

# GOVERNMENT OF INDIA

## CENTRAL RAILWAY



### TENDER DOCUMENT

**TENDER NO. CR-BB-SnT-EAST-2026-64**

**Name of Work:- Replacement of EI operating panel with VDU at five stations of PNVL-Roha section and other improvemental work in EI installed in East section of Mumbai Division of Central Railway.**

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|  |   | <b>TENDER FORM (FIRST SHEET)</b> |
| <b>Tender No.</b>  | <b>CR-BB-SnT-EAST-2026-64</b>   |                                  |
| Name of the Work   | <b>Replacement of EI operating panel with VDU at five stations of PNVL-Roha section and other improvemental work in EI installed in East section of Mumbai Division of Central Railway.</b>   |                                  |
| From (Full Address of the Firm)  |   |                                  |
| To<br>The President of India,<br>Acting through Sr. Divisional Signal and Telecom Engineer,<br>Central Railway,<br>Mumbai. |   |                                  |
| 1  | i/We_____ have read the various conditions to tender attached hereto and agree to abide by the said conditions. I/We also agree to keep this offer open for acceptance for a period of _____ days from the date fixed for closing of the tender and in default thereof, I/We will be liable for forfeiture of my/our "Bid Security". I/We offer to do the work for Railway, at the rates quoted in the attached bill(s) of quantities and hereby bind myself/ourselves to complete the work in all respects within _____ months from the date of issue of letter of acceptance of the tender. |                                  |
| 2  | I/We also hereby agree to abide by the Indian Railways Standard General Conditions of Contract, with all correction slips up-to-date and to carry out the work according to the Special Conditions of Contract and Specifications of materials and works as laid down by Railway in the annexed Special Conditions/Specifications, Standard Schedule of Rates (SSOR) with all correction slips up-to-date for the present contract.   |                                  |
| 3  | A Bid Security of _____ has already been deposited online/ submitted as Bank Guarantee bond. Full value of the Bid Security shall stand forfeited without prejudice to any other right or remedies in case my/our Tender is accepted and if:  |                                  |
| A  | I/We do not submit the Performance Guarantee within the time specified in the Tender document;  |                                  |
| B  | I/We do not execute the contract documents within seven days after receipt of notice issued by the Railway that such documents are ready, and   |                                  |
| C  | I/We do not commence the work within fifteen days after receipt of orders to that effect.   |                                  |
| 4  | 4. (a) I/We am/are a Startup firm registered by _____ Policy and Promotion (DIPP) and my registration number is _____ Department of Industrial valid upto (Copy enclosed) and hence exempted from submission of Bid Security.   |                                  |
| 5  | We are a Labour Cooperative Society and our Registration No. is . _____ with _____ and hence required to deposit only 50% of Bid Security.  |                                  |
| 6  | Until a formal agreement is prepared and executed, acceptance of this tender shall constitute a binding contract between us subject to modifications, as may be mutually agreed to between us and indicated in the letter of acceptance of my/our offer for this work.  |                                  |
| Signature of Witnesses:  |   |                                  |

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|             | (1) _____<br>Signature of Tenderer(s)<br>(2) _____ Date _____<br>Address of the Tenderer(s)   |
| <b>2</b>    | <b>Instructions to Tenderers and Conditions of Tender:</b> The following documents form part of Tender / Contract:  |
|             | (a) Tender Forms – First Sheet and Second Sheet<br>(b) Special Conditions/Specifications (enclosed)<br>(c) Bill(s) of quantities (enclosed)<br>(d) Standard General Conditions of Contract and Standard Specifications (Works and Materials) of Indian Railways as amended/corrected upto latest correction slips, copies of which can be seen in the office of _____ or obtained from the office of the Chief Engineer, _____ Railway on payment of prescribed charges.<br>(e) Standard Schedule of Rates (SSOR) as amended / corrected upto latest correction slips, copies of which can be seen in the office of _____ or obtained from the office of the Chief Engineer, _____ Railway on payment of prescribed charges.<br>(f) All general and detailed drawings pertaining to this work which will be issued by the Engineer or his representatives (from time to time) with all changes and modifications. |
| <b>3</b>    | <b><u>Order of Precedence of Documents:</u></b>   |
|             | In a contract agreement, in case of any difference, contradiction, discrepancy, with regard to conditions of tender/contract, specifications, drawings, Bill(s) of Quantities etc., forming part of the tender/contract, the following shall be the order of precedence:  |
| <b>I</b>    | Letter of Award (LOA)   |
| <b>ii</b>   | Bill(s) of Quantities   |
| <b>iii</b>  | Special Conditions of Contract  |
| <b>iv</b>   | Technical Specifications as given in tender documents   |
| <b>v</b>    | Drawings  |
| <b>vi</b>   | Indian Railways Standard General Conditions of Contract updated with correction slips issued up to date of inviting tender or as otherwise specified in the tender documents.   |
| <b>vii</b>  | Indian Railways Unified Standard Specification (IRUSS-2019) updated with correction slips issued up to date of inviting tender or as otherwise specified in the tender documents, if applicable in the contract.  |
| <b>viii</b> | CPWD Specifications 2019 Vol I & II updated with correction slips issued up to date of inviting tender or as otherwise specified in the tender documents, if applicable in the contract.  |
| <b>ix</b>   | Indian Railways Unified Standard Specifications (Works and Material) 2010 updated with correction slips issued up to date of inviting tender or as otherwise specified in the tender documents, if applicable in the contract.  |

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|  | <b>X</b>  | IR Specifications/Guidelines updated with correction slips issued up to date of inviting tender or as otherwise specified in the tender documents. |
|  | <b>Xi</b> | Relevant B.I.S. Codes updated with correction slips issued up to date of inviting tender or as otherwise specified in the tender documents.        |

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# **CHAPTER-I INSTRUCTIONS TO TENDERERS**

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| 1.0   | <b>TENDER NOTICE</b><br><b>SIGNAL &amp; TELECOMMUNICATION DEPARTMENT</b>   |  |
|       | <b>TENDER No. CR-BB-SnT-EAST-2026-64</b>   |  |
|       | Tenders are invited by Sr. Divisional Signal and Telecom Engineer, Mumbai CSMT, Central Railway, for and on behalf of the President of India for the following S&T work.   |  |
|       | Name of Work   | <b>Replacement of EI operating panel with VDU at five stations of PNVL-Roha section and other improvemental work in EI installed in East section of Mumbai Division of Central Railway.</b>  |
|       | Estimated Cost of Work   | <b>Rs. Refer to NIT.</b>   |
|       | Bid security Deposit   | <b>Rs. Refer to NIT.</b>   |
|       | Cost of Tender Document  | <b>Rs. 0.00/-</b>  |
|       | Completion Period  | <b>Refer to NIT.</b>   |
|       | Validity of Offers   | <b>Refer to NIT.OR PER GCC.</b>  |
|       | Closing date for Submission of tender  | <b>Refer to NIT.</b>   |
|       | Tender Document is available on website <a href="http://www.ireps.gov.in">www.ireps.gov.in</a> . The tenderer has to read the tender document from the website and submit his/her offer online through the same website. The requisite tender fee can be submitted to Railways as per latest GCC clause or any amendments. |  |
| 1.0.1 | <b><u>ELIGIBILITY CRITERIA:</u></b>  |  |
|       | <b>I)</b>  | <b><u>Technical Eligibility Criteria: (As per GCC clause and latest amendments)</u></b>  |
|       | <b>a)</b>  | <p>The tenderer must have successfully completed or substantially completed any one of the following categories of work(s) during last 07 (seven) years, ending last day of month previous to the one in which tender is invited:</p> <ul style="list-style-type: none"> <li>i) Three similar works each costing not less than the amount equal to 30% of advertised value of the tender, or</li> <li>ii) Two similar works each costing not less than the amount equal to 40% of</li> </ul> |

