary wire is used for conventional /tramway OHE, the anti-creep wire shall also be of 65 sq.mm cadmium copper catenary wire. In case 95 sq.mm pure copper catenary wire is used for conventional /tramway OHE, the anti-creep wire shall be of 95 sq.mm pure copper catenary wire.

**ITEM NO. B ERECTION OF TRACTION MASTS AND MAIN MASTS OF SWITCHING STATIONS AND LT SUPPLY TRANSFORMER STATIONS BY MANUAL/CRANE**

The price shall cover cost for manual/crane erection, alignment and setting before grouting of individual traction mast and main mast of switching post and booster transformer stations, including dwarf mast and mast for L.T. supply transformer stations whether rolled or fabricated including those for head span. Erection of traction mast also includes painting with cold galvanizing paint in rusted area and also removal of the bends if any in the mast supplied by contractor. The masts released under item no (D84) may also have to be reused.

**ITEM NO B1** Supply and erection of fabricated mast K, B, T & S series etc excluding S1 to S8 masts.

**ITEM NO B2** Supply and erection of BFB mast 8"x8", 6"x6" and RSJ 8"x6" & S1 to S8 masts

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

**PAYABLE UNIT WEIGHTS FOR STANDARD MASTS**

S.No.	Types of Masts	Weight in Kg per metre including Galvanisation.
1.	6" x 6" x 25.15 BFB	38.03
2.	162 X 154 X 27.1 KG BFB	38.00

3.	200 X 200 X 49.9 BFB	51.20
4.	8" X 6" X 35 CBS RSJ	53.39
5.	S 1	53.39
6.	S 3	76.40
7.	S 4	53.39
8.	S 5	111.53
9.	S 6	53.39
10.	S 7	76.40
11.	S 8	111.53
12.	K 100	23.70
13.	K 125	30.30
14.	K 150	38.18
15.	K 175	43.72
16.	K 200	49.87
17.	K 225	57.50
18.	K 250	66.72
19.	B 100	27.71
20.	B 125	32.47
21.	B 150	38.92
22.	B 175	44.61
23.	B 200	49.92
24.	B 225	61.50
25.	B 250	70.72
26.	S 100	23.72
27.	S 101	19.98

Note for item B1 & B2 The purchaser reserve the rights to change the quantities among the item No. B1 & B2 as the rate are equal.

**ITEM NO. B3 SUPPLY AND ERECTION OF FABRICATED STEEL WORK  
OTHER THAN MAST BY MANUAL/CRANE.**

The price shall cover cost of supply and erection, alignment and setting before grouting, wherever required, the portals, gantries, 2/3 tracks cantilever structures, booms. The price shall also include supply and erection of galvanized bolts, nuts washers etc. Wherever required as per approved designs and drawings. Drop arms will be paid under item No. B4.

NOTE FOR ITEM B (B1, B2, B3 & B4)

- (I) The price for the item B1, B2 & B3 shall also include cost of stenciling of location number, contact wire height, stagger, implantation and Rail level including emergency telephone indication. On Mast/ Portal uprights in the manner as directed by the purchaser. The price shall also include the straightening of masts/ portal upright bent during transit and cutting of mast/ portals to suit the site conditions. The mast/structures cut to suit site condition, proportionate weight will only be paid under item B1, B2 & B3.
- (ii) For erection under items B1, B2, B3 & B4 the contractor can use his own road crane duly transporting the structures to site.
- (iii) The mast/ portals supplied under item 3 shall conform to the following:
  - i) Quality of steel – ST 42-S of IS 226, IS – 2062
  - ii) Fabricated etc. – IS – 800
  - iii) Electric arc welding – IS – 816.

For galvanization of the mast, zinc conforming to grade ZN 99.99 and as per IS – 209 and 1966 shall be used. The Mast/ Portals shall be Galvanized as per IS 2629 of 1968 and the masts of Zinc coating shall not be less than 610 gms/ sq.m generally and in the case of polluted area, the steel galvanisation shall be 1000 gms/sq.m for all galvanised materials under this contract.

The mast/ portals which are not conforming to the standard mentioned above will be rejected.

- (iv) Temporary bonding of structure by means of 2 nos. of 8 SWG wire shall be done before boom erection, where proper bonding arrangement is not available.
- (v) In case mast erected due to any modifications/alterations and where OHE wiring is not done mast number plate and stenciling of number and other parameters as per RDSO directives have to be provided by the contractor. The cost of such number plates is included in the supply and erection schedules of item No. B.
- (vi) The quantity schedule for item no B1, B2 & B3 are prepared based on certain drawings given during preparation of schedule. The purchaser reserves the right to change quantities among item no B1, B2 & B3 during execution of works as per site requirements.
- (vii) If the purchase Engineer desires for the mast/ structure erected in between two main lines/yard lines to coat with different color bands for easy identification of elementary section, the contractor shall do so at no extra cost.

#### **ITEM NO. B4 SUPPLY AND ERECTION OF FABRICATED AND GALVANIZED SMALL PARTS STEEL WORK**

The price shall cover the cost of supply and erection of the above steel works including fasteners which are to be supplied by the contractor as per the approved designs and drawings.

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 nonstandard fabricated steel work the calculated weight to be considered for payment under this item shall be included in the relevant drawing based on latest IS sectional weight at the time of submitting the designs for approval of the purchaser. All type of Drop arm with accessories, Pedestal Insulator outrigger (with mast/structure) and feeder super (individual or on portal) mast, 3121/3122 will only be paid under this schedule.

#### NOTE FOR ITEMS B1, B2, B3 & B4

For the purpose of payment against items B1, B2, B3 & B4 weight for 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. If the weight of structure received by the contractor is less than the weights specified for the standard mast, payment shall be made for less weight only.

If purchaser desires to provide For bridge mast, 32mm dia galvanised hard steel bolts or as required – 4 Nos. with necessary washer, nut and check nut, The bolt shall be 32□ x 1110/300 mm or as required by the purchaser. The weight of the same may be got approved by the purchaser. The cost of the bolt, washer, nut and check nut will be paid as per the weight approved by the purchaser under item B4. For bridge mast if any angle/channel arrangement is required to be provided as per purchase engineers directive. The same also will be paid under item B4.

If purchaser desires to use stainless steel bolt & nuts for bridge mast, the cost of SS bolt & nut will be paid on mutually agreed rates.

#### **ITEM NO. C1 CONCRETE FOR FOUNDATION AND PLINTH IN HARD SOIL ITEM NO. C2 CONCRETE FOR FOUNDATION AND PLINTH IN ROCKY SOIL**

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 or requiring breaking by tractor/JCB breaker (in schedules C1 & C2) shoring where necessary, casting concrete including form work where necessary, casting concrete grouting of masts and finishing the top of concrete foundation or anchor blocks wherever under ground cable or pipes are met with the contractor should arrange to excavate with due care so as not to damage the U.G. cables/ Pipes and arrange for slight deviation of the U.G. cable to the extent necessary to cast foundation and protect the cables using DWC pipes of adequate thickness and length as approved by the Purchaser's Engineer at site. 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 contractor shall arrange for filling up of earth around

foundation where the embankment is low and enough shoulder width is not available as directed by Purchaser's Engineers. The price shall also include diverting the tracks side drains if any on account of OHE mast foundation works. The purchaser engineer shall certify where use of chisel and hammer or breaking has been necessary. The contractor shall arrange for supply of all tools and plants for breaking operations by tractor or/and JCB breaker 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 C1 or C2 as the case may be. If half of the depth or width of the excavations is in hard soil/ concrete/ masonry/ drains/ walls and the other half is in rock the entire foundation shall be paid under item C2. The price shall also include the cost of cement. The cement to be used for construction of PCC/RCC should be of ISI branded ordinary Portland cement to IS269 or latest version.

#### NOTES FOR MEASUREMENT FOR ITEMS C1 AND C2

1. The payable volume of the foundations under item C1 and C2 shall be the designed one as shown in the drawings for which the whole has been blasted/chiseled irrespective of the actual configuration assumed by the later due to the following.
2. The depth of the excavation shall be measured from the formation level to the maximum excavated point.

#### **ITEM NO. C3 CONCRETE FOR FOUNDATION AND PLINTH IN OTHER THAN HARD SOIL AND ROCKY SOIL.**

The price shall include all works mentioned in item C1 and C2 in all classes of soil except hard soil concrete or masonry drains and walls and rock.

#### **ITEM NO. C4 REINFORCED CONCRETE FOR FOUNDATION AND PLINTH**

The price shall cover excavation for reinforced concrete work for foundations, supply of steel for reinforcement and other materials including bending, binding, laying of the reinforcement, shoring where necessary casting concrete including form 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 or anchor blocks on bridge piers, irrespective of whether they are actually reinforced or not, and those for cast- in-situ piles foundations and counter weight foundations. The volume of cast-in-situ piles shall be added to the volume of foundation block for the purpose of payment. Dowel bars as may be required for bond with bridge structures shall be supplied and erected free of cost by the purchaser. Dowel bars will not be considered as reinforcement for the purpose of this item.

For cable trench work in FP/SSP/SP, the angel of suitable size shall be placed for proper resting of cable trench cover. No extra payment is admissible for the above steel work. The price shall also cover cable supports trays which is provided on cable trench.

Note: Nominal reinforcement will be necessary in black cotton soil foundations. Such nominally reinforced foundation in black cotton soil will be payable under item C-3 and not under item C-4.

The steel for nominal reinforcement will be arranged by the contractor after taking the approval from K-RIDE and the concrete mixture, in such a case shall be as for normal of foundations 1:2:4.

## NOTES FOR ITEMS C (C1, C2, C3 &amp; C4)

1. The price under item C (C1, C2, C3 & C4) shall be same for any shape of size on concrete blocks, cable trench or brick wall in calculating the individual volume of concrete and brick work, or a cubic meter beyond the third decimal shall be rounded off to the nearest third decimal.
2. The price under item C1, C2, C3 & C4 shall apply for concreting of all pedestals, plinths and foundations for gantries/ portals and supporting steel work and cable trenches and for other civil engineering work wherever required.
3. For purpose of computation of volume of concrete and brick work under item 2 the volume of steel work embedded in the foundation block of muff shall be ignored.
4. 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.
5. The prices shall include cost of embedment of drain pipes, conduits for cables or earthing flats where necessary.
6. Dowel bars in special foundations and nominal reinforcement in black cotton soil foundations will be necessary. Such nominal reinforced foundation in black cotton soil will be payable under item C3 and not under item C4. 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 foundation 1: 2: 4.
7. In case, the anchor foundation cast becomes redundant due to reasons beyond the control of K-RIDE, no extra rates are admissible for the Anchor loops embedded in the anchor foundation.
8. Muffing of OHE mast/structures should be done along with grouting in order to ensure homogeneous bonding between Muffing and grouting concretes.
9. For all foundation works in OHE/Feeder/PSI works – M-15 concrete shall be used and for core – M – 20 concretes shall be used with 20mm ballast for both the concrete.
10. For every 50 m<sup>3</sup> of concrete casted, three samples of test cubes of size 15x15x15 cm shall be made and tested for crushing strength after 28 days at any government approved agency/colleges. If any sample test cube fails, the performance of the foundations will be observed for a period of one year from the date of casting for any crack or disintegration; if found satisfactory, payment for that batch will be made after the observation period.
11. If any foundation becomes obsolete due to change in track alignment etc. during the execution of the work, the contractor may be asked to recast new foundation in lieu of the old. In such cases, the contractor is eligible to get payment for each such location under item C1, C2, C3 & C4 as may be applicable.

**ITEM NO. D1 PREPARATION OF DESIGNS AND DRAWINGS FOR OVERHEAD EQUIPMENT AND VERIFICATION OF PURCHASERS ENGINEERING PLANS.**

The price shall cover verification of purchasers engineering track plans indicating the layout of new lines with respect to the existing lines, which will be issued by the purchaser in stages. The preparation of lay out plans and other design are to be

finalized by the contractor in consultation and in close coordination with purchaser. The contractor may be asked to prepare the layout plans based on the site details if the purchaser is not able to supply the Engineering track plan. The rate shall be per TKM. The price shall include the following.

- i) Preparation of sectioning diagram & wiring diagram for the whole section and the part of the section.
- ii) Preparing a detailed Electrification layout plan indicating the existing track and OHE arrangements with the proposed track and OHE arrangements based on the details given in the existing OHE layout / proposed alignment track plan/ Site details taken from the site. (If existing yard is a major yard and proposed modification is very small then for preparing the existing yard OHE lay out plan if not provided by purchaser, half the rate will be given and for new proposal full rate is eligible).
- iii) Preparation of cross section drawings and structure erection drawings for each structure locations for the new locations and modified structure/ mast.
- iv) 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'.
- v) 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 this specified height of contact wire and requisite clearances.
- vi) 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 Aux. transformer station.
- vii) Supply of requisite specified number of copies of all drawings including completion drawings specified.
- viii) Bonding Layout Plan: -
  - a) Preparation of Bonding layout plan based on signaling plan and as desired by the Purchaser Engineer as per site condition
  - b) Any change in Bonding arrangements in existing line consequent to the OHE modifications done, shall also to be prepared for the entire kilometer length.
  - ix) Preparation of wire run diagram duly incorporating existing tension lengths if any in the same Km of work.

Note: 1) This price shall also cover soil investigation of testing in an approved manner.  
2) All the designs & drawings shall preferably be done in CAD or on any other higher software.

NOTE FOR MEASUREMENTS: For the purpose of payment against this item the length of track shall be measured as under:

1. GENERAL: By the difference in the chainages of the length under consideration as incorporated in the layout plans.
2. TURNOUTS: The track taking off shall be deemed as starting from the SRJ 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 chainage of anchor mast of the terminating OHE.
6. **FEEDER AND RETURN FEEDERS FROM GRID SUB STATION TO FEEDING STATION:** This item will be also applicable independently in case of feeders/ return feeders/ conductors from grid substation to overhead equipment feeding stations or in a case of feeders/ conductors running on independent structures (not supporting OHE) along or across tracks.

#### NOTES FOR MEASUREMENTS

The length of line to be considered for purpose of item 6 shall be measured by the distance between the centre of gantries of the grid substation 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 feeder/ conductors are running completely on independent structures OR

by the distance between the centre of the structures supporting the OHE on either side of the first and last independent structure in case of feeders/ return feeder/ conductors running along-with the track support OHE.

#### **ITEM NO. D2 PREPARATION OF DESIGN AND DRAWINGS FOR SWITCHING STATION.**

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, busbar connections cable run layout, detailed designs and drawings for steel work and structural support, 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 number of copies of all drawings, including completion drawings as specified.

#### **ITEM NO. D3 PREPARATION OF STATION WORKING RULE DIAGRAM AND WORKING INSTRUCTION PERTAINING TO 25 KV AC TRACTION.**

This includes preparing of revised station working instructions and drawings based on the revised OHE and signaling plans. This will include preparing / Altering of station working rule diagrams and instructions, pertaining to 25 KV AC Electric Traction. The Drawing size depends on the No. of Loop Lines/ Road in the stations. A minimum of 15 copies of stations rules diagram (Colour CAD print) and 15 copies of station working instructions are to be prepared as directed by the purchaser's Design Engineer. The rate includes supply, painting and Erection of station working rule diagram on a Milky

White Decolam Sheet 4 mm thick and Aluminum Framed Board in a neat manner. Generally, one Board per station is to be provided. The Board should be a minimum of 1800 mm x 1200 mm size and if the number of Loops/ Roads are more than size of the Board shall be increased as directed by the Purchaser Engineer. The rate shall also include correction to the existing Sectioning Diagrams available in Sr. SE/ SE/ CTPC/ AEE/ TRD/ SR. DEE/ TRD and at section control rooms. For sections newly electrified, new boards have to be kept in the places mentioned supra at no extra cost. If the works proposed in a contract is done in a phased manner, the contractor is eligible to get payment for each phase at the same rate paid under item D3. The new board will be supplied only one time. The rate also includes corrections to be incorporated on either side stations consequent to the changes made in a station.