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|                     | advertised value of the tender, or<br>One similar work costing not less than the amount equal to 60% of advertised value of the tender, or  |
| <b>b)</b>           | <p>(1) In case of tenders for composite works (e.g. works involving more than one distinct component, such as Civil Engineering works, S&amp;T works, Electrical works, OHE works etc. and in the case of major bridges – substructure, superstructure etc.), tenderer must have successfully completed or substantially completed any one of the following categories of work(s) during last 07(seven) years, ending last day of month previous to the one in which tender is invited:</p> <ul style="list-style-type: none"> <li>i) Three similar works each costing not less than the amount equal to 30% of advertised value of each component of tender, or</li> <li>ii) Two similar works each costing not less than the amount equal to 40% of advertised value of each component of tender, or</li> <li>iii) One similar work each costing not less than the amount equal to 60% of advertised</li> </ul> |
| <u>Note</u><br>b(1) | Separate completed works of minimum required values shall also be considered for fulfillment of technical eligibility criteria for different components.  |
| b(2)                | In such cases, what constitutes a component in a composite work shall be clearly pre-defined with estimated tender cost of it, as part of the tender documents without any ambiguity.   |
| b(3)                | To evaluate the technical eligibility of tenderer, only components of work as stipulated in tender documents for evaluation of technical eligibility, shall be considered. The scope of work covered in other remaining components shall be either executed by tenderer himself if he has work experience as mentioned in clause 7 of the Standard General Conditions of Contractor through subcontractor fulfilling the requirements as per clause 7 of the Standard General Conditions of Contract or jointly i.e., partly himself and remaining through subcontractor, with prior approval of Chief Engineer in writing.   |
|                     | However, if required in tender documents by way of Special Conditions, a formal agreement duly notarised, legally enforceable in the court of law, shall be executed by the main contractor with the subcontractor for the component(s) of work proposed to be executed by the subcontractor(s), and shall be submitted along with the offer for considering subletting of that scope of work towards fulfilment of technical eligibility. Such subcontractor must fulfill technical eligibility criteria as follows:   |
|                     | The subcontractor shall have successfully completed at least one work similar to work proposed for subcontract, costing not less than 35% value of work to be subletted, in last 5 years, ending last day of month previous to the one in which tender is invited through a works contract.   |
| Note:               | for subletting of work costing up to Rs 50 lakh, no previous work experience of subcontractor shall be asked for by the Railway.  |
|                     | In case after award of contract or during execution of work it becomes necessary for contractor to change subcontractor, the same shall be done with subcontractor(s) fulfilling the requirements as per clause 7 of the Standard General Conditions of   |



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|     | Contract, with prior approval of Chief Engineer in writing.   |
|     | <b><u>Note for Technical Eligibility Criteria</u></b>   |
|     | Work experience certificate from private individual shall not be considered. However, in addition to work experience certificates issued by any Govt. Organization, work experience certificate issued by Public listed company having average annual turnover of Rs 500 crore and above in last 3 financial years excluding the current financial year, listed on National Stock Exchange or Bombay Stock Exchange, incorporated/registered at least 5 years prior to the date of closing of tender, shall also be considered provided the work experience certificate has been issued by a person authorized by the Public listed company to issue such certificates.   |
|     | In case tenderer submits work experience certificate issued by public listed company, the tenderer shall also submit along with work experience certificate, the relevant copy of work order, bill of quantities, bill wise details of payment received duly certified by Chartered Accountant, TDS certificates for all payments received and copy of final/last bill paid by company in support of above work experience certificate.   |
| II) | <b><u>Financial Eligibility Criteria:(As per GCC clause and latest amendments)</u></b>  |
|     | <p>The tenderer must have minimum average annual contractual turnover of V/N OR 'V' Whichever is less; where.</p> <p>V= Advertised value of the tender in crores of Rupees<br/>N= Number of years prescribed for completion of work for which bids have been invited.</p> <p>The average annual contractual turnover shall be calculated as an average of “total contractual payments” in the previous three financial years, as per the audited balance sheet. However, in case balance sheet of the previous year is yet to be prepared/ audited, the audited balance sheet of the fourth previous year shall be considered for calculating average annual contractual turnover.</p> <p>The tenderers shall submit requisite information as per Annexure-XXXIII, along with copies of Audited Balance Sheets duly certified by the Chartered Accountant/ Certificate from Chartered Accountant duly supported by Audited Balance Sheet.</p> |
|     | <i>Explanation for clause 1.0.1 - Eligibility Criteria can be refereed from GCC 2022</i>  |

**1.0.2 Mandatory Documents to be submitted by the tender**

| SN | (A) MANDATORY DOCUMENTS<br>(Tenders without these documents/Provisions will be summarily rejected.)   |
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| 1. | PAN card  |
| 2. | GST Registration Certificate  |
| 3. | <p>Documents as per <b>Clause 10.1 of GCC</b> Eligibility conditions - Technical Eligibility Criteria.</p> <p>The tenderer must have successfully completed or substantially completed any one of the following categories of work(s) during last 07 (seven) years, ending last day of month previous to the one in which tender is invited:</p> <ul style="list-style-type: none"> <li>(i) Three similar works each costing not less than the amount equal to 30% of advertised value of the tender, or</li> <li>(ii) Two similar works each costing not less than the amount equal to 40% of advertised value of the tender, or</li> <li>(iii) One similar work costing not less than the amount equal to 60% of advertised value of the tender.</li> </ul> <p>For composite and other type of works, document as per Clause 10.1 of GCC shall be submitted.</p> <p>It is desirable to submit the work completion certificate as per Sample performa for the completion certificate attached at <b>Annexure –XIX</b> of tender document. Along with copy of final variation statement duly signed by concerned officials.</p> |
| 4. | <p>Documents as per <b>Clause 10.2 of GCC</b> Eligibility conditions - Financial Eligibility Criteria</p> <p>The tenderer must have minimum average annual contractual turnover of V/N or V whichever is less; where</p> <p style="padding-left: 40px;">V=Advertised value of the tender in crores of Rupees</p> <p style="padding-left: 40px;">N=Number of years prescribed for completion of work for which bids have been invited.</p> <p>The average annual <b>contractual turnover</b> shall be calculated as an average of "total contractual payments" in the previous three financial years, as per the audited balance sheet. However, in case balance sheet of the previous year is yet to be prepared/audited, the audited balance sheet of the fourth previous year shall be considered for calculating average annual contractual turnover.</p> <p>The tenderers shall submit requisite information as per <b>Annexure-VIB, along with copies of Audited Balance Sheets duly certified by the Chartered Accountant/Certificate from Chartered Accountant duly</b></p>  |

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|    | <b>supported by Audited Balance Sheet.</b>   |
| 5. | As per Standard GCC April 2022 with latest correction slips, Standard format of certificate to be submitted by the bidder as per Revised <b>Annexure-V</b> . In addition to <b>Annexure-V</b> , in case of other than Company/Proprietary firm, <b>Annexure-V(A)</b> shall also be submitted by the each member of a Partnership firm/Joint Venture (JV)/Hindu Undivided Family (HUF)/Limited Liability Partnership (LLP) etc as the case may be.  |
| 6. | <p><b>HUF:</b> (If applicable)</p> <p>(i) A copy of notarized affidavit on Stamp Paper declaring that he who is submitting the tender on behalf of HUF is in the position of 'Karta' of Hindu Undivided Family (HUF) and he has the authority, power and consent given by other members to act on behalf of HUF.</p>   |
| 7. | <p><b>Partnership firm:</b> (If applicable)</p> <p>(i) A notarized copy of partnership deed or a copy of the Partnership deed registered with the Registrar.</p> <p>(ii) A notarized or registered copy of Power of Attorney in favour of the individual to tender for the work, sign the agreement etc. and create liability against the firm.</p> <p>(iii) An undertaking by all partners of the partnership firm that they are not blacklisted or debarred by Railways or any other Ministry/Department of the Govt. of India from participation in tenders /contracts as on the date of submission of bids, either in their individual capacity or in any firm/LLP in which they were/are partners/members Concealment /wrong information in regard to above shall make the bid ineligible or the contract shall be determined under Clause 62 of the Standard General Conditions of Contract.</p> <p>The tenderer shall clearly specify that the tender is submitted on behalf of a partnership firm.</p> <p>For more details kindly refer Para 18 of GCC April 2022 PART - I</p> |
| 8. | <p><b>Joint Venture:(JV)</b> (If applicable)</p> <p><b>In case one or more of the members of the JV is/are partnership firm(s), following documents shall be submitted:</b></p> <p>(i) A notarized copy of the Partnership Deed or a copy of the Partnership deed registered with the Registrar.</p> <p>(ii) A copy of consent of all the partners or individual authorized by partnership firm, to enter into the Joint Venture Agreement on a stamp paper,</p> <p>(iii) A notarized or registered copy of Power of Attorney in favour of the individual to sign the MOU/JV Agreement on behalf of the partnership firm</p>   |

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|  | <p>and create liability against the firm.</p> <p>(iv)An undertaking by all partners of the partnership firm that they are not blacklisted or debarred by Railways or any other Ministry/Department of the Govt. of India from participation in tenders/contracts as on the date of submission of bids, either in their individual capacity or in any firm/LLP in which they were/are partners/members. Any Concealment/wrong information in regard to above shall make the bid ineligible or the contract shall be determined under Clause 62 of the Standard General Conditions of Contract.</p> <p><b>In case one or more members is/are Proprietary Firm or HUF, the following documents shall be enclosed:</b></p> <p>(i)A copy of notarized affidavit on Stamp Paper declaring that his Concern is a proprietary Concern and he is sole proprietor of the Concern OR he who is signing the affidavit on behalf of HUF is in the position of 'Karta' of Hindu Undivided Family (HUF)and he has the authority, power and consent given by other members to act on behalf of HUF.</p> <p><b>In case one or more members of the JV is/are companies, the following documents shall be submitted:</b></p> <p>(i)A copy of resolutions of the Directors of the Company, permitting the company to enter into a JV agreement,</p> <p>(ii)The copies of <b>MOA (Memorandum of Association)/AOA(Articles of Association)</b>of the company</p> <p>(iii)A copy of Certificate of Incorporation</p> <p>(iv)A copy of Authorization/copy of Power of Attorney issued by the Company (backed by the resolution of Board of Directors) in favour of the individual to sign the tender, sign MOU/JV Agreement on behalf of the company and create liability against the company</p> <p><b>In case one or more members of the JV is/are LLP firm/s, the following documents shall be submitted:</b></p> <p>(i)A copy of LLP Agreement</p> <p>(ii)A copy of Certificate of Incorporation of LLP</p> <p>(ii)A copy of resolution passed by partners of LLP firm, permitting the Firm to enter into a JV agreement</p> <p>(iv)A copy of Authorization /copy of Power of Attorney issued by the LLP firm(backed by resolution passed by the Partners) in favour of the individual, to sign the tender and/or sign the MOU/JV agreement on behalf of the LLP and create liability against the LLP.</p> <p>(v)An undertaking by all partners of the LLP that they are not blacklisted or debarred by Railways or any other Ministry/Department of the Govt. Of India from participation in tenders/contracts as on the date of submission of</p> |
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|     | <p>bids, either in their individual capacity or in any firm/LLP or JV in which they were /are partners/members. Any Concealment /wrong information in regard to above shall make the contract liable for determination under Clause 62 of the Standard General Conditions of Contract.</p> <p><b>In case one or more members of the JV is/are Society/s or Trust/s, the following documents shall be submitted:</b></p> <p>(i)A copy of Certificate of Registration</p> <p>(ii)A copy of Memorandum of Association of Society/Trust Deed</p> <p>(ii)A copy of Rules &amp; Regulations of the Society</p> <p>(iv)A copy of Power of Attorney, in favour of the individual to sign the tender documents and create liability against the Society/Trust.</p> <p>For more details kindly refer Para 17 of GCC April 2022PART – I-</p>                            |
| 9.  | <p><b>Company registered under Companies Act 2013</b>(If applicable)</p> <p>(i)The copies of <b>MOA(Memorandum of Association)/AOA(Articles of Association)</b>of the company</p> <p>(ii)A copy of Certificate of Incorporation</p> <p>(iii)A copy of Authorization/Power of Attorney issued by the Company (backed by the resolution of Board of Directors) in favour of the individual to sign the tender on behalf of the company and create liability against the company.</p>   |
| 10. | <p><b>LLP(Limited Liability Partnership)</b>(If applicable)</p> <p>(i)A copy of LLP Agreement</p> <p>(ii)A copy of Certificate of incorporation.</p> <p>(iii)A copy of Power of Attorney/Authorization issued by the LLP in favour of the individual to sign the tender on behalf the LLP and create liability against the LLP.</p> <p>(iv)An undertaking by all partners of the LLP that they are not blacklisted or debarred by Railways or any other Ministry/Department of the Govt. of India from participation intenders /contracts as on the date of submission of bids, either in their individual capacity or in any firm/LLP or JV in which they were/are partners/members. Concealment /wrong information in regard to above shall make the contract liable for determination under Clause 62 of the Standard General Conditions of Contract.</p> |
| 11. | <p><b>Registered Society &amp;Registered Trust</b>(If applicable)</p> <p>(i)A copy of Certificate of Registration</p> <p>(ii)A copy of Memorandum of Association of Society/Trust Deed</p> <p>(ii)A copy of Power of Attorney in favour of the individual to sign the tender documents and create liability against the society/Trust.</p>   |