If the purchaser so desire that if any station have major yard having RRI cabin, Station Manager Room, station master room separately, any other cabins are to be provided with separate station working rule diagram boards, the contractor is eligible to get payment for each board as half the rate paid under item D3 extra.

All the painting works on the White Decolam Sheets should be done with colour Fluorescent Paints as Directed by the Purchaser Engineer. If the purchaser so desires instead of painting in the white Decolam board, the station working diagram shall be taken on flex sheet by the contractor and fixed on the white Decolam Board. For major stations having RRI cabins and SMR rooms/PF SM rooms separately, the number of such boards as required will be decided by the purchaser's Engineer at site.

#### **ITEM NO. D4 SUPPLY AND ERECTION OF GUY ROD ASSEMBLY**

The price shall cover supply and erection of guy rod assembly of various lengths for traction masts, feeder line towers or supports complete with mast /structure guy rod anchor fittings, guy rod with anchor attachment if any, with mast 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. Such location for anchorage, small parts steel work, complete with bolts and nuts etc. If any, for attach in the mast, guy rod fittings to the mast/ structure which is also included in this schedule of work. No extra rates are payable for the small parts steel items used if any.

#### **COMPONENTS REQUIREMENT**

Rly Id No.	Description of Components	Qty per unit
3232 or suitable with attachment with mast/structure as the case may be	Mast guy rod fitting (welded) complete with 4 short bolts nuts lock nuts and washers for attachment to masts/ SPS including appropriate fittings for portal structures of various designs.	1 Off
5001/ 5001-1/ 5001-3	Anchor Bolts (complete with nuts lock nuts and split pint)	1 Set
5002	Guy rod stirrup	1 Off

5004 or 5005 or 5006 – 1	Guy rod with nut washer and split pin	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 require d)

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. D5 SUPPLY AND ERECTION OF A SINGLE BRACKET ASSEMBLY (INCLUDING STAY AND BRACKET INSULATORS)**

The price shall cover on a flat rate basis any bracket assembly on a traction mast or support or drop arm, and shall include those of high/ low level platform, in the vicinity of turnouts, over bridges or overlaps and at locations with reduced encumbrance or terminating wires. The price shall include cost of supply of all components galvanized steel tubes, 5 mm dropper wires including adopter small parts steel work complete with bolts and nuts etc. if any. The price shall cover erection of all components including solid core insulators, dropper wires and small parts steel work excluding MCC i.e., 3121/3122 in the case of multiple cantilever locations. This include the anticreep centre arrangement at masts/ structures. The price shall include :

Rly Id No. Unit	Description of Components	Qty per
3020	Mast fitting for hook insulator with 2 of bolts, nuts, locknuts washers of 16 mm	1 set or as required.
2400	Tubular stay arm assembly (including description of components galvanized steel tube)	1 set or as required
2110/2130	Catenary suspension bracket assembly or hook bracket	1 Off 2380
1160/2120 2140	Suspension clamp	1 Off ( as required)
2040 or	Bracket tube assembly complete with tube cap and sleeve where required (including galvanized steel tube).	1 set 2080
3070-1/2	Mast Bracket fitting assembly including 2 off bolts, nuts locknuts and washers of 16 for attachment to structure or to small part steel work.	1 set
2150-1/	Register arm hook assembly complete with bolts,	1 Off

2160-1	nuts and locknuts.	
6000-1 required	Stay arm insulators –	1 Each or as
6030-1 required	Bracket insulators -	1 Each or as
2420 or 2430	Register arm assembly or raised register arm assembly (including galvanized steel tube).	1 Set
2270-4 or 5 2460 style 02 or 2470 style – 02 2540 1 Each 2520	Register arm dropper assembly including 5 mm dropper wire, complete bolts, nuts etc.  Bent steady arm	1 Set
2360/2490-2	25 mm steady arm drop bracket/ clamp  do	
3131 & 3076	Adoptors & Backing angle	do
1220/ F)	Contact wire swivel clip or raised register arm clamp	1 off 1370/-1 (Mod-
2550-1/2	antiwind clamp	as required

**Note:-** Bent steady arm need to be provided in each bracket instead of normal steady arm.

**ITEM NO. D6 (II) EXTRA ON D5 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 D5 for the provision of additional fittings required to support an additional OHE on a single bracket assembly payable under item D5. The price shall include supply of all extra fittings including the double contact wire swivel clip, if any.

**ITEM NO. D7 SUPPLY & ERECTION OF A SINGLE BRACKET ASSEMBLY SUITABLE TRAMWAY TYPE OVERHEAD EQUIPMENT (REGULATED) INCLUDING STAY AND BKT INSULATORS.**

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 overlaps and at locations with reduced encumbrance or terminating wires. The prices shall include the cost of supply of all components including dropper galvanized steel tubes, including wires small parts steel work complete with bolts and nuts etc. If any. The price shall cover erection of all components including solid core insulator, dropper wires and small part steel work excluding MCC i.e., 3121/3122 in the case of multiple cantilever locations. This include the anti creep arrangement at masts/ structures. The price shall include:

Rly Id No.	Description of Components	Qty per unit
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3020	Mast fitting for hook insulator with 2 of bolts, nuts, locknuts washers of 16 mm	1 set or as required.	or	as
2400	Tubular stay arm assembly (including description of components galvanized steel tube)	1 set or as required	or	as
2110/ 2130 2382	Catenary suspension bracket assembly or hook Bracket	1 Off		
1160/ 2120 2142	Suspension clamp	1 Off ( as required)		
2040 or 2080	Bracket tube assembly complete with tube cap and sleeve where required (including galvanized steel tube). Mast Bracket fitting assembly including 2 off	1 set 1 set		
3070- 1/2				
2150- 1/ 2160- 3	bolts, nuts locknuts and washers of 16 for attachment to structure or to small part steel work. Register arm hook assembly complete with bolts, nuts and locknuts.	1 Off		
6000- 1	Stay arm insulators –	1 Each or as required	or	as
6030- 1	Bracket insulators -	1 Each or as required	or	as
2420 or 2432	Register arm assembly or raised register arm assembly (including galvanized steel tube).	1 Set		
2270- 4 or 5 2460 style 02 or 2470 style – 02	Register arm dropper assembly including 5 mm dropper wire, complete bolts, nuts etc.	1 Set		
2540 2520	Bent steady arm	1 Each		
2360/2490-2	25 mm steady arm drop bracket/ clamp	do		
3131 & 3076 1220/ 1370/-1(Mod-F)	Adoptors & Backing angle Contact wire swivel clip or raised register arm clamp	do 1 off		
2550-1/2	antiwind clamp			as required

**Note:-** Bent steady arm need to be provided in each bracket instead of normal steady arm.

**ITEM NO. D8 SUPPLY AND ERECTION OF PULL OFF ARRANGEMENT FOR ONE OHE**

The price shall cover supply for all components required for a pull off arrangement to pull one equipment only including head span mast fittings, complete with M.S. angle equilibrising plate assembly steady arm catenary, dropper clip, contact wire swivel clip and fittings, conductors, small jumper (50) wire. The price shall cover supply and erection of all components including solid core insulators small jumper wire and conductors as required.

**ITEM NO. D9 EXTRA FOR EACH ADDITIONAL EQUIPMENT PULLED**

The price shall cover as an extra to item D8 supply and erection of additional fittings required in case of the pull off to pull more than one equipment. The price is applicable for each extra equipment pulled.

**ITEM NO. D10 SUPPLY AND ERECTION OF A PULL-OFF ARRANGEMENT FOR REGULATED TRAMWAY TYPE OHE.**

The price shall cover supply of all components required for a pull off arrangement to pull one equipment only complete with steady arm, contact wire; swivel clip and fittings, conductors. The price shall cover erection of all components including solid core insulators, small jumpers and conductors as required.

**NOTE:** No extra payment shall be admissible under item No. D5 for bracket assemblies on platform structures with extra insulators to support cantilever assemblies.

**ITEM NO. D11 SUPPLY AND ERECTION OF MOUNTING ARRANGMENT OF SPAN WIRE.**

The price shall cover supply of all components including adjusters, terminal fittings and mast attachments required to attach a span wire of 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 not include the cost of small parts steel work if any. The price shall cover erection of all components including mounting arrangements for span wire and including solid core insulators but excluding small parts steel work if any.

**ITEM NO. D12 SUPPLY AND ERECTION OF A SPAN WIRE.**

The price shall also cover supply and erection of a span wire per metre. The payable length shall be the horizontal distance between the inner faces of all traction masts/ structures on which the mast attachments are mounted.

No extra length shall be provided for Sag. The price is applicable for all types of span wires including head span wires. Erection of a metre beyond the first decimal shall be rounded off to the nearest first decimal.

**ITEM NO. D14 SUSPENSION/ REGISTRATION FOR CONTACT WIRE ONLY**

The price shall cover 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.

Vee clamp or double vee clamp with adjuster or steady arm with steady wire clamp.  
Contact wire swivel clip.

**ITEM NO. D16 SUPPLY AND ERECTION OF REGULATING EQUIPMENT (3 PULLEY TYPE) MODIFIED WITH COUNTER WEIGHT ASSEMBLY FOR CONVENTIONAL/ COMPOSITE OHE.**

The price shall cover supply of regulating equipment, SS wire rope, anti-falling rod of suitable length, counter weight and small part steel required for fixing with mast /structure for regulating equipment and anti-falling rods. Suitable forged clevis as approved by RDSO for fixing with mast/structures to be used. In case of old type of regulating equipment, the same is to be replaced by new type of regulating equipment consequent to any modifications/request by the purchaser. The rate includes above also. The price shall cover supply and erection of all items given above including **counter weight (suitable for 1.2 T OHE Load)**. 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. D18 & D19. The price shall also include for marking 15<sup>o</sup>, 35<sup>o</sup> and 45<sup>o</sup> deg temperature marking on the BWA mast and color band including the half tension lengths as required by the purchaser for items under D16 & D17.

**Note:** - For item No. D16 the weight of counter weight should be kept so that tension in catenary wire and contact wire should be maintained **1.2T**.

**ITEM NO. D17 SUPPLY AND ERECTION OF REGULATING EQUIPMENT (3 PULLEY TYPE) MODIFIED WITH COUNTER WEIGHT ASSEMBLY FOR TRAMWAY TYPE OHE (REGULATED)**

Same as D16 above but with counter weight assembly conforming to style 01 of the relevant termination arrangement drawing No. ETI/ OHE/G/04212 or latest.

**ITEM NO. D18 (i) SUPPLY AND ERECTION OF MATERIALS FOR TERMINATION OF SINGLE CONDUCTOR OF OVERHEAD EQUIPMENT**

The price shall cover supply of all material necessary for the termination of single conductor of overhead equipment on traction mast or structure, including appropriate mast anchor fittings including suitable attachment with mast/structure, backing angle, cleaves assembly, adjuster, anchor double straps, ending clamp for the catenary or contact wire or terminating wire and fitting including 9 tonne porcelain insulator assembly but excluding terminating wire if any. The price shall cover erection of all materials including the 9 tonne conventional porcelain insulator assembly and except terminating wire if any.

**Note:** - In case if 'V' type anchorage is adopted for terminating a single conductor such an arrangement would be counted as two off under item D18 for the purpose of payment.

**ITEM NO. D19 SUPPLY AND ERECTION OF MATERIALS FOR TERMINATION OF DOUBLE CONDUCTOR (CONVENTIONAL/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 fitting including attachment with mast/structure, Backing angle, cleaves – assembly three adjusters, ending clamps for catenary and contact wire anchor double strap assembly, equalizing/ compensating plate and fittings including 9 tonne

conventional porcelain insulator assembly in a FTA/RE location but excluding the termination wire if any. The price shall cover erection of all materials including the 9 tonne conventional porcelain insulator assembly. When anchoring of a OHE (Both catenary and contact wire) through large span wire (130 sq. mm) is done, supply and erection rate for termination will be paid under this schedule of work.

**ITEM NO. D22 (VI) SUPPLY 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) including 9 tons conventional insulator and will exclude the parts covered under item D16 & D17.

**ITEM NO. D23 SUPPLY AND ERECTION OF MATERIALS FOR TERMINATION OF 25 KV TERMINATING WIRE (150 SQ.MM) COPPER CROSS TRACK/ ALONG TRACK FEEDER.**

The price shall cover supply of all materials necessary for termination of terminating wire 150 sq. mm Copper on a structure for cross track or along track including appropriate anchor fittings, backing angle, Cleaves assembly, adjuster anchor double straps, ending clamp for 150 sq. mm Copper wire and fitting including 9 tons conventional porcelain insulator assembly and but excluding terminating wire (150 sq. mm Copper) if any. The price shall also cover erection of all materials including 9 tonne conventional insulator assembly and excepting terminating wire if any.

**NOTES TO ITEM D16, D17, D18, D19, D22 & D23**

1. Anchor fittings including suitable attachment for mast/structure and backing angle complete with bolts and nuts wherever required is included in this item.
2. Deleted.
3. The price under items D18, D19 & D22 shall also include the cost of double eye distance rod (Id. No. 5183) if proved for any type of terminations.
4. Supply and erection of materials for terminations of catenary wire on either side of the portal at anticreep locations or at bridge face will also be paid for under this item.
5. As per site requirement if the termination 9 tonne insulator is to be shifted to mid span of Anchor span no extra rate for shifting at the time of erection is admissible.
6. The price including provision of spacer pipes to be provided in anti-falling device as per tension length and marking of 15° C, 35° C and 45° C marks on the mast/structures as per standard width and colour code in vogue.
7. Due to some reason or other OHE and guy rods are provided with two separate anchor fittings, no extra rates are admissible for any of the materials provided extra.
8. In regulating equipment, SS wire rope the manufacturers identification mark ferrules should be kept on cast iron weight side.
9. Erection rates under item No. D16, D17, D18, D19, D22 & D23 also includes the temporary termination of OHE/Feeder/RC wires on structures/mast during modification also during the wiring works, where temporary termination is done. – For such terminations supply rates are not admissible.
10. The insulator provided for terminations in normal zone and for polluted and red zone, shall be 9 tonne porcelain insulator (1050 mm creepage)

11. Anti falling device rod shall be fixed on mast/structure as per RDSO drawing No. TI/DRG/OHE/ATD/RDSO/00009/06/0. and no extra payment is admissible for the above arrangement.

**ITEM NO. D24 EXTRA ON ITEM A1 FOR SUPPLY AND ERECTION OF ADDITIONAL FITTINGS REQUIRED AT A TURNOUT, DIAMOND CROSSING OR OVERLAP.**

The price shall cover on flat rate basis supply of additional components and fittings required at turnouts, crossings or overlaps (un-insulated 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 or equipment conductor at a turnout, diamond crossing, Insulated and Un-Insulated overlaps or neutral section including jumper wire. The price shall cover erection of all materials including jumper wire (and all adjustments required at turnouts, diamond crossing, overlaps and neutral section).