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|     | (iv)A copy of Rules &Regulations of the Society   |
| 12. | <b>Documents for evaluating the Bid Capacity, for tenders having advertised value more than Rs.10.00 crore (Ref: Clause 10.3 and for tenderer participating as JV firm Clause 17.15.3 of TENDER FORM (Second Sheet) along with Annexure-VI of GCC APRIL 2022.</b> |

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| 1.0.3 |   | <b>Work of similar nature</b> would mean – the similar nature of the work has been defined in clause 1.1 below.  |
| 1.1   |   | <b><u>SIMILAR NATURE OF WORK :</u></b>   |
|       |   | The similar nature of the work is defined as below<br><b><u>Any indoor or combined indoor &amp; outdoor signalling work for provision of Design, Supply, Installation testing and Commissioning of RRI/PI/Electronic Interlocking system for passenger carrying lines.</u></b>   |
| 1.2   |   | <b>Scope of the Work :</b>   |
|       |   | The scope of the work against which tenders are invited is furnished in Clause No. 2.3 of Chapter-II (Special Conditions of Contract) of this Tender document. Tenderers are advised to study the same carefully and submit their offers for the complete scope of the work failing which it will be treated as incomplete and dealt with accordingly.   |
| 1.3   |   | <b><u>Rules &amp; General Conditions :</u></b>   |
|       | A | The materials and installation required, tendering procedure and terms & conditions are prescribed in the Tender Documents. The Tender Document includes “Tender Notice & Tender Form”, “Instructions to Tenderers (I.T.T.)” “General Conditions of Contract in addition to and/or in part supersession up to latest correction slips” (GCC), “Special Conditions of Contract (SCC)”, “Technical Specifications & Requirements”, and all Annexure & formats together with any addendum and corrigendum issued prior to the tender opening. |
|       | B | Any additional information/ Clarification regarding the tender, if required by any tenderer may be obtained from the Sr Divisional Signal & Telecommunication Engineer, Central Railway, 1 <sup>st</sup> Floor, DRM (S&T) Office, Mumbai-400 001.  |
|       | C | The submission of the Tender shall be deemed to have been done after careful study and examination of the Tender Document with full understanding of the implications thereof. Any clarification required by a Tenderer shall be obtained from the Office of the   |



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|     |   | Tender Inviting Authority on any working day during office hours.  |
|     | D | The Tenderer should read the conditions carefully and also see the schedule of works, technical specification etc. before submitting the offer and also ascertain site conditions and the magnitude of works involved.   |
|     | E | Conditional tenders will generally not be considered and are liable to be rejected. Railway however reserves the right to reject such tenders summarily without assigning any reasons whatsoever. The Railway also reserves the right to reject any special conditions stipulated by the Tenderer as considered unacceptable to the Railway. If any deviations from the General conditions / special conditions / specifications or any other condition of tender are proposed by the tenderer, they should be <b>mentioned on Statement of Deviation (Annexure -IV), chapter-V along with financial implications, if any in separate sheet and not elsewhere in the tender documents.</b> Only such special conditions/specifications stipulated by the tenderer/s, which are having nil financial repercussion, and which have been specially approved by Railways in writing shall be deemed to have been accepted by the Railways and shall form part of the contract agreement. The tenderer/s conditions/stipulations which are at variance with the tender conditions/ codal provisions and not approved/ accepted by Railways, shall be withdrawn by the tenderer/s. |
|     | F | If it is found at any stage of the finalization of the tender or during actual execution of the work that the information furnished in this tender including clarifications, is incorrect, the tenders are likely to be rejected. The Railway reserves the right to cancel the tender without assigning any reason.  |
|     | G | All the relevant documents shall be uploaded online in the space provided along with tender form as per terms and condition of tender.   |
| 1.4 |   | <b><u>Bid security Deposit:</u></b>  |
|     |   | The tender must be accompanied with requisite Earnest money mentioned in the tender notice, as per item 2.6 of chapter-II.   |
| 1.5 |   | <b><u>Local Conditions:</u></b>  |
|     |   | It will be imperative on each Tenderer to fully acquaint him with all the local conditions and factors, which would have any effect on the performance of the contract and cost of the work. The Railway shall not entertain any request for clarifications from the Tenderer regarding such local conditions. No request for change of price will be entertained after the offer is accepted by the Railway on account of any local condition or factor. The tenderer(s) shall inspect the proposed site of work and acquaint himself/themselves  |



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|     |   | with the site conditions, working hours, layout of land, trees and shrubs that he/they will have to cut, type of strata likely to be met within the borrow pits, stacking space for materials, approach roads, path ways available etc. and all relevant items connected with the execution of the work. No claim shall be entertained for the contractor(s) making his/their own arrangements for approaches/approach road from outside Railway land and contractor(s) will bear entire expenses such as road taxes, payment for right of way, etc. to outsiders and for Construction of approaches/approach roads, etc. |
| 1.6 |   | <b><u>Tender and required documents to accompany the offer:-</u></b> <b><u>(Submit scanned copies Online in the space provided) As per GCC Clause and latest amendments.</u></b>  |
|     |   | List of desirable documents for the evaluation of the offer. Hence, the Tenderers are advised to ensure that these documents are submitted with their offer:-   |
|     | A | Complete list indicating Type/Model/Version and name of OEM(s) against the <b>(identified in the Schedules of material and works)</b> items proposed to be supplied by them against this tender. If demanded.   |
|     | B | Document(s) to establish requisite tie-up with OEM(s) of various supply items, <b>IF DEMANDED EXCLUSIVELY</b> , regarding after sales support during warranty period as Annexure IX, Chapter V (Annexure and Performa's).   |
|     | C | The tenderer shall submit a statement indicating any deviations against any clause of this tender including all the technical specification concerned to this work in the format of Annexure-IV of <b>Chapter-IV, duly signed &amp; stamped on each page. If no certificate is submitted by the tenderer, it will be assumed that there is Nil deviation from tenderer side.</b>  |
|     | D | List of Personnel, organization /technical staff available on hand and proposed to be engaged for the subject work, with their designation and experience if demanded exclusively   |
|     | E | List of works completed in the last previous seven financial years as per clause 1.0.1 (1)a, giving description of work, organization for whom executed, approximate value of contract at the time of award, date of award and date of scheduled completion of work. Date of actual start, actual completion and final value of contract should also be given.  |
|     | F | List of works on hand indicating description of work, contract value, and approximate value of balance work yet to be done and  |