The price shall not include extra bracket assemblies overhead equipment, termination of overhead equipment and cut-in-insulators in the case of insulated overlap and neutral section which will be paid for under items D5, D6, D7, D8, D9, D10, D24, D25, D26, D27, D28, A1 & A2 whichever applicable.

**Note:- 160 SQ. mm Copper jumper wire need to be used for G jumper.**

**ITEM NO. D25 EXTRA ON ITEM A2 FOR SUPPLY AND ERECTION OF ADDITIONAL FITTINGS REQUIRED AT A TURNOUT, DIAMOND CROSSING OR OVERLAP.**

Same as item no. D24 for item A2 instead of item A1.

Note for Item No. D24 & D25: A cross over shall be paid for as 2 off of Item D24 & D25 whichever applicable, special configuration of OHE commonly known as overlap shall be paid for as 1 off D24 & D25 whichever applicable under this item. This shall apply in case of the overlap used in changing over from regulated to unregulated equipment or unregulated to regulated equipment.

**Note: - 160 SQ. mm Copper jumper wire need to be used for G jumper.**

**ITEM NO. D26 SUPPLY AND ERECTION OF PORCELAIN CUT-IN-INSULATOR.**

The price is applicable to the provision of an additional 9 tonne porcelain cut-in-insulator on a flat rate basis such as in a headspan, cross span or in span wire or an overhead equipment conductor at an insulated overlap, in anti-creep any additional insulators provided. The price shall cover supply of all components required for the cut-in-insulators assembly, including appropriate terminal end fittings for the conductor and the 9 tonne porcelain insulator. The price shall cover erection of all components, including the 9 tonne porcelain insulator. This price shall also be applicable as an adjustment price for non-provision of insulators under items D18, D19, D22 & D23.

**ITEM NO. D27 SUPPLY AND ERECTION OF A PORCELAIN SUSPENSION INSULATOR.**

The price is applicable to the provision of a 9 tonne porcelain suspension insulator (Polluted zone type for polluted area) assembly for suspension of an Copper 25 KV feeder 150 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 clamp and the 9 tonne porcelain 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 tonne porcelain insulator assembly but excluding small parts steel work, with bolts and nuts etc. for fixing if any. The price shall include the cost of provision of a flat armour tape to be used in connection with suspension of SPIDER conductor.

#### **ITEM NO. D28 SUPPLY 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 aluminum jumper/ busbars. The price shall cover supply of all components and fittings/ angle iron (outrigger) to support the jumpers including supply of Post insulator but excluding supply of small parts steel works with bolts and nuts etc. for fixing with mast/structure 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. for fixing with mast/structure if any.

#### **ITEM NO. D29 SUPPLY 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 special droppers for supporting the equipment and all terminal end fittings for conductors, the section insulator assembly and the 9 Tonne conventional porcelain insulator assembly on the catenary and dropper wires as required. The price shall cover erection and adjustment of all components including section insulator assembly 9 tonne porcelain insulator on the catenary and droppers. Stiffener rod of requisite length to be provided on both ends with contacts wire pieces.

Rly Id No.	Description of the Components	Qty per Unit
1120/ETI/O HE SK/436/136 0	Catenary ending clamp	2 Off
1192/ETI/O HE/ 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	1 off
6020	Section Insulator 9 – Tonne porcelain cut – in – insulator	1 off

#### **ITEM NO. D30 SUPPLY 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. The price shall cover erection and adjustment of all components including sectioning insulator

assembly. The cantilever assembly at this location will be paid under item no. D7.

NOTE : Whenever 9 tonne porcelain insulators are provided on the contact wire for bifurcation /isolation of supply, or before providing section insulator assembly erection works, erection rate for provision of 9 – tonne porcelain insulators will be paid under item No. D26 as the work is to be done for sectioning purpose.

**ITEM NO. D31 ERECTION OF A CERAMIC BEADED GLASS FIBRE TYPE SHORT NEUTRAL SECTION ASSEMBLY:**

The rate includes erection of Ceramic beaded glass fiber type short neutral section of Imported make as per RDSO spec. No. TI/SPC/OHE/SNS/0000. The contractor shall procure and shall make his own arrangements for transporting the same to the site. For erection of Neutral section, any droppers are to be modified, no extra payment are admissible

**ITEM NO. D32 SUPPLY AND ERECTION OF 25 KV S.P. ISOLATORS WITHOUT EARTH CONTACT ASSEMBLY**

The prices under this item shall cover supply and erection of isolator switches of approved make

complete with arcing horns, operating rods, operating rod guides operating rod insulator, Pedestal Insulators, mounting base and 6 lever navtal lock. The provision of 160 sq mm jumper wires of required length to be paid under item D35, with 2 nos of terminal connectors. (RI – 1009) bolted type to be paid under item No. D59 is not included in the scope. The price shall also include flexible copper earth connection between isolator handle and mast/structure.

The price shall also cover supply and erection of all small parts steel with bolts and nuts required for erection of Isolator on the mast/ structure supporting pedestal insulators, supporting operating Rods, Handle, Jumpers, number plate of approved design etc. Any other pedestal insulator fixed for Jumper with/ without rigger shall be paid under item D28 and B4 respectively.

**ITEM NO. D33 SUPPLY AND ERECTION OF 25 KV DOUBLE POLE ISOLATOR.**

The price shall cover supply and erection of a double pole isolator of approved make complete with mounting base operating rod and operating rod guides operating rod insulator pedestal insulator, 6 lever navtal lock.

The price shall also include 3 /4 numbers of terminal connectors to be provided on isolators for OHE/SSP as the case may be and flexible copper earth connection between isolator handle and mast/structure.

The price shall also cover supply and erection of Alcu Strip, number plate of approved design, small parts steel structure, supporting operating Rods, Handle, Jumpers etc. If any other items supplied and erected like outrigger, pedestal insulator which will be paid under item D28 and B4 .

**ITEM NO. D34 EXTRA ON ITEM NO. D32 and D33 FOR AN INTERLOCKING DEVICE.**

The price shall cover supply and erection of an inter locking mechanism on an isolator along with small parts steel if any, to permit working of two or more isolators.

Note for item **D32 and D33**: All Isolators are to be supplied with Insulators and with complete accessories and small parts steel. Isolator key box of appropriate size shall be provided for at each station on the section, one number of such isolator box shall be

provided at the nearby OHE depot in charge of the section and one number at SSP/SP, as desired by the purchaser engineer at site.

**ITEM NO. D 35 SUPPLY AND ERECTION OF A COPPER JUMPER**

The price shall cover on a flat rate basis the supply of all components and fittings required for providing a flexible copper jumper connection, including parallel grooved clamps, bimetallic and aluminum copper ALCU strips, wherever required and terminal or tee clamps at either end including jumper wire of appropriate length.

The price shall also cover the erection of the complete jumper assembly including jumper wire of appropriate length, The price shall not however be applicable for jumper connections already included under items A1, A2, D24 and D25 but shall be applicable for any jumper connections in any combination between feeders, Isolators, L. T. Transformer's dropout switches, Lightning arrestors for overhead equipments and outgoing busbars for switching stations booster stations. Continuity jumper as Boom anchor anticrime will be payable under this item. For continuity jumper across the ending clamps under OLS, the supply of all components and fittings including catenary wire for erection under the over line structure as per Drg. No. ETI/OHE/SK-529 or latest will also be payable under this item. The jumper wire shall be of RDSO's approved supply. (Including aluminum jumper wire of appropriate length). If the purchaser desires to go in for fit & forget type PG clamps, it will be informed to the contractor at the time of execution. The jumpers provided for continuity of supply at Feeding Post/SSP/SP and along track feeder continuity shall be of 160 sq.mm jumper of suitable length as required at site.

**ITEM NO. D 37 SUPPLY AND ERECTION OF A STRUCTURE BOND / INTERLOCK BOND**

The price shall cover supply of all materials including mild steel flat required to be provided in a structure bond connecting a traction mast or structures to the nearest non-track circuited rail, or (locations other than earth wire) earth electrode, including all fasteners at both ends, bonding should have suitable insulation sleeve in an approved manner. The price shall include shaping and drilling and paint of all materials including the bond. The price shall also include provision of heat shrinkable PVC sleeve of minimum length of 40cm for structure bond under track circuited rail. This would also cover connections or earthing terminals of equipments like L.T. transformers with structures and then to Rails as per relevant drawing. The rate will be per bond.

**ITEM NO. D 38 SUPPLY AND ERECTION OF LONGITUDINAL BOND / INRUN BOND**

The price shall cover the supply of all materials including mild steel flats, fasteners etc. required to be provided in a longitudinal bond connecting 2 rails at the rail joint at the locations specified by the Purchaser. The price shall includes shaping and drilling and painting of the bond and erection of all components including the Bond. The rate will be per bond. In Feeding post area Longitudinal bonds shall be provided as per RDSO design. 'U' shaped bonds which are provided in the points and crossing will be paid under this item.

**ITEM NO. D 39 SUPPLY AND ERECTION OF TRANSVERSE AND SPECIAL BOND**

The price shall cover supply of all materials including mild steel flats, fasteners insulation sleeve etc. required to provide Impedance bonds / Transverse Impedance bond connecting rails of the same/adjacent tracks at the locations and specified by the Purchaser. The price shall also cover the supply of all materials including mild



steel flat to provide special bonds at a level crossings, foot over/road over bridge/protective screen etc for which the location will be specified by the Purchaser. The price shall include shaping and drilling of the bond, painting and erection of all materials including the bond. This will be paid per bond. The price shall also include provision of heat shrinkable PVC sleeve of minimum length of 40 cm. Whenever it is required.

**NOTE for ITEM No. D37, D 38 and D 39**

1. The OHE traction bonds should be fixed to the rail and connected in such a way that they do not interfere with tamping tools during tamping as shown in drawing No. CE/570. The traction bonds shall be connected to the rail at a distance of not more than 80 mm from the adjoining sleepers.
2. Drilling of holes in the rails shall be done only with prior approval of authorized K-RIDE official and drilling should be done in the presence of nominated K-RIDE official.
3. All holes drilled to the rail shall be chamfered soon after drilling.
4. Drawing No. CE/570 showing the fixing arrangement of traction bonds to be followed strictly.
5. If any bonds provided and got damaged by the packing machine during track alignment work or by any other means etc., the same shall be replaced for which payment shall be made at the rates given under item Nos. D37, D38, D39 as applicable and the contractor shall set right/replace the same before handing over the assets to maintenance.
6. In case of yard remodeling & signaling work being done in stages during doubling, the bonding works of the concerned yard will have to be modified at each stage as per the requirement. At each stage the payment will be made at the rate specified for that particular item.
7. Jointing of flats by welding is only permitted except in platforms where it is inevitable.
8. On platforms bonds need to be secured with the use of cleat.

**ITEM NO. D 40 SUPPLY AND ERECTION OF SINGLE EARTH ELECTRODE**

The price shall cover supply and erection of an earthing stations with a single pipe embedded into the ground complete with protective concrete box and lugs suitable for directly connecting two mild steel flats of minimum size 40 mm x 6 mm. The earth resistance shall be measured and stenciled in the concrete box. The concrete Box shall be, as per RDSO's Design and may not be possible to remove unless otherwise bond fasteners are removed. The rate includes provision of Charcoal and Salt to a minimum size of 0.3 x 0.3 x 2.0 mts. in alternative layers irrespective of Soil Condition at Site.

**ITEM NO. D 41 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 gutters on wall. 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. Welding shall make the connection of earth strips to each other. The connections of earth strips to various equipments structures of fencing

post shall be made with G.I. bolts and nuts and spring washers/locknuts. This will be paid per metre length.

**ITEM NO. D 42 SUPPLY AND ERECTION OF COPPER STRIPS FOR EQUIPMENT EARTHING**

The price shall cover supply and erection of 25 mm x 3 mm copper strips to connect the earth terminals of equipments like potential transformers, lightning, arrestors, L. T. supply transformers and booster transformers to the main masts of the gantries on which they are mounted. The price shall cover all fastenings required for fixing the copper strip along any structure member of the gantry. The flat shall be painted with suitable paint to avoid theft.

**ITEM NO. D 43 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 LT panels.

**ITEM NO. D 44 SUPPLY AND ERECTION OF VACUUM TYPE 25 KV INTERRUPTERS**

The price shall cover supply, erection, testing and Commissioning of vacuum type interrupter of indigenous, RDSO's approved make complete with supporting framework and terminal connectors. The price for erection shall include alignment and grouting of the interrupters 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, equipment, instruments including power supply required for carrying out necessary checks, tests and commissioning shall be arranged by the contractor. The rate includes supply and erection of interlock to be provided between Isolator and interrupter and one number pad lock of 6 lever Navtal for each Interruptor.

**The price for item D 44 is inclusive of 2 distinct flexible solid copper earths to be provided between Mechanism Box and the frame/ earth if any. The rate also includes supplying of 1 No. each of closing coil, Tripping coil, drum contact (auxiliary contact) for each interrupters etc. and 6 copies of operating manual and wiring diagram.**

In case K-RIDE supply interruptor/circuit breaker, the same has to be erected by the contractor for which erection rate only will be paid.

**SPECIAL INSTRUCTION FOR THE INTERRUPTER IF INSTALLED AT TSS.**

In addition to the condition mentioned above, the rate also includes providing a T-N-C switch of English Electric (or) Recon or Siemens make and indication lamp holder with lamp mounted on a separate sheet metal box duly painted with enamel paint on a separate sheet metal box duly painted with enamel paint of appropriate colour (as existing) in TSS.

**ITEM NO. D45 SUPPLY AND ERECTION OF 25 KV POTENTIAL TRANSFORMER**

The price shall cover supply, erection, testing and commissioning of a 25 KV potential transformer type-I complete with all fittings and accessories as per relevant specifications, including terminal connector and fixing bolts at the PT terminals. 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 also include the cost of any small parts steel work.

**ITEM NO. D46 SUPPLY AND ERECTION OF 42 kV LIGHTNING ARRESTOR (STATION CLASS)**

The price shall cover supply, erection, testing and commissioning of 42 kV lightning arrestors complete with all fittings and accessories as per relevant specifications including terminal connectors if any in LA top. The cost of erection shall include proper alignment of the lightning arrestor in position. The price shall not cover supply and erection of copper jumper (65/160) which will be paid under Item **D 35**. The price shall include the cost of the small parts steel work.

**SUPPLY AND INSTALLATION OF CABLES (D50-D55)\_**

**ITEM NO. D 50 CONTROL AND INDICATION**

The price shall cover supply, installation and connecting up of cables for control and indication from the interrupters to the terminal board. The price shall include supply and erection of terminal connectors at both ends, if required and conduits where necessary.

**ITEM NO. D 51 HEATER SUPPLY**

The price shall cover supply installation and connecting up of heater supply cable from interrupter to interrupter or from interrupter to the 230 VAC fuse box mounted on wall inside the control cubicle and from this fuse box to L.T. distribution board provided by the Purchaser inside the control cubicle. The price shall include cost of supply and erection of terminal connectors and each end if required and conduit if any at the interrupter end.