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|     |   | date of award.   |
|     | G | Documentary evidence necessary to establish that they possess the requisite skill, technical expertise, technical and skilled manpower and necessary equipments to execute complete work covered in the schedule with stipulated specifications/details. If applicable.  |
|     | H | Last audit report from registered Chartered Accountant.  |
|     | I | Power of Attorney, (if any), in acceptable form duly notarized from Magistrate as per GCC Clause and latest amendments   |
|     | J | (i) Certified copy of JV agreement in case of JV,<br>(ii) Partnership deed in case of partnership firms as per GCC Clause and latest amendments<br>(iii) Memorandum of Articles of Association of the firm, extract of board of directors meeting authorizing signatory to submit the offer to the Railways.   |
|     | K | For detail list of Documents required for Sole Proprietorship Firm: ,HUF, Partnership Firm,JV ,Company registered under Companies Act2013, LLP(Limited Liability Partnership, Registered Society & Registered Trust, <b>Refer GCC CLAUSE AND LATEST AMMENDMENTS.</b>   |
| 1.7 |   | <b><u>PARTNERSHIP DEEDS, POWER OF ATTORNEY, EMPLOYEMENT/PARTNERSHIP ETC. OF RETIRED RAILWAY EMPLOYEES,JOINTVENTURE,As per GCC Clause and latest amendments.</u></b>  |
| 1.8 |   | <b><u>Submission of Tender: -</u></b>  |
|     | A | The tenderer should read the tender document carefully especially the conditions and also see the schedule of supply and works Before submitting a tender, the tenderer will be deemed to have satisfied himself by actual inspection of the site and locality of the works, that all conditions liable to be encountered during the execution of the works are taken into account and that the rates he enters in the tender forms are adequate and all inclusive to accord with the provisions in Clause-37 of the Standard General Conditions of Contract for the completion of works to the entire satisfaction of the Engineer. |
|     | B | As far as possible the Tenderer's bid should not have any condition or specification or assumption contrary to the provisions in these tender documents on which the tenderer's bid is based. Tenderer's Special conditions, not in conformity with the tender   |

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|                     |   | specifications / drawings are required to be listed separately with details of exact financial implications, if any and to be submitted along with offer. Railway may not take cognizance of conditions / variations from the tender documents or drawings etc. It needs to be emphasized that only such conditions/ stipulations which are at variance with the tender conditions codal provision stipulated in the tender documents need be mentioned, in case tenderer choose to stipulate such special conditions taking into account the restrictions mentioned elsewhere in the tender document. Only such special conditions / specifications stipulated by the Tenderer's which have been specifically approved by the Railways in writing shall be deemed to have been accepted by the Railways and shall form part of the Contract Agreement. The tenderer's conditions / stipulations which are at variance with the tender conditions / codal provisions and not approved / accepted by Railways, shall be withdrawn by the tenderer/s. |
|                     | C | The complete tender document along with Supporting Documents shall be submitted online on the website itself. No manual/hard copy submission is allowed.  |
|                     | D | <b>Note:</b> If the tenderer has any problems in the submission of tender, the tenderer should inform this office in writing one week before the tender closing date.   |
| 1.9                 |   | <b><u>System of Quoting Rates:</u></b>  |
|                     | A | Tenders are requested to quote their rates in figures and words rounded off to one Rupee, in a manner as defined for each schedule in the schedule of material and works. The quoting shall be either percentage above or below basis or item-wise rates are to be offered. Either of them shall be followed as described at the end of schedule of material and works.   |
|                     | B | The rates quoted in the offer by the tenderer shall be inclusive of basic cost and all taxes / duties (excise & customs duty, sales tax, GST, interstate tax, works contract tax, transport, loading, unloading charge, Octroi etc.,) <b>as applicable at present.</b>  |
| <b>Note for GST</b> |   | All the tenderer should ensure that they are GST complaint & their quoted tax structure/ rates are as per GST law."   |
|                     | C | Octroi exemption certificates and any other statutory duties exemption form shall be issued by the Railway in the name of contractor only, subject to this being permissible under prevailing relevant rules. However no additional payment is admissible in case Octroi exemption certificate form for concessional taxes and duties is not honored by concerned authorities.  |
|                     | D | Railways will deduct recovery of Sales Tax on work contract at source at the rate prevailing as per State Government Sales Tax in force, where the work is being executed.  |
|                     | E | Railways shall affect recovery of income tax at source at the rates in vogue.   |

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|      | F | The rates quoted by tenderer and accepted by Railway Administration shall hold good till the Completion of the work and no additional individual claim will be admissible on account of fluctuation in market rates, increase in taxes/any other levies/toll etc.   |
|      | G | Further, no cognizance will be given for any sort of fluctuations in taxes and other market conditions etc. for any individual items for the purpose of making adjustments in payments.   |
|      | H | “The tenderer for carrying out any construction work in_____ (name of the State) must get themselves registered from the Registering Officer under Section – 7 of the Building and Other Construction Workers Act, 1996 and rules made thereto by the _____ (Name of the State) Govt. and submit certificate of Registration issued from the Registering Officer of the _____(Name of the State) Govt. (LabourDeptt.). For enactment of this Act, the tenderer shall be required to pay cess @ 1% of cost of construction work to be deducted from each bill. Cost of material shall be outside the purview of cess, when supplied under a separate schedule item.” |
|      | I | The price quoted should be firm and no price variation clause will be acceptable. Variation in Statutory levies and duties shall be permissible on production of documentary evidence. Towards this extent, the tenderer should indicate the percentage of components of those items in all-inclusive quoted prices in the absence of which no increase in duties will be permissible.  |
| 1.10 |   | <b><u>Validity of Offer:</u></b>  |
|      | A | The tenderer shall keep the offer open as defined in clause 1.0 from the date of closing of submission of tender. Within that period, the tenderer cannot withdraw his offer subject to the period being extended further if required by mutual agreement from time to time. Any contravention of the above condition will make the tenderer liable for forfeiture of his Bid security Deposit.   |
|      | B | It is understood that after submitting his / their tender subject to the period being extended further if required by mutual agreement from time to time, he will not resile from his offer or modify the terms and conditions thereof in a manner not acceptable to Railway. Should the Tenderer fail to observe or comply with the foregoing stipulation, the amount deposited, as Earnest Money for the due performance of the above stipulation shall be forfeited by the Railway.  |
| 1.11 |   | <b><u>Closing of Tender submission:</u></b>   |
|      |   | The tender cannot be submitted, beyond the day and time as described in NIT (also defined as per clause 1.0) or as per corrigenda.  |

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| 1.12 |  | <b><u>Rates During Negotiation :</u></b>  |
|      |  | The Tenderer/s shall not increase his/their quoted rates in case the Railway Administration negotiate for reduction of rates, such a negotiation shall not amount to cancellation or withdrawal of the original offer and the rates originally quoted will be binding on the Tenderer/s.  |
| 1.13 |  | <b><u>Errors, Omissions &amp; Discrepancies (in the tender document) :</u></b>  |
|      |  | Should a tender find discrepancies in or omissions from the drawings or any of the Tender Forms or should he be in doubt as to their meaning, he should at once notify the authority inviting tenders who may send a written instruction to all tenders. It shall be understood that every endeavor has been made to avoid any error which can materially affect the basis of the tender and the successful tenderer shall take upon himself and provide for the risk of any error which may subsequently be discovered and shall make no subsequent claim on account thereof. The Contractor(s) shall not take any advantage of any mis-interpretation of the conditions due to typing or any other error and if in doubt shall bring it to the notice of the Engineer, without delay. In case of any contradiction only the printed rules, and books should be followed and no claim for the mis-interpretation shall be entertained. |
| 1.14 |  | <b><u>Rights of Railway to deal with Tenders:</u></b>   |
|      |  | <p>The authority for the acceptance of the tender will rest with the Railway. It shall not be obligatory on the said authority to accept the lowest tender or any other tender, and tenderer(s) shall neither demand any explanation for the cause of rejection of his/ their tender nor the Railway to assign reasons for declining to consider or reject any particular tender or tenders.</p> <p>The Railway administration reserves the right to accept any tender in respect of the whole or any portion of the work specified in the tender or to sub-divide the work among different Tenderers or to reduce the work or to accept any tender for less than the tendered quantities without assigning any reason whatsoever.</p> <p>Railway administration also reserves the right to cancel any or all tenders at any stage and in such case cost of tender document shall not be refunded.</p>                                  |
| 1.15 |  | <b><u>Acceptance of Tender, issue of LOA, Submission of Performance BG Bond and</u></b>   |

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|      |   | <b><u>commencement of Contract by the successful Tenderer:</u></b>  |
|      |   | A letter of acceptance (LOA) of the offer shall be issued by the Railway Administration to the successful Tenderer that his offer has been accepted, on receipt of which he shall submit a Performance Guarantee (PG) bond as described in Clause No. 2.7 of Chapter II, Special Conditions of Contract and shall execute a formal Contract Agreement with the President of India acting through the <b>Sr. Divisional Signal and Telecommunication Engineer, Mumbai Division, Mumbai-400001</b> for carrying out the work according to terms and conditions of this tender including "General Conditions of Contract" of Railway and Special Conditions / Specifications of this tender. Upon issuing of LOA the contract for the work shall be deemed to have been awarded to the Tenderer and accordingly the completion period will be reckoned from the date of issue of LOA irrespective of the date of signing of contract agreement subsequently.   |
| 1.16 |   | <b><u>Signing of Contract Agreement:</u></b>  |
|      | A | The Tenderer whose tender is accepted shall be required to appear in person at the office of <b>Sr. Divisional Signal and Telecommunication Engineer, 1<sup>st</sup> floor, Mumbai-400001</b> as the case may be, or if tenderer is a firm or corporation, a duly authorized representative shall appear (there would be no need for appear in person if agreement is signed digitally) and execute the contract agreement within seven days of notice from Railways that the Contract Agreement is ready. Failure to do so shall constitute a breach of the agreement affected by the acceptance of the tender. The Contract Agreement shall be entered into by Railway only after submission of valid Performance Guarantee by the Contractor. In such cases the Railway may determine that such tenderer has abandoned the contract and there upon his tender and acceptance thereof shall be treated as cancelled and the Railway shall be entitled to forfeit the full amount of the Bid Security and other dues payable to the Contractor under this contract. The failed Contractor shall be debarred from participating in the re-tender for that work. |
| 1.17 |   | <b><u>Commencement of work by Submission of Programme for execution:</u></b>  |
|      |   | The successful tenderer upon receipt of LOA shall commence the work by way of submitting a detailed time schedule in terms of Clause No. 2.9 of Chapter – II, Special Conditions of Contract, for completion of work within the allowed completion period.  |
| 1.18 |   | <b><u>Security Deposit:</u></b>   |



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|              |  | In addition to the Performance Guarantee Bond mentioned above, Security deposit will be deducted from 1 <sup>st</sup> running bills onwards as per latest GCC clause and latest amendments.   |
| 1.19         |  | <b><u>Retention / Release of Bid security Money :</u></b>   |
|              |  | The bid security money shall be retained/released as per item 2.6 of chapter-II.  |
| 1.20         |  | <b><u>CHANGE IN ADDRESS:</u></b>  |
|              |  | Any change in the address of the contractor shall be forthwith intimated in writing to the Railway. The Railway will not be responsible for any loss/ inconvenience suffered by the Contractor on account of his failure to comply with this.   |
| 1.21         |  | <b><u>GUIDELINES FOR PARTICIPATION OF JOINT VENTURE FIRMS :</u></b>   |
|              |  | <b><u>As per GCC Clause and latest amendments.</u></b>  |
| 1.22         |  | <b><u>General Conditions of Contract (GCC):Along with issued corrigendum slips.</u></b>   |
|              |  | The GCC, April2022 has been uploaded on Railway Board's website. Lt may be accessed through the path: <a href="http://www.indianrailways.gov.in/railwayboard">www.indianrailways.gov.in/railwayboard</a> >>"About Indian Railways">> "Railway Board Directorates" >>"Civil Engineering" >>"IR General Conditions of Contracts" >>IR General Condition of Contracts- 2022. |
| <b>NOT E</b> |  | <b>"This tender complies with Public Procurement Policy (Make in India) Order2017, dated 15/06/2017, issued by Department of Industrial Promotion and Policy, Ministry of Commerce, circulated vide Railway Board letter no.2015/RS(G)/779/5 dated 03/08/2017 and 27/12/2017"</b>   |