**ITEM NO. D52 CATENARY INDICATION**

The price shall include supply, installation and connecting up of cable for catenary indication, between potential transformer Type - I and the terminal board inside the control cubicle. The price shall include supply and erection of terminal connectors at both the end if required and conduit to be embedded between the steel work base and the cable trench and shall include all fastenings on masts and structural members to support them.

**ITEM NO. D54 110 V.D.C. SUPPLY**

The price shall cover supply installation and connecting up of cable between 110 V 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 when it is 0.5 and above only.

3. Prices under items **D50, D51, D52, D53, D54, D55 and D56** do not include cost of concrete cable trenches which will be paid for under item **C4**.

**ITEM NO. D55 SUPPLY & LAYING OF 70 SQ MM XLPE INSULATED PVC SHEATHED ALUMINIUM CABLE**

The price shall cover supply and laying of XLPE insulated PVC sheathed aluminium conductor armoured power cable of aluminum cable of size 2 core x 70 sq.

mm as per ISS: 7098 heavy duty, 1100 V with IS markings for signal purpose as per latest RDSO directives. The cable shall be laid from L. T. signalling AT to the station building AT control panel or part thereof. The cable should be of RDSO approved make. The cable should be properly clamped on walls and GI pipe of required size and length is to be provided where ever cable is taken out from the earth to surface level. The price shall include testing, connecting/jointing and commissioning of cable and it will be paid / metre length. Suitable cable indicators are to be supplied and placed at 50 meters interval in an approved manner. No intermediate joint is permitted, whatever be the length of cable used. If lower [5 kVA] capacity L. T auxiliary transformers, are to be erected, then the payment is made for the supply and laying of XLPE insulated PVC sheathed aluminium conductor armoured power cable of aluminum cable of size 2 core x 25 sq. mm as per ISS: 7098 heavy duty, 1100 V with IS markings will be paid at half the rate per metre under this item. The price shall also cover supply and erection of suitable cable glands and connectors at both ends.

**ITEM NO. D56 CABLE TRENCH CUTTING**

For laying the 2 x 70 sq mm XLPE cable trench to be excavated to a depth of 3 feet and suitable width. After laying the cable sand to be filled to a depth of 20 cm and Bricks to be placed crosswise through out the length the trench to be covered with excavated mud. The mud should be kept with a heap for future settlement . The price shall inclusive of concreting of platform area to its original shape. The rate will be paid per metre length. The same rate is applicable for 2 x 25 sq. mm XLPE cable also.

**ITEM NO. D57 Supply and erection of ALUMINUM BUS BARS 50/39 mm**

The price shall cover supply and erection of aluminum busbars 50/39 mm (OD/ID) including cutting, bending, shaping and clamping on to insulators, connectors or equipment terminals.

**ITEM NO. D58 Supply and erection of SOLID COPPER BUSBAR 18 MM**

The price shall cover supply and erection of solid copper busbar 18 mm including cutting, bending and shaping.

**Note for ITEM NO. D57 & D58:**

The price under item D57 & D58 does not cover the cost of terminal connectors on the jumper and which will be paid for under item **ITEM NO. D59 & D60** as applicable. The cost of terminal connector provided on Isolator end is included in the Isolator.

**ITEM NO. D59 SUPPLY AND ERECTION OF ALUMINUM BUSBAR CONNECTORS**

The price shall cover supply and erection of busbar junctions and connectors of various types specified, including bolts, nuts etc., required at junctions or terminations of busbars.

**ITEM NO. D60 SUPPLY AND ERECTION OF SOLID COPPER BUSBAR CONNECTORS**

The price shall cover supply and erection of solid copper busbar junctions and connectors of various types specified including bolts, nuts etc., required at junctions or terminations of solid copper busbars.

**ITEM NO. D61 SUPPLY AND ERECTION OF ALUMINIUM BUS TEE CONNECTORS:**

The price shall cover supply and erection of Aluminum bus tee connectors including

bolts, nuts etc.

**ITEM NO. D62 SUPPLY AND ERECTION OF ALUMINIUM TAP CONNECTORS:**

The price shall cover supply and erection of Aluminum tap connector including bolts, nuts etc.

**ITEM NO. D63 SUPPLY AND ERECTION OF ALUMINIUM TERMINAL CONNECTOR BOLTED TYPE:**

The price shall cover supply and erection of Aluminum terminal Connector bolted type including bolts, nuts etc.

**ITEM NO. D64 SUPPLY AND ERECTION OF COPPER BUSBAR CONNECTOR BUS TERMINAL (6310):**

The price shall cover supply and erection of Copper busbar connector bus terminal (6310) including bolts, nuts etc.

**ITEM NO. D65 SUPPLY AND ERECTION OF SOLID COPPER BUSBAR CONNECTOR BUS SPLICE (6320):**

The price shall cover supply and erection of Solid Copper busbar connector bus splice (6320) including bolts, nuts etc.

**ITEM NO. D66 SUPPLY AND ERECTION OF SOLID COPPER BUSBAR CONNECTOR BUS TEE JOINT**

The price shall cover supply and erection of Solid Copper busbar connector bus tee joint including bolts, nuts etc.

**ITEM NO. D67 SUPPLY AND ERECTION OF SOLID COPPER BUSBAR CONNECTOR BUS TERMINATING TEE**

The price shall cover supply and erection of Solid Copper busbar connector bus terminating tee including bolts, nuts etc.

**ITEM NO. D68 SUPPLY AND ERECTION OIL FILTRATION, TESTING AND COMMISSIONING OF 10 KVA L.T. SUPPLY TRANSFORMER (OIL TYPE)**

The price shall cover supply and erection of 10 KVA L.T. supply transformer 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 Indian 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 for commissioning shall be arranged by the contractor. The price also includes the cost of L.T. fuse box with 63 Amps to be mounted on the Aux. Tr. Mast.

**ITEM NO. D69 SUPPLY AND ERECTION OF LT CONTROL BOARD FOR AT LOCATION AS PER RDSO SPEC. NO. TI/SPC/PSI/ CLS/0020 WITH A&C SLIP NO. 4 (7/2010) or latest**

The price shall cover supply, erection, testing and commissioning of LT control and distribution panel for colour light Signaling suitable for 10 kVA with automatic changeover supply facility as per RDSO specification No. TI/SPC/PSI/CLS/0020 with A & C Slip No. 4 (7/2010) or latest.

The price also shall include provision of suitable cable termination box 63 Amps for terminating the LT cable of AT & local EB supply and outgoing cable to signal equipment at Cabin/Station building. The price shall also cover provision of 16 sq. mm copper leads for connecting terminal board to the LT control and distribution panel.

The price shall also include supply of necessary cable glands, fasteners, grouting bolts and clamps required for fixing/grouting of panel board.

#### **ITEM NO. D70 - SUPPLY AND ERECTION OF 25 KV DROP OUT FUSE SWITCH**

The price shall cover supply and erection 25 kV Drop out fuse (5 amps/1 amp) switch complete with all mounting accessories and terminal connectors as required including the supply of 25 kV solid core insulator. The price shall include supply and erection of small parts steel work, fuse element and mounting base channel. The D.O fuse switch of 5 amps shall be provided for 100 kVA/50 kVA auxiliary transformers and 1 amp for 10 kVA auxiliary transformers. No extra rate is admissible for the fuse element whether 5 Amps or 1 Amps fuse element is provided.

#### **ITEM NO. D71 SUPPLY AND ERECTION OF PROTECTIVE SCREEN FOR FOB / ROB.**

The price shall cover supply and erection of protective screen for one line on either side of the FOB / ROB in an approved manner as per RDSO drawing No. ETI/C/0068. The protective screen shall be painted with two coats of red oxide zinc chromate primer confirming to ISI and finished with two coats of aluminum paint. The price is inclusive of any arrangement required for erection of protective screen.

#### **ITEM NO. D72 SUPPLY AND ERECTION OF ANTI-CLIMBING DEVICES FOR L.T. SUPPLY TRANSFORMER STATIONS**

The price shall cover the supply and erection of anticlimbing device consisting of galvanized steel fixtures mounted on each mast below the transformer. The price shall be for each mast provided with the Anti climbing device.

#### **ITEM NO. D73 SUPPLY AND ERECTION OF CAUTION BOARDS ALONG WITH SUITABLE FIXING CLAMPS.**

The price includes the supply and erection of Enamel caution board with suitable clamps for fixing in the Mast/ structure/wall including suitable bolt and nuts as per RDSO specification.

01	Public Caution Board (Regional Language/Hindi/English)
02	Staff Caution Board (Regional Language/Hindi/English)
03	Caution unwired Track Ahead board (English/Hindi)
04	Caution unwired Turnout board – (Enamel) (English/Hindi)
05	Electric Engine Stop Board (English)

06	LC danger Board (Regional Language/Hindi/English) with picture of skull & bone
07	OHE Restricted clearance board (Enamel) (English/Hindi)
08	Power Block Working Limit Board (Enamel) (English/Hindi)
09	Caution 25 kV (Retro Reflective Type) (Regional Language/Hindi/English)
10	Danger 25 kV (Retro Reflective Type) (Regional Language/Hindi/English)

#### **ITEM NO. D74 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 or support and releasing of SPS DA etc. The dismantled equipment shall be returned to the purchaser along with steel works like MCC DA and consequent adjustment to overhead equipment required such as changing the droppers leveling etc. No extra rates are payable for providing new dropper wires, catenary / contract wire clips if any. The foundations and steel work and bracket assembly for the new mast or structure will be paid for under relevant Items under schedule B, C and D respectively. Where ever changing of winch type regulating equipment by modified 3 pulley type regulating equipment is carried out, in addition to supply and erection of 3 pulley type RE, transfer of OHE shall be paid for transferring OHE from old RE to new RE.

#### **ITEM NO. D75 PROVISION OF AN ADDITIONAL BRACKET ASSEMBLY/ ASSEMBLIES ON A MAST OR SUPPORT**

The price shall cover dismantling of an existing bracket assembly/assemblies/ along with the steel works like MCC DA and provision of a multiple cantilever cross arm SPS wherever required and erection of bracket assemblies on the multiple cantilever cross arm/SPS. The price shall include any consequential adjustments to traction overhead equipment such as re-spacing of droppers, leveling etc. This price shall not include the price for supply and erection of any additional bracket assembling which will be paid for under relevant Item under Schedule D.

#### **ITEM NO. D76 DISMANTLING OF OVERHEAD EQUIPMENT**

The price shall cover cost of dismantling of OHE equipment including terminations, tensioning devices, section insulators guy rod assemblies at the termination and Anti creep, bracket, assemblies and associated small part steel work (excluding components embedded in concrete) the dismantled equipments shall be returned to the purchaser. This item includes releasing of Earth Wire and its termination, cut in insulator, Anti creep wire also if any. The released catenary wire to be coiled in drums or cut into pieces for handing over as desired by the purchaser. If anti-creep wire alone is released at any location, half the length of Anti creep wire will be paid under this item. The rate is inclusive of Guy Rods. Terminations and SPS to be released from either end of Anti creep anchor and OHE.

The rate is also inclusive of pedestal Insulators to be released from OHEs/ Anchor Locations/ Return conductors as the case may be. The rate includes for releasing of Isolators and section insulator assembly released along with OHE if any.

**ITEM NO. D77 DISMANTLING OF FEEDER/RETURN CONDUCTOR**

The price shall cover dismantling of feeder, return feeder or return conductor including guy rods, terminations, suspension assemblies, insulators super masts and associated small part steel work. Whenever feeder wire is released and transferred to new location, dismantling and erection shall be paid. The length of the feeder wire so released/erected is reckoned duly calculating half the length of the span on either side of the location.

**ITEM NO. D78 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 shall be returned to the Purchaser's Engineer. The cost of dismantling of overhead equipment would be paid for under Item D76. The extended overhead equipment shall be deemed as starting from the center line of the splice to the extended overhead equipment and shall be paid for under Item A1 or A2 or A3 as applicable. Half the rate shall only be paid if and only catenary or contact wire alone is spliced and extended. In case of splicing and extension of AC wire, half the rate shall be paid. The length of the AC wire spliced will be paid based on **Schedule – G** rates applicable to the tender. The splicing of catenary wire with contact /insulated catenary wire using ending clamp/splice under the ROB will be paid under this item and half the rate shall be paid for each such splicing.

**ITEM NO. D79 DISMANTLING OF A SECTION INSULATOR**

The price shall cover cost of dismantling of a section insulator assembly and also if required splicing of catenary and contact wires and the necessary adjustments to droppers. The dismantled equipment shall be handed over to the Purchaser's Engineer at the spot of dismantling or at the Contractor's / Purchaser's depots, as required by Purchasers Engineer.

**ITEM NO. D80 SLEWING OF EQUIPMENT**

The price shall cover for temporary slewing or lowering of erected OHE adjusted and/or unadjusted to ground for special works, at the request of the purchaser and restoration and readjustment of the equipment after completion of special work. Slewing of OHE shall be paid for the OHE slewed near to the new OHE to be spliced during modification work. The price shall be per location/span or part thereof including anchoring spans. This is inclusive of RC wire and earth wire if any.

Additional components or materials used during such restoration of re-adjustment shall be paid provided such use has, in the opinion of the Purchaser, become necessary due to reasons beyond the control of the contractor.

**ITEM NO. D81 DISMANTLING OF AN ISOLATOR**

The price shall cover cost of dismantling of an isolator including dismantling of isolator single pole or double pole or gang operated including dismantling of pedestal insulators, operating rod insulator, operating rod and connection to the overhead equipment and associated small parts steel work in isolated cases.



**ITEM NO. D82 DISMANTLING OF A PIN/PEDESTAL INSULATOR**

The Price shall cover cost of dismantling of a pedestal/ pin insulator including dismantling of jumper connection, if any and associated small parts steel work.

**ITEM NO. D83 DISMANTLEMENT OF OHE MAST/STRUCTURE BY CUTTING**

The price shall also cover the cutting and retrieving of the old steel structure as directed by the purchaser. The price shall cover the cutting and retrieving of Old mast of any type including TTU's as directed by the purchasers Engineers at site. While releasing such TTU's proper care shall be taken in such a way that no damage occurred to the Booms. However, the dismantling of the TT boom will be paid under item **D87**. The OHE foundation must be chipped or broken to a depth of 670mm from the tip of the foundation. All the retrieved mast shall be stacked at the places to the nearest OHE maintenance depot as decided by the purchaser in the section. On completion of cutting site clearance shall be done duly back filling if there any need be. Any small part steels available in the mast/structure shall release safely and handed over to the purchaser. No extra rate is admissible for the same.

**ITEM NO. D84 DISMANTLEMENT OF OHE MAST/STRUCTURE BY BREAKING THE FOUNDATION.**

The price shall cover retrieving of steel mast/structure from the foundation after retrieving the OHE mast the mast hole may be filled with enough soil and as directed by purchaser's engineer. During the time of dismantling operation any deformation occurred it should be set right. The rate shall also applicable for retrieval of TTUs. All the retrieved mast shall be stacked at the place/ depot decided by the purchaser in the section. All the retrieved mast shall be stacked at the place to the nearest OHE maintenance depot as decided by the purchaser in the section. The deformation of mast, occurred either during the retrieval or during transport shall be removed by the contractor. If it is not removed or the mast was cut and removed by the contractor due to other reasons, then the payment will be made only under item No. **D83**

Note: All the dismantlement equipment, fittings, masts, SPS steel work shall be returned to the purchaser.