# **CHAPTER-II**

## **SPECIAL**

### **CONDITIONS OF**

#### **CONTRACT**



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| 2.0 | <b>SPECIAL CONDITIONS OF CONTRACT</b> |  |
|     | 2.0.1                                 | The Tender shall be governed by the following Special Conditions of Contract (SCC), and Technical specifications etc (Chapters III and IV) in addition to the General Conditions of Contract of Railway (hereinafter called as GCC although meant for civil engineering works but will also be applicable to this work) with latest amendments. Where there is any conflict between the instructions to Tenderer, conditions of tendering, special condition of contract, Tender forms, Annexure etc. on one hand and GCC on the other, the former (SCC) shall prevail.                              |
|     | 2.0.2                                 | <b>Any Special conditions stated by the Tenderer in the covering letter submitted along with the tender shall be deemed to be part of the Contract to such extent only as have been explicitly accepted by the Railway.</b>  |
|     | 2.0.3                                 | These specifications / documents describe the material to be supplied, work to be Performed and the method of construction, for the complete installation in strict accordance with the drawings and specifications mentioned here and such instructions as may from time to time be given by the Railway. The contractor shall quote for the work giving all information after close scrutiny of the plans/ drawings and site survey. If contractor finds that some drawing/specification is missing from the tender document it shall point out immediately before the opening date of the tender. |
| 2.1 | <b><u>Name of the Work:</u></b>       |  |
|     |                                       | The name of the work has been defined in clause 1.0 of chapter-1.  |
| 2.2 | <b><u>Location of the Site:</u></b>   |  |
|     |                                       | <p>The work site has been defined as below</p> <p>A) Division: Mumbai<br/> B) Section: Mumbai Division<br/> C) Station/Sections: Stations or section or installation as advised by Sr.DSTE/E/BB<br/> D) L.C. Gate/IBH - if any.<br/> E) Jurisdiction of BB division, Consignee of Stores: SSE/Sig/Stores/PANVEL</p> <p>ANY ADDITIONAL INFORMATION ABOUT THE LOCATION OF THE SITE CAN BE KNOWN FROM RAILWAY TIME TABLE OR RAILWAY MAP.</p>  |

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| 2.3 |               | <b>Scope Of The Work:</b> The scope of the complete work has been broadly defined under various activities as described below.  |
|     | <b>NOTE:-</b> | <b>ALL ITEMS SHOULD BE SUPPLIED FROM AUTHORIZED VENDOR ONLY.</b>  |
|     |               | <b>Tender No.- CR-BB-SnT-EAST-2026-64</b>   |
|     |               | <b>Replacement of EI operating panel with VDU at five stations of PNVL-Roha section and other improvemental work in EI installed in East section of Mumbai Division of Central Railway.</b>   |
|     |               | <b>Existing make of EI at stations -MEDHA.</b>  |
|     |               | <b>TECHNICAL SPECIFICATION</b>  |
|     | A             | This work is required to be carried out in accordance with latest RDSO specification and Railway Board guidelines.  |
|     | B             | The work is required to be carried out in accordance with the RE manual for stations falling under 25 KV electrified traction. The equipments and installation practices of signaling system will have to be in line with the requirement of AC Electrified section as specified in manual of instructions of installation and commissioning of S&T equipments in 25 KV AC Electrified section. |
|     | C             | The work to be carried out in accordance with Interlocking Plans for the stations/level crossing gate, issued by the Railways. These IP's are tentative and minor variation/alteration may take place. The tenderer should carry out correction/alteration/additions in design of circuits arising out of these changes without any additional cost.  |
|     | D             | The installation practices of all signaling gears should be as per the Signal Engg. Manual issued in July 2021 and to suit latest relevant correction slips and Central Railway practice.   |
|     | E             | Provision should be there for lighting and Surge Protection in the Central Evaluator/Field Unit and or its power supply input and communication lineinput/output connected with the central evaluator, as per RDSO Specification No. RDSO/SPN/144. Bidders should follow international/ RDSO recommended practices for Lighting and Surge Protection measures.                                  |
|     | F             | The Central Evaluator will have a separate port to connect to the station data logger for monitoring the section wise clear/occupied information. Standard Data Logger protocol   |

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|  |   | as specified in RDSO/SPN/99 shall be used for this purpose.  |
|  | G | Tenderers are advised to inspect the site and assess the actual requirement before quoting for the work.   |
|  |   | <b>BRIEF SCOPE OF WORK TO BE DONE BY TENDERER</b>  |
|  | A | Supply of material and execution as per schedule.  |
|  | B | Supply, installation, testing and commissioning of Multi section Digital Axle Counter complete system including the Central Evaluator and final track clearance relay for each section, Reset boxes, LV boxes, Track side electronic unit with detection point complete assembly including mushroom with protection cover & fixing arrangement for each detection point, clamps deflector for either side of each detection points, monitoring console, earthing, service test panel etc. with all other Accessories as per tender schedule.   |
|  | C | The MSDAC equipment is properly, installed and commissioned by adhering to RDSO approved latest pre-commissioning check-list and procedure as defined by OEM in its installation manual. Installation to be carried out by OEM or under supervision of OEM and certified by OEM. The quality and integrity of the installation remains complete responsibility of the OEM. OEM shall certify that verification of system installation has been completed by the their authorized representatives and all necessary arrangements meet the required standards of engineering for trouble free working of installed system.   |
|  | D | All the drawings must be digitized and plotted on Auto CAD 2000 or latest version and will be supplied on CDs and a hard copy of tracing Circuit Sheets/Locking Table shall be on (A-3) size. No change shall be made in any of the approved drawings without permission of CSTE or his authorized representative. Tenderer will give TWO Sets of CDs/Pendrive/Hard disc comprising of drawings of all the circuit diagrams etc. Further, all the drawing shall include the name of the work, as given by the Railway, blocks, for signature of Railways Officials and contractor and it should be signed by the Contractor or his authorized representative. All the drawing should be drawn as per the standard practice of Central Railway. All the tracings shall be drawn on good quality "Gateway" brand 95/100 GSM tracing paper. |
|  | E | Laying of signaling/ telecom cables as per cable route plan and its terminations. HQ letter no N.321/N/S/CABLE dt 01.09.2023 Regarding avoiding of cable cuts during execution of works is to be followed.   |
|  | F | Work related to Cable termination Rack, Data logger, various types of Signals, Signal foundation, various types of Location  |