**ITEM NO. D85 DISMANTLEMENT OF GUY ROD ASSEMBLY**

The price shall cover dismantlement of guy rod assembly including Guy Rod mast fitting with V- bolt/loop in an isolated cases where guy rod alone needs to be removed.

**ITEM NO. D86 ERECTION OF TEMPORARY MAST INCLUDING CANTILEVER ASSEMBLY, TRANSFER OF OHE TO NEW MAST AND RELEASING THE TEMPORARY MAST UNDER POWER/NON-POWER BLOCK**

The price includes the rate for insertion of 16 feet long sleepers below to the rail and erection of temp mast, erection of Bracket, supporting of OHE. On completion of work transfer of OHE to new mast and releasing of Temp Mast and sleepers are also included in the scope of work. The rate given includes for **the work done under power block also**. The Transportation, Loading, unloading with or without crane shall be paid extra under transportation of OHE material.

**ITEM NO. D87 RELEASING OF PORTAL BOOMS**

The rate includes releasing of portal booms, TTB's, dismantling of booms and handing over of released materials to the purchaser as decided by the Purchase Engineer in charge. The rate given includes for the **work done under power block also**. If the

contractor desires to use road crane for releasing work, he can do so and no extra payment is admissible for the crane.

**ITEM NO. D88 SPLICING AND EXTENSION OF RC WIRE/ FEEDER WIRE**

The price shall cover splicing of terminated RC wire/Feeder wire or cut and splicing through RC wire/Feeder wire with the new RC wire/feeder wire for the purpose of proposed alignment. For the Dismantled Portion of RC wire/feeder wire, will be paid under item **D77**. The price shall include releasing of termination if any.

**ITEM NO. D89 RELEASING OF AUX. TRANSFORMER INCLUDING RELEASING OF DROP OUT FUSE AND LIGHTNING ARRESTOR FENCING PANELS, SPS IF ANY AND RELEASING OF JUMPERS FROM OHE**

The price for releasing of plinth/pole mounted. Aux. Transformer from Location which includes releasing of Drop out fuse and Lightning Arrestor fencing panels, SPS if any and releasing of jumpers from OHE. The released materials are to be handed over safely to the purchaser's Engineer.

**ITEM NO. D91 SPREADING OF 20 MM BALLEST IN THE SSP/ SP SWITCH YARD.**

The price shall cover supply and spreading of uniformly graded 20/25 mm Ballast stone size in the SSP yard duly leveling the area as soon as cable trench, work, fencing work, Interrupter, Mast/ Gantry erection is over. The Ballast stone shall be of good quality and free from any dust/ dirt/ muck. Prior approval shall be obtained from the purchasers engineer for the ballast stone sample. The ballast stones shall be spread out uniformly to a depth of 20 cm as directed by purchaser's Engineer.

**Item no. E1 Supply of 107 Sq. mm hard drawn copper contact wire.**

The price shall cover the cost of supply of hard drawn grooved continuous cast copper contact wire 107 sq mm for overhead equipment. The rate is inclusive of transportation, proper storage and watch & ward of the conductors. The cost of erection of contact wire shall be payable under Item No. A1 & A2. Reconciliation of material should be done as per actual use taking into account anchor and overlap. The measurement will be from centerline of anchoring mast minus the length of large span wire if any used in the wiring shot. The unused cut pieces generated during erection shall not be measured. Unused cut pieces shall not be taken back by K-RIDE.

**Item no. F1. Supply of 65 Sq. mm stranded cadmium copper catenary wire.**

The price shall cover the cost of supply of stranded copper catenary wire for overhead equipment. The rate is inclusive of transportation, proper storage and watch & ward of the conductors. The cost of erection of catenary wire shall be payable under Item Nos. A1, A2, A4 & A5. Reconciliation of material should be done as per actual use taking into account anchor and overlap. The measurement will be from center line of anchoring mast minus the length of large span wire if any used in the wiring shot. The unused cut pieces generated during erection shall not be measured. Unused cut pieces shall not be taken back by K-RIDE.

**Item no. G1. Transport of OHE material.**

The tenderer shall quote the rate per MT-KM for transporting of OHE

mast/structure/materials/Contact wires/Catenary and equipments dismantled at site. The rate quoted will be applicable whether the materials transported are full load or part load of the vehicle. The distance in KM from the place where the transportation to be carried out to the place of un-loading will be based on actual Road route KM. For safe loading and un-loading of heavy and lengthy materials, contractor has to arrange cranes. The rate under this item is inclusive of loading/un-loading by manual or cranes.

**ITEM No. G2: Supply and erection of schematic diagram and shock treatment Board**

The price shall cover supply and erection of schematic diagram of switching station of 3x2 feet in size on white decolam plywood of 8 mm thickness. Shock treatment chart should be printed in standard size and fixed in a glass frame. Price shall include fixing/mounting arrangements. Each set consists of one schematic diagram board and one shock treatment chart.

**ITEM No. G3: Manning of Switching Stations/Traction Sub- stations**

The prices shall cover the payment/wages to the staff to be deployed at each switching station and traction sub-station as directed by purchaser's Engineer. Manning shall be done round the clock. The staff to be deployed must be skilled and fully conversant with operation of various equipments installed in switching station and traction sub-stations. The staff shall be deployed after test and trial by purchaser and on issue of competency certificate. The staff deployed shall act in accordance with instructions/ directions given by Traction Power Controller/representative of purchaser. The staff shall not leave the working place (Switching station and Traction Sub-station) in any case without prior permission of purchaser's representative. The price shall cover conveyance charges to the staff for going and coming to the working place. The period of manning shall be decided by the purchaser during execution of contract and manning shall commence on receipt of intimation in writing from the purchaser one month in advance.

**Note:** In case Feeding Post is situated in adjacent to TSS same will also be included for manning along with TSS.

**ITEM No. G4: Supply, Erection, oil filtration, testing and Commissioning of 25 kV/240 V, 5 kVA L.T. supply transformers.**

The price shall cover Supply of 25kV/240V, 5 kVA LT supply transformers, at site, as per the RDSO's specification, 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 enamelled number plate of approved design. The price shall also cover oil filtration and pre-commissioning tests as approved by the Indian 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. G5: SUPPLY OF PTFE TYPE 25 KV SHORT NEUTRAL SECTION ASSEMBLY.**

The Price Shall Include supply of PTFE type 25 KV short neutral section assembly (Phase break ) suitable for 107 Sqmm Contact wire and 65 Sqmm Catenary wire as per RDSO specification no TI/SPC/OHE/SNS/0000 Rev 1 with addendum and corrigendum slip no 1 or latest and make Arthur Flurry Part no. 685.000.00 1 Make / Brand Arthur Flurry. Import documents Firm supply import documents OEM certificate of guarantee

and quality

**ITEM No. G6: Fabrication and supply of heavy duty emergency OHE mast made of MS RAW materials as per SCR/SC sketch no. TRD/SC/S014/289 (Approx weight 650 KG).**

The price shall cover Fabrication, Supply and Transportation to Contractor / Railway Depot of heavy-duty emergency OHE mast as per drawing no SCR/SC sketch no. TRD/SC/S014/289. The erection and dismantling shall be paid under item no **D86**.

**ITEM No. G7: SUPPLY OF DISCONNECTOR ASSEMBLY FOR 42 KV SURGE ARRESTOR.**

The Price Shall Include supply of disconnecter assembly for 42 KV surge arrestor as per rdso specification for lightening arrestor assembly no. TI/SPC/PSI/MOGTLA/0101 (02/2015) or latest with complete set and suitable hardware for fixing.

**ITEM No. G8: Supply and erection of neutral section warning boards**

The price includes the supply and erection of one set of Retro reflective type Neutral section Boards as detailed below with suitable clamps for fixing on to the Mast/structure with suitable bolts and nuts as per RDSO specification.

1	Neutral Section warning Board – Retro-reflective type 500 m warning board as per RDSO Drg.	2 Nos
2	Neutral Section warning Board – Retro-reflective type 250 m warning board as per RDSO Drg.	2 Nos
3	Neutral Section warning Board – Retro-reflective type DJ open board – Loco as per RDSO Drg.	2 Nos
4	Neutral Section warning Board – Retro-reflective type DJ close board – Loco as per RDSO Drg	2 Nos
5	Neutral Section warning Board – Retro-reflective type DJ close board – EMU as per RDSO Drg	2 Nos

**ITEM No. G9 & G10: Provision of buried rail arrangement**

The price includes Excavation of trench of size 0.6m with a depth of 1.2m from ground level along the track and erection of buried rail of 13m length (Rail will be supplied by Railways)

The price includes Supply and erection of GI flat 75x8 mm to a depth of 500 mm below existing ground level duly bolted with buried rail on either sides and connecting to nearest traction rail with tin plated copper bush and M12 bolts (SS) as per RDSO DRg. No. TI/DRG/PSI/E.stn/00001/14/0. Rev.1 or latest if any.

**ITEM No. G11: Supply, erection, Testing & Commissioning of control and distribution panel for colour light signalling supply in 5 kVA AC traction system as per RDSO technical specifications No. TI/SPC/PSI/CLS/0020 (7/10) with A&C slips No.1 to 4 or latest, connections as required.**

The price shall cover supply, erection, testing and commissioning of LT control and distribution panel for colour light Signaling suitable for 5 kVA with automatic changeover supply facility as per RDSO specification No. TI/SPC/PSI/CLS/0020 with A & C Slip No. 4 (7/2010) or latest.

The price also shall include provision of suitable cable termination box 63 Amps for terminating the LT cable of AT & local EB supply and outgoing cable to signal equipment at Cabin/Station building. The price shall also cover provision of 16 sq. mm copper leads for connecting terminal board to the LT control and distribution panel.

The price shall also include supply of necessary cable glands, fasteners, grouting bolts and clamps required for fixing/grouting of panel board.

**ITEM No. G12: Supply of Motor Bike 150 CC or more as per relevant special conditions**

The Motor Bike shall be new and delivered and maintained by the Contractor in good roadworthy condition. A new helmet shall also be provided along with the bike. The motor bike shall be washed and cleaned once in a month. The bike shall be replaced with a new Motor Bike after a maximum run of 90000 Kms or three years whichever is earlier. The Motor Bike shall be registered and insured for use on the public roads and shall have comprehensive insurance cover for any rider having valid driving license and authorized by the Engineer. The Contractor shall provide fuel, lubricants and other oils for running of the Motor Bike for 3000 Kms monthly and ensure maintenance in conformity with the vehicle manufacturer's recommendations and all relevant toll and parking charges incurred in connection with the works shall be borne by the Contractor. The motor bike shall be provided day and night as required by the Engineer/Employer. A suitable replacement shall be provided by the contractor for any motor bike out of service for more than 24 hours. If the contractor fails to provide motor bike as specified, an amount of Rs.500 per day for each motor bike (that the Contractor failed to provide) shall be recovered from the Contractor.

**ITEM No. G13: Erection, testing, commissioning of 25 KV/240 V Auxiliary Supply Transformer (25 kVA capacity) Oil type.**

The price shall cover supply and erection a 25 KVA L.T. Supply transformer complete with all fittings and accessories including terminal connectors. The price shall 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 (25 kVA capacity) Oil type shall conform to RDSO specification no.ETI/ PSI/15 (8/2003) or latest amendments.

**ITEM No. G14: Supply, erection, Testing & Commissioning of control and distribution panel for colour light signalling supply in 25 KVA AC traction system as per RDSO technical specifications No. TI/SPC/PSI/CLS/0020 (7/10) with A&C slips No.1 to 4 or latest, connections as required.**

The price shall cover supply, erection, testing and commissioning of LT control and distribution panel for colour light Signaling suitable for 25 kVA with automatic changeover supply facility as per RDSO specification No. TI/SPC/PSI/CLS/0020 with A & C Slip No. 4 (7/2010) or latest.

The price also shall include provision of suitable cable termination box 63 Amps for terminating the LT cable of AT & local EB supply and outgoing cable to signal equipment at Cabin/Station building. The price shall also cover provision of 16 sq. mm copper leads for connecting terminal board to the LT control and distribution panel.

The price shall also include supply of necessary cable glands, fasteners, grouting bolts and clamps required for fixing/grouting of panel board.

**ITEM No. G15: Laying of UG Cables by Trenchless Technology by adopting Horizontal Boring & Drawing of cable including preparation at site in Normal soil 5/6" Bore with supply and erection of HDPE Pipe.**

The price includes laying of UG cables by horizontal boring of 5/6" bore. The price shall also include the supply & laying of HDPPE pipe and passing the cable through the pipe.

**H-1: Tirfor 5.0 Tonne /3.0 Tonne with 20 m steel rope:**

The Item price includes cost of supply of Tirfor 5T/3T, as per IS:5604/1984 or latest, ISI marked (Make TRACTEL /TIRFOR or equivalent as approved by Engineer).

**H-2: Pull-Lift 3/4 Tonne (with loop type chain):**

Pull lift manual 3T capacity with steel chain 12-15 Mtrs length, with ISI Marked and test certificate for having tested 150% of its capacity.

**H-3: Dropper making jig & wire straightener for 5 mm dropper wire:**

Dropper making jig and wire straightener for 5mm dropper wire.

**H-4: Come along clamps for catenary suitable for 19/2.108mm conductor:**

The clamp shall be of self-gripping for catenary wire, required fabricated with alloy steel, while the shackle is forged from high tensile steel

**H-5: Come along clamps for contact wire 107mm2:**

The clamp shall be of self-gripping for contact wire, required bodies fabricated with alloy steel, while the shackle is forged from high tensile steel.

**H-6: Earthing Discharge Rod Complete (light weight 11 kgs (As per RDSO spec. ETI/OHE/51(9/87) Re. 1, Oct 92 to be supplied):**

The Item price includes cost of supply of earthing discharge rod of fiber glass, screw type suitable for working voltage of 25KV AC traction as per RDSO specification no ETI/OHE/51(9/87) with latest A&C slip no 1(10/92). The earth discharge rod should be of complete fiber glass body screw type having spring loaded top clamp of copper suitable to fit in catenary/contact wire/ 50 mm dia bus bar, 2 nos. rail clamps having cable junction at 1.5m from rail clamp, along with single core flexible multi strand annealed copper 248/0.45mm size heat resistant PVC cable 10.5 m long (7.5m+2x1.5 = 10.5m). The whole assembly to be supplied in a suitable canvas bag.

**H-7: Aluminium Straight ladder (8m) with Hook on top:**

As per the RDSO standards and approved vendors.

**H-8: Aluminium Straight Ladder Extensive (11m):**

The Item price includes cost of supply of Aluminum Straight ladder extendable type

(11mtr) : Closed height 6mtr, extended height 11 mtr. Ladder shall be made out Made out of Aluminium 'C' shape section size 66.6x31.7mm, step of aluminium corrugated tubing 25.4 mm, as per IS : 733-1983 temper-6. It shall be fitted with safety lock, pulley, rope and non-slippery rubber shoes in the bottom. (SUMER make ref-AL100/8809 or equivalent as approved by Engineer).

**H-9: Drilling machine (25mm) Motor Driven (radial or pillar).**

As per the RDSO standards and approved vendors.

**H-10: Bench Grinder (Double end) pedestal motor Driven (203 mm) disc.**

As per the RDSO standards and approved vendors.

**H-11: Air Cooled, regulator type welding machine (Single phase,230V, with output 250amps)**

The Item price includes cost of supply of Portable arc welding machine 250 A capacity, rated output current 10 - 250 Amps, rated output voltage 28 V, Rated input power-5KVA, Electrode size & welding thickness 0.5mm to 3.15mm,suitable to work on 230 V  $\pm$  15%, 50Hz single phase AC supply, Insulation class-B or higher, work on 230 V  $\pm$  15%, 50Hz single phase AC supply, Insulation class-B or higher , IP23 protection, Complete set shall be supplied along with suitable copper electrode holder, earth clamp and PVC copper multi-strand cable of 10 m length

**H-12: Portable Electric Drill 21mm, Single Phase,230v (For Drilling) Railli Wolf, Hitachi, Black & Decker Makes Only**

The Item price includes cost of supply of portable heavy - duty electric drill suitable for drilling holes of 21mm dia, working on single phase, 230 V AC supply along with 2 no's suitable spare drill bits. (make Railli wolf model WDH-12 or equivalent model of Hitachi/Black & Decker as approved by Engineer).

**H-13: Contact wire cutter 36" as per RDSO specification and approved Vendor**

**H-14: Dropper wire cutter 12" as per the RDSO standards**

**H-15: D shackles set of one each (1",3/4",5/8",1/2")**

As per the RDSO standards and approved vendors.

**H-16: D Shackles Set of one Each (1",3/4",5/8",1/2")**

The Item price includes cost of supply of a set of D Shackles made of alloy steel. Set consisting one no. shackle of each size (1", 3/4", 5/8", 1/2"). Shackles shall have loaded capacity up to 5T and made as per IS: 6132 and shall be suitable for use in TRD works as approved by Engineer.

**H-17: Single Sleeve pully block 3 1/2" x 1/2" Groove steel fibre for drawl of contact catenary wire**

As per the RDSO standard and approved vendors.

**H-18: Single Sleeve pully block 6" x 1" Groove steel (with top eye to be supplied, cap 2T, asper IS: 13156 of 1991**

As per the RDSO standard and approved vendors.

**H-19: Contact wire twist cum bender 6 inch:**

As per the RDSO standard and approved vendors.

**H-20 to 25: Set of Steel Sling 19mm Dia with Eye Each End Of 1M,2M,3M,4M, &10M**

The Item price includes cost of supply of a set of Steel slings with eye on both ends. Each

set shall have sling of 8mmX2M and 12mmX3M length as approved by Engineer.

**H-26: Copper Hammer 2 kg:**

As per the RDSO standards and approved vendors.

**H-27: Metric tape 30 m, 15m each (PVC tape only):**

Good quality ISO certified products only

**H-28: Light weight ladder trolley**

The Item price includes cost of supply of Fiber/light weight, winch type Ladder Trolley suitable to move on railway track for maintenance of 25KV AC OHE with following details:

- (a) adjustable height up to 5 mtrs
  - (b) MS round pipe 1.5" dia,
  - (c) step distance 300mm of 1.5"MS pipe
  - (d) Ladder trolley Base size = 1676m (inner)
  - (e) foldable upper platform 2'x2'
  - (f) Ladder wheels = 4x12" dia Nylon suitable for 1676mm BG track
  - (g) Maximum weight of the trolley = 200kg,
  - (h) Paint: auto finish paint of approved quality.
- (Note: - Contractor shall submit the drawing of ladder Trolley for approval by GM/KRIDE before execution of the work.)

**H-29: Engineering Ratchet:**

Good quality ISO certified products only

**H-30: LED Tri colour lamps:**

As per the RDSO standards and approved vendors.

**H-31: Tirfor 3 Tonner/2 Tonne:**

As per the RDSO standards and approved vendors.

**H-32: Spring balance 25 kg capacity:**

Good quality ISO certified products only

**H-33: Wire claws (Panja):**

As per the RDSO standards and approved vendors.

**H-34: Crow bar:**

Good quality ISO certified products only.

**H-35: Shovels:**

Good quality ISO certified products only.

**H-36: Sledge hammer 10 lb:**

Good quality ISO certified products only.

**H-37: Tree pruner (with telescopic handle & saw blade):**

Good quality ISO certified products only.

**H-38 – H-40: ¾ inch Manila rope 100m, 1/2 inch Manila rope 150m & 1 inch Manila rope 50m long**

Good quality

**H-41 Manual rail hole drilling Ratchet and clamp with chamfering tool:**



As per the RDSO standards and approved vendors.

**H-42 Battery operated LED based flashing Tail lamp as per RDSO spec no. 2002/TR/281/TL (rev.0):**

As per the RDSO standards and approved vendors.

**H-43 Dynamometer 10-Tonne capacity with carrying box with 150 mm Dia with test certificate**

As per the RDSO standards and approved vendors

**H-44 High focus LED rechargeable hand torch light.**

As per the RDSO standards and approved vendors

**H-45 Walkie Talkie Sets (2w Output)**

Item price includes cost of supply of Trans receiver, VHF, hand held Walkie – Talkie set 5W (tuned for rated power of 2 watts), 16 channels synthesized with 2200 mAh Ni-Mh Battery pack. Configuration VHF-3 band 136-174MHz full band (OR in between range) along with one spare battery pack of capacity 2200mAh and rapid charger. The VHF walkie-talkie shall be MIL standard compliant for 810.

The battery pack to be supplied should be compatible with the set.

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(1) Frequency Range: 136-174 MHz (or in between frequency range)

(2) Number of Channels: 16 channels or more.

(3) Type of Operation: Simplex, press to talk with built in condenser mic and speaker.

(4) Transmitter RF Power Output: 1W/5W  $\pm 0.5$ dB Switchable / programmable.

Rapid Battery Charger:

(a) Input Voltage: 230v +/- 10%, 50 Hz

(b) Input Voltage: As per the set battery pack for which charger is submitted.

(c) Charging Capability: Capable of charging 1 battery set at a time.

(d) Battery charging Rate: The charging current shall be within 1Amp.

(e) Reverse polarity protection (DC input) to be provided.

(f) Reverse polarity protection (Battery Terminal) should be provided.

(g) Short Circuit protection should be provided

(h) Visual indication for all modes of charging status.

(i) DC input cable with battery eye let to be provided with DC operated charger.

Model Motorola GP-328/Kenwood TK-2000

**H-46 Megger 2500V:**

Insulation tester 2.5KV Analog similar to CIE make Model no. CIE/444 confirming to IS:2992/1987 complete with suitable product twist

**H-47 Digital earth clamp megger to be supplied:**

As per the RDSO standards and approved vendors

**H-48 to 58:**

**Light weight Tool Box along with**

**Set of tools for Technicians a) DE Spanner set from 6 TO 32 (12 PIECES)**

**b) Ring Spanner set 16x17, 18x19, 20x22, 24x26, 30x32, 36x40**

**c) Screw Driver 6 "**

**d) Screw Driver 12 "**

**e) Hammer 1/2 lb**

**f) Cutting plier**

**g) Plumb bob**

**h) Hack saw**

**i) Spirit Level**

**j) Rechargeable 30-watt power LED Flood Lights**

Good quality ISO certified products only.

**H- 59: Industrial Digital Thermometer**

As per the RDSO standards and approved vendors

**H-60: Digital Crane weighing scale with remote display & printer 5 t**

Good quality ISO certified products only.

**H-61: Petrol Driven Light Weight Rail Drill machine with 52 kg & 60 kg Rail Adopter and 2 pairs of drills:**

As per the RDSO standards and approved vendors

**H-62: Portable cutting machine (Hand Held):**

Good quality ISO certified products only.

**H-63: Chain Saw 18" or 24" for tree cutting:**

Good quality ISO certified products only.

**H-64: Come along clamps for catenary suitable for 19/2.65mm conductor**

Clamp shall be of self-gripping for catenary wire, required fabricated with alloy steel, while the shackle is forged from high tensile steel The clamp shall be of self-gripping for contact wire, required bodies fabricated with alloy steel, while the shackle is forged from the high tensile steel

**H-65: Aluminium Ladder 15 mtr for cross track feeder checking:**

As per the RDSO standards and approved vendors

**H-66: Supply and commissioning of OLIVIR-G Plus system (Overhead Line Inspection with Video Recording and GPS making system for current collection test) as per RDSO specification No. TI/SPC/OHE/OLIVIR/0051 or latest**

The Item price includes cost of supply of GPS based OHE monitoring & current collection system Oliver-G as per RDSO spec No: TI/SPC/OHE/OLIVER/0051(01/15) or latest. The price includes all accessories/authentic software required for the mapping as per mentioned RDSO specification. The price also includes the cost of site demonstration by OEM engineer with suitable number of days of training to staff.

**H-67: Electronic Distance measuring equipment up to 500 m clear vision:**

Good quality ISO certified products only.

**Note:**

- 1. The work done under power block shall be paid 100 percent extra charges over and above erection rates of items except for item No. D86 & D87, 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 except item No. D86 & D87, provided such work is not called for on account of non-compliance with specifications, approved drawings and instructions given by the Purchaser from time to time.**

**The extra erection rate under this item will not be payable, if power block is given for a total duration of a 4 hour or more in a day (24 Hours). Where the prices under this item are applicable, the Contractor shall finalize the quantities of various items of work to be done under a power block, jointly with the Purchaser's Engineer prior to taking the work in hand.**

- 2. The material shall be supplied as per the target sections mentioned in the milestones and as approved by K-RIDE.**

**Section-9 PART - C****PAYMENT PROCEDURE****Scope:**

This 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 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:****(a) Prices for items from Schedule A to H:**

The rates given against various items of work in eight Schedules viz., Schedule -A to H of the tender. The tenderers are required to quote a single percentage below/at par/above each schedule separately. The actual payment to be made against any item of Schedule A to H, shall be derived after loading the prices of that schedule with the tenderer's quoted percentage for the same schedule. The prices so obtained shall be the unit prices for the various items of work given in Schedule A to H.

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 supplied by the purchaser for which only erection charges will be payable, and for execution of work in accordance with specifications and approved drawings and designs.

**(b) UNIT PRICES FOR MATERIALS**

The prices indicated for Schedule A to H supply items 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 or road from manufacturer's factory and completing all necessary formalities in this respect, such as submission of forwarding notes, collection of railway receipts, all insurance premia or any other charges, indemnity bond for the material supplied for which on-account payment exists etc. as also siding or shunting charges, if any, levied.

The prices shall include all taxes, duties and levies (including Octroi etc.) applicable on this works contract. Therefore, Bidder 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.

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

### **FOR ERECTION.**

The unit prices indicated for Schedule – A to H erection items are inclusive of cost of erection and testing to be done by the Contractor to the extent indicated in Section 7 and also cover all cost of administration of the contractor, insurance premium, banker's charges for guarantees, cost of stamps, cost of storage, loading and unloading and handling of materials and for any road transport which the contractor may use for carriage of materials between his depot and depot/s and site of work. The unit prices shall include cost of works and adjustments necessary to be done by the contractor during or after the tests carried out by the Purchaser as Section 9.

### **Other Payment Terms:**

(i) No adjustment on account of variation in insurance and freight charges (road or rail) will be permitted.

(ii) Price variation on material: No adjustment of unit prices of fittings, materials, equipments or components on account of prices, fluctuation on raw materials will be permitted. No adjustment on account of variation in insurance and freight charges (road or rail) will be permitted. However, reimbursement on account of prices fluctuation on Ferrous, Non- Ferrous, Steel, Zinc required for Structures and small parts Steel, Cement and Erection component will be allowed as per section 7 of PCC.

### **A. PAYMENT PROCEDURE**

#### **1. ON ACCOUNT PAYMENT AGAINST SUPPLY OF MATERIAL**

On Account Payment will be made as described below:

(i) **“On Account Payment”** shall be made for the items specified in detailed terms of payment of each schedule under clause No. 4.0 as given below.

(ii) **‘On Account Payment’** For Schedule A to H shall be made to the extent of 85% of the accepted supply rate, after receipt, acceptance, account, proper storage and protection against loss, damage or deterioration on the items mentioned in each schedule.

(iii) **‘On Account Payment’** made to the contractor will subsequently be adjusted against progress payments and against payment due on provisional acceptance.

(iv) All invoices shall be accompanied with the following, for the purpose of arranging **‘On Account Payment’** against the contract

NOTE: All the invoices should be accompanied by the following:-

- ⇒ E - way bill
- ⇒ Supplier's challans.
- ⇒ Transport challans
- ⇒ Inspection Certificate granted by the Purchaser's representative/RITES.
- ⇒ Certificate of receipt of materials at Contractor's Depot/s duly accepted by the Purchaser's Engineers.
- ⇒ Quality assurance documents
- ⇒ Invoice from approved vendor against our contract
- ⇒ Certificate that contractor stores/depot has been insured. (Insurance copy to be submitted.)

## **2. PROGRESS PAYMENT AGAINST SUPPLY AND ERECTION OF MATERIAL:**

On completion of each item of BOQ, the contractor shall receive payment to the extent of 95% of the supply and erection costs after making any recoveries and adjusting of On Account Payment, which may be due.

## **3. Balance 5% PAYMENT:**

The balance 5% of each item of the BOQ shall be paid to the contractor after commissioning and after Completion of all the work in all the respects of the portion of the work or handing over of the installation/material to the employers / Railways representative along with the released material. This is applicable for all schedules.

### **4.0.1 PROCEDURE OF SCHEDULE WISE PAYMENTS**

#### **4.1 Schedule A:**

(i) **On Account Payment** will be made to the extent of 85% only for item Nos. A3 as per terms and conditions given in clause No. A (1) under "Payment Procedure".

(ii) The **Progress Payment** to the extent of 95% of all the items in the schedule shall be paid for the supply and erection prices after final adjustment of OHE and SED checking and after adjustment of "**On Account payment**" & other recoveries, if any, wherever applicable.

(iii) The balance 5% of each item of the BOQ shall be paid to the contractor after commissioning.

#### **4.2 Schedule B: MAST AND PORTALS**

**On Account Payment** shall be made only for item Nos. B1-B4 as per terms and conditions given in clause No. A(1) under "**Payment Procedure**".

(i) On account payment to the extent of 85% of the prices on supply of masts, portals and SPS as per terms and conditions given in clause No. A (1) under "Payment Procedure".

(ii) The **Progress Payment** to the extent of 95% of all the items in the schedule shall be paid for the supply and erection prices after erection of masts, portals and SPS, after making any recoveries and adjusting of On Account Payment, which may be due. However, payment conditions can be relaxed by MD/K-RIDE for Second Stage of Progress payment to the extent of 95% if the erection gets delayed by more than **TWO months** purely on K-Ride's account. The decision taken in this respect by the Purchaser shall be final and suitable safeguard may be provided to protect Purchaser's interest.

(iii) The balance 5% of each item of the BOQ shall be paid to the contractor after commissioning.

#### **4.3 Schedule C: (FOUNDATION)**

(i) Payment will be made on casting of foundation blocks, with or without Core holes, to the extent of 85% of the Prices of supply and erection for schedule-C and on the total volume of foundation blocks inclusive of muffs, as included in the approved cross-section drawings or as installed at site with permission of the Purchaser's representative.

(ii) On completion of grouting the progress payment to the extent of 95% of supply and erection shall be made.

(iii) Payment for balance 5% of prices of supply and erection shall be made after completion of muffing and commissioning of the agreed subsection.

#### **4.4 Schedule D:**

##### **(i) Item No. D1, D2 & D3 (Design & Drawing)**

The payment shall be made as under:

- (a) 50% of Scheduled rates shall be paid after "in principle approval of design/drawings by KRIDE".
- (b) 40% of Scheduled rates shall be paid after the submission & acceptance of as erected/ completion drawings by K-RIDE.
- (c) Payment of balance 10% of prices shall be made after submission of required number of copies of as erected drawing to the purchaser.

##### **(ii) Other items except item No. D1, D2 & D3:**

(a) **On Account Payment** will be made only for item Nos. D4, D12, D16, D17, D26, D27, D28, D29, D30, D32, D33, D44, D45, D46, D50, D51, D52, D54 and D55, D68,

D69, D70, D92, D93 to the extent of 85% as per terms and conditions given in clause No. A(1) under "Payment Procedure".

(b) **On Account Payment for Item No. D5 & D7:** The ONA Payments of Bracket Assembly to the extent of 85% is permitted only after receipt of the below mentioned parts of the Bracket Assembly:

Stay arm Insulator (Porcelain/Composite) – 1 Off  
Bracket arm insulator (Porcelain/Composite) – 1 Off  
25 mm Stay/RT Tube – 6 mtr  
40 mm/49 mm Large Bracket tube – 3 mtr  
BFB Steady arm – 1 mtr  
Catenary suspension bracket assembly – 1 off

(c) **Progress Payment** to the extent of 95% of all the items in the schedule shall be paid for the supply and erection prices after final adjustment of OHE and SED checking and after adjustment of "**On Account payment**" & other recoveries, if any, wherever applicable.

(d) Payment of balance 5% of prices shall be made after commissioning.

#### 4.7 Schedule E:

On account payment for schedule E shall be made to the extent of 85% of the accepted price on receipt of material as per terms and conditions given in clause No. A (1) under "Payment Procedure".

The progress payment to the extent of 95% of the accepted price of supply shall be made after completion of erection of material after adjustment of "**On Account payment**" & other recoveries, if any, wherever applicable.

Payment of balance 5% of prices shall be made after commissioning.

#### 4.8 Schedule F:

On account payment for schedule F shall be made to the extent of 85% of the accepted price on receipt of material as per terms and conditions given in clause No. A(1) under "Payment Procedure".

The progress payment to the extent of 95% of the accepted price of supply shall be made after completion of erection of material after adjustment of "**On Account payment**" & other recoveries, if any, wherever applicable.

Payment of balance 5% of prices shall be made after commissioning.

#### 4.5 Schedule G:

The Payment against Schedules - G4, G5, G13, G15 shall be made to the extent of 85% of the accepted price on receipt of material. The Payment against Schedules -



G4, G5, G13, G15 shall be made to the extent of 95% of the accepted price on erection of material.

The Payment against Schedules - G1, G2, G3, G6, G7, G8, G9, G10, G11, G12 & G14 shall be made to the extent of 95% of the accepted price on receipt and erection of material.

Payment of balance 5% of prices shall be made after commissioning.

#### **4.6 Schedule H:**

The Payment against all the items in Schedule H shall be made to the extent of 95% of the accepted price on handing over of material in good condition to the railway depot.

Payment of balance 5% of prices shall be made after commissioning of the section.

#### **5.0 Work Under Power Block**

In case a portion of the work is carried out during power block, 100% extra rates will be paid over and above the accepted erection rate (i.e. without adding extra for manual erection) of relevant item except item No. D86 & D87, on certification by engineer. This shall be paid only 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 against each item except item No. D86 & D87, provided such work is not called for on account of non-compliance with specifications, approved drawings and instructions given by the Employer 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 04 hour or more in a day**. Where the prices under this item are applicable, the contractor shall finalize the quantities of various items of work to be done under a power block, jointly with the Employer's Engineer prior to taking the work in hand."

**6.0.** OHE material shall be inspected by M/s. RITES/ RDSO representative as per the extant directives from Railway/KRIDE. The inspection charges of materials as required by RDSO/RITES shall be borne by contractor. If the inspection is carried out other than by RDSO/RITES, 1% of the cost of material will be deducted by KRIDE as inspection charges.

#### **7.0 TERMS OF PAYMENT:**

7.1 All bills shall be submitted by firm/contractor only (to whom contract has been awarded) to the authority mentioned in Preamble.

#### **7.2 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, 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 and from payment on provisional Acceptance.
- (b) The cost of shortage of materials in case of final reconciliation will be recovered in full by the Purchaser at relevant price in or book rate or last purchase rate whichever is higher, to the extent of requirement of such materials for each sub-section.

**NOTE:**

(1) If there are any shortages during final reconciliation, their cost will be recovered by the Purchaser from the Contractor at the book rate or the last purchase rate or the prevailing market rate, whichever is higher, plus 5% on account of initial freight, 2% on account of incidental charges together with supervision charges at 12.5% of the total cost inclusive of material freight and incidental charges. Freight between the Purchaser's source of supply and the Contractor's depot shall be to the Contractor's account.

(2) The cost of materials if supplied under Section 9 (under other railway stores). will be recovered in the manner indicated in sub-para (a) above.

(3) The materials supplied under Section 9 (under other railway stores) shall be covered by the suitable indemnity bond till the work is completed as certified by Engr.-in-charge.

(4) The Performance security shall be as per item 4.19 of the section 7.

**9. PAYMENT FOR ADDITIONAL SUPPLIES:**

The contractor shall receive payment for additional supplies ordered if any, in accordance with the prices included in Section 9 Schedule- A-H, on delivery of such supplies to the purchaser after due adjustment against 'On account' payment made only if purchaser accepts or ask contractor to supply the same.

**10. FINAL PAYMENT:**

On the basis of Work Completion certificate issued by the Engineer for all the works in all the sections covered in this contract, the final bill for the balance payment for each item/sub-item of work shall be submitted by the Contractor along with a clear "NO CLAIM CERTIFICATE". The provisional acceptance certificate shall be issued by the Engineer only when he has accepted the work wholly after conducting the acceptance tests on each item of work.

## **11. FINAL SETTLEMENT:**

On expiry of the guarantee period 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.

## **12. 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 dimensions were increased on account of physical impossibility of carrying out the work in accordance with approved drawings and designs. In case the dimensions of work are less than those shown in the approved designs and drawings and the work is accepted without being rejected, payment will be made as per work actually done.

(b) The measurements will be made generally in accordance with standard engineering practice and in conformity with the explanatory notes for schedule - A to H (Section 9 Part B).

(c) It shall be open to the Contractor and the Purchaser to take specific objection to any recorded measurement or classification on any ground within seven days of the date of such measurements. Any re-measurements taken by the Engineer or the Engineer's representative in the presence of the Contractor or in his absence after due notice has been given to him in consequence of objection made by the contractor shall be final and binding on the contractor and no claim whatsoever shall thereafter be entertained regarding the accuracy and classification of the measurements.

(d) 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.

**Note: The material shall be supplied as per the target sections mentioned in the milestones and as approved by K-RIDE.**

**SECTION-10**

**FORMAT OF BANK GUARANTEE FOR  
SECURITY DEPOSIT ETC.,**

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**NOTE:** *This Section contains forms which, once completed, will form part of the Contract. The forms for Performance Security and Advance Payment Security, when required, shall only be completed by the successful Bidder after contract award.*

*All italicized text is for guidance how to prepare the various forms and shall be deleted from the final documents.*

**FORMAT OF BANK GUARANTEE FOR SECURITY DEPOSIT**

To,.....( Name of the Employer)  
.....(Address of the Employer).

Whereas .....(Name and Address of the contractor) (herein after called the Contractor) has undertaken, in pursuance of contract no.....  
Dated:.....(Name of the contract and brief description of the work) (herein after called the Contract)

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with his obligations in accordance with the Contract;

AND WHEREAS we have agreed to give the Contractor such a Bank Guarantee;

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, up to a total of Rs. \_\_\_\_\_ [amount of guarantee]  
Rupees \_\_\_\_\_ [in words], and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of \_\_\_\_\_ [amount of guarantee] as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the Contract or of the Works to be performed there under or of any of the Contract documents which may be made between you and the Contractor shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

This guarantee shall be valid until 28 days from the date of expiry of the Defects Liability Period.

Signature and seal of the guarantor \_\_\_\_\_  
Name of Bank \_\_\_\_\_  
Address \_\_\_\_\_  
Date \_\_\_\_\_

**FORM OF BANK GUARANTEE FOR PERFORMANCE SECURITY**

*(On non-judicial stamp paper of the appropriate value in accordance with stamp Act. The stamp paper to be in the name of Executing Bank).*

**From:**

Name and Address of the Bank.....  
.....

**To:**

The Managing Director,  
Rail Infrastructure Development Company (Karnataka) Limited,  
"Samparka Soudha", 1st Floor,  
B.E.P Premises (Opp. Orion Mall),  
Dr. Rajkumar Road,  
Rajajinagar 1st Block,  
Bangalore - 560 010

WHEREAS, Rail Infrastructure Development Company (Karnataka) Limited, hereinafter called the **Employer**, acting through **[Insert Designation and address of the Employer's Representative]**, has accepted the bid of **[Insert Name and address of the Contractor]**, hereinafter called the **Contractor**, for the work of **[Insert Name of Work]**, vide Notification of Award No **[Insert Notification of Award No...]**  
**AND**

WHEREAS, the contractor is required to furnish Performance Security for the sum of **[Insert Value of Performance Security required]**, in the form of bank guarantee, being a condition precedent to the signing of the contract agreement.

WHEREAS, **[Insert Name of the Bank]**, with its Branch **[Address]** having its Headquarters office at **[Address]**, hereinafter called the **Bank**, acting through **[Designation(s) of the authorised person of the Bank]**, have, at the request of the **[Insert name of the JV partner]**, a JV partner on behalf of the contractor, agreed to give guarantee for performance security and additional performance security as hereinafter contained:

- 1 KNOW ALL MEN by these present that I/We the undersigned **[Insert name(s) of authorized representatives of the Bank]**, being fully authorized to sign and incur obligations for and on behalf of the Bank, confirm that the Bank, hereby, unconditionally and irrevocably guarantee to pay the Employer the full amount in the sum of **[Insert Value of Performance Security required]** as above stated.
- 2 The Bank undertakes to immediately pay on presentation of demand by the Employer any amount up to and including aforementioned full amount without any demur, reservation or recourse. Any such demand made by the Employer on the Bank shall be final, conclusive and binding, absolute and unequivocal notwithstanding any disputes raised/ pending before any Court, Tribunal, Arbitration or any Authority or any threatened litigation by the Employer of Bank.
- 3 On payment of any amount less than aforementioned full amount, as per demand of the Employer, the guarantee shall remain valid for the balance amount i.e. the aforementioned full amount less the payment made to the Employer.

- 4 The Bank shall pay the amount as demanded immediately on presentation of the demand by Employer without any reference to the contractor and without the Employer being required to show grounds or give reasons for its demand or the amount demanded.
5. The Bank Guarantee shall be unconditional and irrevocable.
- 6 The guarantee hereinbefore shall not be affected by any change in the constitution of the Bank or in the constitution of the Contractor.
- 7 The Bank agrees that no change, addition, modifications to the terms of the Contract Agreement or to any documents, which have been or may be made between the Employer and the Contractor, will in any way release us from the liability under this guarantee; and the Bank, hereby, waives any requirement for notice of any such change, addition or modification to the Bank.
- 8 This guarantee is valid and effective from the date of its issue, which is **[insert date of issue]**. The guarantee and our obligations under it will expire on **[Insert the date Sixty days after the expected end of completion period]**. All demands for payment under the guarantee must be received by us on or before that date.
- 9 The Bank agrees that the Employers right to demand payment of aforementioned full amount in one instance or demand payments in parts totaling up to the aforementioned full amount in several instances will be valid until either the aforementioned full amount is paid to the Employer or the guarantee is released by Employer before the Expiry date.
- 10 The Bank agrees that its obligation to pay any amount demanded by the Employer before the expiry of this guarantee will continue until the amount demanded has been paid in full.
- 11 The expressions Bank and Employer herein before used shall include their respective successors and assigns.
- 12 The Bank hereby undertakes not to revoke the guarantee during its currency, except with the previous consent in writing of the employer. This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 758.
- 13 The Guarantee shall be in addition to and without prejudice to any other security Guarantee (s) of the contractor in favour of the Employer available with the Employer. The Bank, under this Guarantee, shall be deemed as Principal Debtor of the Employer.
14. This guarantee shall be valid for 60 days from the date of expected end of completion period.

Date .....

Place.....

.....

[Signature of Authorized person of Bank/Guarantor]

.....  
[Name in Block letters]

.....



.....  
[Designation]

.....  
[P/Attorney] No.

.....  
Bank's Name and Seal

.....  
[P/Attorney] No.....

Witness:

1. *Signature*  
*Name & Address & Seal*
  
2. *Signature*  
*Name & address & Seal*

Note :

1. *All italicized text is for guidance on how to prepare this bank guarantee and shall be deleted from the final document.*
  
2. *In case the guarantee is issued by a foreign Bank, which does not have operations in India, the said bank shall have to provide a counter-guarantee by State Bank of India.*
  
3. *In case the Contractor is a JV, the Performance Security is required to be furnished on behalf of the JV in favour of the Employer by the JV Partners in proportion of their respective percentage share specified in the JV Agreement. The percentage share of M/s **[Insert Name of the JV Partner]** in the JV is **[Fill share % in the JV]** percent. All the Bank Guarantee of JV Partners are liable to be encashed cumulatively.*

**FORM OF BANK GUARANTEE FOR ADDITIONAL PERFORMANCE SECURITY**

***(On non-judicial stamp paper of the appropriate value in accordance with stamp Act. The stamp paper to be in the name of Executing Bank)***

**From:**

*Name and Address of the Bank.....*  
 .....

**To:**

The Managing Director,  
 Rail Infrastructure Development Company (Karnataka) Limited,  
 "Samparka Soudha" , 1st Floor,  
 B.E.P Premises (Opp. Orion Mall),  
 Dr. Rajkumar Road,  
 Rajajinagar 1st Block,  
 Bangalore - 560 010

WHEREAS, Rail Infrastructure Development Company (Karnataka) Limited, hereinafter called the **Employer**, acting through **[Insert Designation and address of the Employer's Representative]**, has accepted the bid of **[Insert Name and address of the Contractor]**, hereinafter called the **Contractor**, for the work of **[Insert Name of Work]**, vide Notification of Award No. **[Insert Notification of Award No.]**.

**AND**

WHEREAS, the contractor is required to furnish Performance Security for the sum of **[Insert Value of Performance Security required]**, in the form of bank guarantee, being a condition precedent to the signing of the contract agreement.

WHEREAS, **[Insert Name of the Bank]**, with its Branch **[Address]** having its Headquarters office at **[Address]**, hereinafter called the **Bank**, acting through **[Designation(s) of the authorised person of the Bank]**, have, at the request of the **[Insert name of the JV partner]**, a JV partner on behalf of the contractor, agreed to give guarantee for performance security and additional performance security as hereinafter contained:

- 1 KNOW ALL MEN by these present that I/We the undersigned **[Insert name(s) of authorized representatives of the Bank]**, being fully authorized to sign and incur obligations for and on behalf of the Bank, confirm that the Bank, hereby, unconditionally and irrevocably guarantee to pay the Employer the full amount in the sum of **[Insert Value of Performance Security required]** as above stated.
- 2 The Bank undertakes to immediately pay on presentation of demand by the Employer any amount up to and including aforementioned full amount without any demur, reservation or recourse. Any such demand made by the Employer on the Bank shall be final, conclusive and binding, absolute and unequivocal notwithstanding any disputes raised/ pending before any Court, Tribunal, Arbitration or any Authority or any threatened litigation by the Employer of Bank..

- 3 On payment of any amount less than aforementioned full amount, as per demand of the Employer, the guarantee shall remain valid for the balance amount i.e. the aforementioned full amount less the payment made to the Employer.
- 4 The Bank shall pay the amount as demanded immediately on presentation of the demand by Employer without any reference to the contractor and without the Employer being required to show grounds or give reasons for its demand or the amount demanded.
5. The Bank Guarantee shall be unconditional and irrevocable.
- 6 The guarantee hereinbefore shall not be affected by any change in the constitution of the Bank or in the constitution of the Contractor.
- 7 The Bank agrees that no change, addition, modifications to the terms of the Contract Agreement or to any documents, which have been or may be made between the Employer and the Contractor, will in any way release us from the liability under this guarantee; and the Bank, hereby, waives any requirement for notice of any such change, addition or modification to the Bank.
- 8 This guarantee is valid and effective from the date of its issue, which is ***[insert date of issue]***. The guarantee and our obligations under it will expire on ***[Insert the date Sixty days after the expected end of completion period]*** All demands for payment under the guarantee must be received by us on or before that date.
- 9 The Bank agrees that the Employers right to demand payment of aforementioned full amount in one instance or demand payments in parts totaling up to the aforementioned full amount in several instances will be valid until either the aforementioned full amount is paid to the Employer or the guarantee is released by Employer before the Expiry date.
- 10 The Bank agrees that its obligation to pay any amount demanded by the Employer before the expiry of this guarantee will continue until the amount demanded has been paid in full.
- 11 The expressions Bank and Employer herein before used shall include their respective successors and assigns.
- 12 The Bank hereby undertakes not to revoke the guarantee during its currency, except with the previous consent in writing of the employer. This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 758.
- 13 The Guarantee shall be in addition to and without prejudice to any other security Guarantee (s) of the contractor in favour of the Employer available with the Employer. The Bank, under this Guarantee, shall be deemed as Principal Debtor of the Employer.

Date .....

Place.....

.....

*[Signature of Authorised person of Bank]*

.....  
[Name in Block letters]

.....  
[Designation]

.....  
[P/Attorney] No.

.....  
Bank's Seal

[P/Attorney] No.....

Witness:

3. Signature  
Name & Address & Seal

4. Signature  
Name & address & Seal

Note :

- 1 All italicized text is for guidance on how to prepare this bank guarantee and shall be deleted from the final document.
- 2 In case the guarantee is issued by a foreign Bank, which does not have operations in India, the said bank shall have to provide a counter-guarantee by State Bank of India.
- 3 In case the Contractor is a JV, the Performance Security is required to be furnished on behalf of the JV in favour of the Employer by the JV Partners in proportion of of their respective percentage share specified in the JV Agreement. The percentage share of M/s **[Insert Name of the JV Partner]** in the JV is **[ Fill share % in the JV ]** percent. All the Bank Guarantee of JV Partners are liable to be encashed cumulatively.

**ADVANCE PAYMENT SECURITY**

***(On non-judicial stamp paper of appropriate value in accordance with stamp Act. The stamp paper to be in the name of Executing Bank)***

**From**

*[Name and Address of the Bank]*

**To**

The Managing Director,  
Rail Infrastructure Development Company (Karnataka) Limited,  
"Samparka Soudha", 1st Floor,  
B.E.P Premises (Opp. Orion Mall),  
Dr. Rajkumar Road,  
Rajajinagar 1st Block,  
Bangalore - 560 010

**Beneficiary/Employer:** Rail Infrastructure Development Company (Karnataka) Limited.

**Guarantee No.:** *[.....reference number of the guarantee.....]* **Dated:** *[.....]*

WHEREAS, Rail Infrastructure Development Company (Karnataka) Limited (**hereinafter called the Employer**) has entered into Contract No. *[.....reference number of the Contract.....]* dated *[.....]* for the execution of *[name of the contract]* (**hereinafter called the Contract**) with *[.....name of the Contractor.....]* (**hereinafter called the Contractor**).

WHEREAS, according to the Conditions of the Contract, an advance payment is admissible to the contractor against submission of bank guarantee(s).

At the request of the Contractor, we *[.....name of the Bank.....]* with our branch at *[.....address.....]*, having our Head Office at *[.....address.....]* (**hereinafter called the Bank**) have, at the request of *[.....Insert name of the JV partner.....]*, a JV partner on behalf of the Contractor, agreed to give the said guarantee as hereinafter contained:

1. KNOW ALL MEN by these present that I/We the undersigned *[.....Insert name(s) of authorized representative(s) of the Bank.....]*, being fully authorized to sign and incur obligations for and on behalf of the Bank, confirm that the Bank, hereby, unconditionally and irrevocably guarantees

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to pay the Employer the sum of Rs.[....value in figure....](Rupees [....value in words....] only)(**hereinafter called the Full Amount**).

2. The Bank undertakes to immediately pay to the Employer, without any demur, reservation or recourse, any amount up to and including aforementioned full amount upon first written demand/demands from the Employer.
3. On payment of any amount less than aforementioned full amount, as per demand of the Employer, the guarantee shall remain valid for the balance amount i.e. the aforementioned full amount less the payment made to the Employer.
4. The Bank shall pay the amount so demanded without any reference to the contractor and without the Employer being required to show grounds or give reasons for its demand or the amount demanded.
5. The guarantee hereinbefore shall not be affected by any change in the constitution of the Bank, the Contractor or the Employer.
6. The Bank agrees that no change, addition, modification to the terms of the Contract Agreement or to any document, which have been or may be made between the Employer and the Contractor, will in any way release us from the liability under this guarantee; and the Bank, hereby, waives any requirement for notice of any such change, addition or modification to the Bank.
7. This guarantee is valid and effective from the date of its issue, which is [....date of issue....]. The guarantee and our obligations under it will expire on dated .....[....Please refer note 4 & 5....]. All demands for payment under the guarantee must be received by us on or before that date.
8. The Bank agrees that the Employer's right to demand payment of aforementioned full amount in one instance or demand payments in parts totaling up to the aforementioned full amount in several instances will continue until either the aforementioned full amount is paid to the Employer or the guarantee validity period expires.
9. The Bank agrees that its obligation to pay any amount demanded by the Employer before the expiry of this guarantee will continue until the amount demanded has been paid in full.
10. The expressions Bank and Employer herein before used shall include their respective successors and assigns.
11. The Bank hereby undertakes not to revoke the guarantee during its currency, except with the previous consent in writing of the employer. This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 758.

Dated[.....]

Place[.....]

.....  
**(Signature of the Authorized Person of the Bank)**

.....  
**(Name in Block Letters)**

.....  
**(Designation)**

.....  
**(Bank's Seal)**

.....  
**(Authorization No.)**

**Witness:**

1. ....  
*Signature, Name & Address*

2. ....  
*Signature, Name & Address*

**Note:**

1. *All italicized text in brackets [...text...] is for guidance on how to prepare this bank guarantee and shall be deleted from the final document.*
2. *In case the guarantee is issued by a foreign Bank, the said bank shall have operations in India and should be issued by Indian operations branch of the said bank.*
3. **Mobilization Advance**

**(a) For Single Entity**

*For each Installment of Advance, two Bank Guarantees of equal amounts (each equal to half of the first installment of advance plus 10%) shall be furnished. Each Bank Guarantee shall be valid for the stipulated completion period of the contract.*

**OR**

**(b) For JV**

*For each Installment of Advance, individual JV partner shall furnish Bank Guarantee equal to his share in the installment of Advance plus 10%. Each Bank Guarantee shall be valid for the stipulated completion period of the contract.*

**4. Advance against Plant and Machinery**

**(a) For Single Entity**

*For each Installment of Advance, a Bank Guarantee equal to the installment of advance plus 10% shall be furnished. The Bank Guarantee shall be valid for the stipulated completion period of the contract.*

**OR**

**(b) For JV**

*For each Installment of Advance, individual JV partner shall furnish a Bank Guarantee equal to his share in the installment of advance plus 10%. Each Bank Guarantee shall be valid for the stipulated completion period of the contract.*

K-RIDE



**INDEMNITY BOND FOR THE SAFE CUSTODY OF THE  
MATERIALS SUPPLIED BY THE CONTRACTOR**

(To be executed on Non-Judicial Stamp Paper of Appropriate Value and  
notarized)

THIS INDEMNITY BOND made on this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_ by \_\_\_\_\_ (*insert the name of the Contractor and its registered address*) (hereinafter called "the Contractor") which expression shall where the context do admits or implies be deemed to include its executors, administrators and assigns, in favour of the Rail Infrastructure Development Company (Karnataka) Limited, Samparka Soudha" ,1<sup>st</sup> Floor, B.E.P Premises (Opp. Orion Mall),Dr. Rajkumar Road, Rajajinagar 1st Block, Bangalore - 560 010 (hereinafter called "K RIDE") on the other part.

WHEREAS by an Agreement/Letter of Acceptance No. \_\_\_\_\_ dated \_\_\_\_\_ (hereinafter called "the said agreement"), the Contractor has agreed to execute the \_\_\_\_\_ (*Name of Work*) (hereinafter called "the Works") .

AND WHEREAS the Contractor has submitted to K RIDE/ the Engineer for payment on materials procured by him and brought to the site of the Works or his workshop for use in the Works.

AND WHEREAS K RIDE/ the Engineer has agreed to make advance/stage payment to the Contractor the total sum of Rs. \_\_\_\_\_ (*in Figures*) [Rupees \_\_\_\_\_ (*in Words*)] in Interim Payment Certificate (IPC) No. \_\_\_\_\_, the quantities and other particulars of which are detailed in this IPC for the said works signed by the Contractor on \_\_\_\_\_ for the Materials brought by the Contractor to site of the works. Brief details are also mentioned in schedule 1 appended hereto.

NOW THIS INDEMNITY BOND WITNESS that in pursuance of the said agreement and in consideration of the sum of Rs. \_\_\_\_\_ (*in Figures*) \_\_\_\_\_ (*in Words*) on or before the execution of these presents to be paid to the Contractor by K RIDE so aforesaid, the Contractor doth hereby covenant and agree with K RIDE and declare as follows: -

1. That the said sum of Rs. \_\_\_\_\_ (*In Figures*) \_\_\_\_\_ (*in Words*) to be paid by K RIDE to the Contractor as aforesaid shall be utilized by the Contractor in or towards the execution of the said works and for no other purpose whatsoever.
2. That the Materials detailed in the said IPC which have been offered to and accepted by K RIDE/ the Engineer, are absolutely the Contractor's own property and free from encumbrances of any kind and the Contractor will not make any application for or receive any further payment on the Materials which are not absolutely his own property and free from encumbrances of any kind, the Contractor indemnifies the K RIDE against all claims on any Materials in respect of which payment is to be made to him as aforesaid.
3. That the Contractor undertakes that the Materials shall be used exclusively for the performance / execution of the Contract strictly in accordance with the terms and conditions of the Contract and no part of the Materials shall be utilized for any other work or purpose whatsoever.
4. That the Contractor is obliged and shall remain absolutely responsible for the safe transit / protection

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and custody of the Materials against all risks whatsoever including acts of the God till the Materials are duly incorporated in the works, commissioned and are taken over by K RIDE/Railway (including surplus Materials, if required as instructed by K RIDE/ the Engineer) in accordance with the terms of the Contract. The Contractor undertakes to keep K RIDE harmless against any loss or damage that may be caused to the Materials.

5. That the said Materials shall not on any account be removed from the site of the works except with the written permission of K RIDE/ the Engineer. Further, K RIDE/ the Engineer shall always be free at all times to take possession of the materials in whatever form the materials may be in, if in its opinion, the Materials are likely to be endangered, mis-utilized or converted to uses other than those specified in the Contract, by any acts or omission or commission on the part of the Contractor or any other person or on account of any reason whatsoever and the Contractor binds himself and undertakes to comply with the directions of demand of K RIDE to return the Materials without any demur or reservation.
6. That the said materials shall, at all times, be open to inspection by K RIDE/ the Engineer or any authorized representative. In the event of the said material or any part thereof at any time being found to be in lesser quantity than for which payment has been released or the same has been stolen, destroyed or damaged or becoming deteriorated, the Contractor will forthwith replace the same or repair and make good the same as required by K RIDE/ the Engineer.
7. That making payment does not mean that Materials are of required specifications and quality or that whole of the quantity brought to site by Contractor will be used in the work. The Contractor is fully responsible for the materials to conform to required quality and specification and if at any time K RIDE/ the Engineer do not find the material satisfactory, the Contractor at his own cost would replace these. K RIDE/ the Engineer would be at liberty to recover cost of these from any dues of the Contractor. Also any Materials which are in excess of what is finally required under the contract would be the Contractor's property without any liability on K RIDE/ the Engineer who would recover the cost of this from the Contractor.
8. That this INDEMNITY BOND is irrevocable. If at any time, any loss or damage occurs to the Materials or the same or any part thereof is mis-utilized in any manner whatsoever, then the Contractor hereby agrees that the decision of K RIDE/ the Engineer as to assessment of loss or damage to the Materials shall be final and binding on the Contractor. The Contractor binds itself and undertakes to replace the lost and/or damaged Materials at its own cost and/or shall pay the amount of loss to K RIDE without any demur, reservation or protest. This is without prejudice to any other right or remedy that may be available to K RIDE/ the Engineer against the Contractor under the Contract or under this Indemnity Bond
9. That if the Contractor shall at any time make any default in the performance or observance in any respect of any of the terms and provisions of the said agreement or of those presents, the total amount of the payment shall immediately on the happening of such default be recovered by K RIDE/ the Engineer from any dues of Contractor. It is also clearly understood by the Contractor that non-observance of the obligations under this Indemnity Bond by the Contractor shall inter-alia constitute a criminal breach of trust on the part of the Contractor for all intents and purpose including legal /

penal consequences.

10. IN WITNESS WHEREOF, the Contractor has hereunto set its hand through its authorized representative, the day, month and year first above mentioned.

11. SCHEDULE 1

Particulars of the Materials	Quantity	Value of the Materials

Signed, Sealed and Delivered by the said Contractor

(Contractor's Name)

Dated: .....

(AUTHORISED SIGNATORY)

Place: .....

SEAL OF COMPANY

IN THE PRESENCE OF:

WITNESS: SIGNATURE \_\_\_\_\_

NAME: \_\_\_\_\_

ADDRESS : \_\_\_\_\_

**Note:**

*The contractor has the option to submit the INDEMNITY BOND to cover all the items and quantities of Materials of stage payment or to submit INDEMNITY BOND each time the stage payment is to be taken or Materials advance is to be taken.*

No.

Office of the.....

Date:.....

--00--00--00--