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|  |    | boxes, Location foundation, erection of Signals,ElectricalLifting Barrier, excavation of trench, cable laying, Modular terminals, FRP Signal units, fixing of Point machines, Electronic Interlocking, MSDAC and track circuitingetc.   |
|  | G  | Tenderer has to perform various tests in association with Railway representative and the contractor will arrange wiremen to assist Railway officials to carry out the various worksin NI working.   |
|  | H  | All measuring instruments and tools required for execution of work will be arranged by contractor.  |
|  | I  | All types of hardware like nails, screws etc. required for installation for equipment shall be supplied by Contractor.  |
|  | J  | Any critical item which is essential for commissioning of the Systems but not included in the Tender Schedule has to be provided by contractor free of cost.  |
|  | K  | Contractor has to collect materials [to be supplied by Railways from various stores Depots or as nominated in Mumbai region by Railway with own arrangement.  |
|  | L  | Materials released from site will be transported [with loading & unloading] to the nominated Railway's Scrap Depot by contractor with own arrangement.  |
|  | M  | Work has to be executed in multiple sections simultaneously / progressively to complete the work within completion period.  |
|  | N  | Material shall be supplied by contractor in batches (not whole quantity at a time) as persite requirement, progress of work and as per instructions of Railway's Engineer incharge.   |
|  | O  | Contractor need to arrange vehicle for site inspection of Railway officials as and when required.   |
|  | P  | As per <b>Railway Board's letter No. 2011/Sig/EI/Policy dated 15.04.2015</b> , tenderer has to fulfill following conditions:  |
|  | I  | Submission of " Undertaking by the tenderer" that the equipment for EI shall be procured from RDSO approved source and installation, testing and commissioning of EI shall also be got done from the same source including after sales support required during the warranty period; AND       |
|  | Ii | After the award of the contract, MoU with RDSO approved source covering supply of equipment for EI, installation, testing & commissioning of EI by the same RDSO approved source including after sales support required during the warranty period, before supply of equipment is undertaken. |
|  |    | <b>RAILWAY'S SCOPE OF WORK</b>  |
|  | A  | Provision of site for temporary accommodation for keeping contractor's men and material, subject to availability of site within Rly. Premises. And construction for making temporary accommodation will have to be done by the tenderer at his  |

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|  |              | own cost.   |
|  | B            | Supervision of each and every activity.   |
|  | C            | Supervision, during fault localization, joint testing and rectification.  |
|  | D            | Co-ordination with other departments of Rlys. and arranging approval for track crossing, road crossing, cable across bridges, culverts etc.   |
|  | E            | Accommodation for imparting training to Railway officials/supervisors.  |
|  |              | <b>ALL OTHER WORKS SHALL BE EXECUTED CONFIRMING TO THE SPECIFICATIONS AND DRAWINGS MENTIONED IN CHAPTER-III &amp; CHAPTER-IV. ALL THE RELEVANT CLAUSES WHICH ARE APPLICABLE TO THE ITEMS OF SCHEDULE OF MATERIAL AND WORKS SHALL BE ADHERED TO.</b> |
|  | <b>2.3.1</b> | <b><u>INDOOR WORK FOR EI/PI/ L.C. GATES/ IBS/ AUTO HUT:</u></b>   |
|  | A            | Supply of material as per schedule of materials and works.  |
|  | B            | Preparation of Route Section Plan, Selection Table, and Locking table to suit the signaling plan issued for this work and submitting the tracings to the Railways for approval.   |
|  | C            | Designing of circuit diagrams as per the approved Route Section Plan and, Selection Table, Locking table and other guidelines of Central Railways in addition to the Signal Engineering Manuals, GR and SR of the Railways.                         |
|  | D            | Designing and Submission of tracings for Square sheet on basis of approved Selection Table and Locking Table.   |
|  | E            | Transportation of materials required for commissioning of indoor works from the Railway's stores at contractor's own cost.  |
|  | F            | Design, supply, Installation, Programming, Testing and Commissioning of EI system as per the technical specifications (chapter-III and IV) and schedule of materials and works.   |
|  | G            | Erection of Relay racks with IDF arrangements, Packeting and Wiring of the Relay room as per the approved circuits.   |
|  | H            | Power Wiring of Bus Bars from the Power Distribution panel for all the DC and AC supplies.  |
|  | I            | Wiring and supply of simulation panel as per site   |



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|  |              | requirements with contractor's own material.   |
|  | J            | Testing of wired circuits for 1wire/2 wire and bell test, selection table test, Square sheet test and contact break test.  |
|  | K            | Installation and commissioning of Operating Panel/VDUs as per Railways' instructions.  |
|  | L            | Extending the cables and Wiring and installation of Telecom equipments like control phones, other telephones, PA system etc.   |
|  | M            | Wiring and installation of other miscellaneous items like KLCRs, Block bell units etc as per Railways instructions.  |
|  | N            | Any other activity defined by Officer In Charge of the work mutually agreed by the contractor.   |
|  | <b>2.3.2</b> | <b><u>OUTDOOR WORK FOR EI/PI/ L.C. GATES/ IBS/ AUTO HUT:</u></b>   |
|  | A            | Supply of material as per schedule of materials and works.   |
|  | B            | Preparation of foundations for Location Boxes, Signals as per the approved drawings.   |
|  | C            | Transportation of all types of materials required for commissioning of works from the Railway's stores at contractor's own cost.   |
|  | D            | Erection of location boxes and signal posts, signal units etc.   |
|  | E            | Excavation of Trenches in soft soil, asphalted areas and platform cutting etc.   |
|  | F            | Laying of trunkings, pipes and other material.   |
|  | G            | Laying of cables in the trunkings or other materials.  |
|  | H            | Termination of cables.   |
|  | I            | Earthing of cables.  |
|  | J            | Meggaring of cables and painting of details.   |
|  | K            | Wiring of and installations of Track circuits, Point machines and signal units, L.C.Gates etc. as per Railways' Instructions.  |
|  | L            | <b>The contractor shall submit all the details/drawings before, during and after the commissioning of the installation as mentioned in the para 2.3.7 of this chapter.</b> |
|  | M            | Any other activity defined by Officer In Charge of the work mutually agreed by the contractor.   |
|  | <b>2.3.3</b> | <b><u>ADDITIONAL INDOOR ACTIVITIES FOR AFTC:</u></b>   |

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|  | A            | Supply of material as per schedule of materials and works.   |
|  | B            | Design of the system for the approved signaling plan i.e.<br>For AFTC, design of frequency plan and evaluation of Tx, Rx and other tuning unit.  |
|  | C            | Verification and finalization of cable plans.  |
|  | D            | Erection of Relay Racks required.  |
|  | E            | Installation and wiring of Indoor equipments along with extending the power supply to the equipments.  |
|  | F            | Packeting for relays from VR relays to IDF.  |
|  | G            | Extending the cables (Shielded cable) from the CT rack to the AFTC system.   |
|  | H            | Final Tuning and commissioning of the system.  |
|  | I            | Any other activity defined by Officer In Charge of the work mutually agreed by the contractor.   |
|  | <b>2.3.4</b> | <b><u>ADDITIONAL INDOOR ACTIVITIES FOR DAC:</u></b>  |
|  | A            | Supply of material as per schedule of materials and works.   |
|  | B            | Design of DP plan and submission for the approval.   |
|  | C            | Verification and finalization of cable plans.  |
|  | D            | Erection of Relay Racks required.  |
|  | E            | Installation and wiring of Evaluator Computers either in the cabinet provided along with evaluator computer or in the Relay Rack as per the design of the evaluator along with extending the power supply to the evaluator computer. |
|  | F            | Packeting for relays from VR relays to IDF.  |
|  | G            | Extending the Quad cables from the CT rack to the DAC system.  |
|  | H            | Final commissioning of the system.   |
|  | I            | Any other activity defined by Officer In Charge of the work mutually agreed by the contractor.   |
|  | <b>2.3.5</b> | <b><u>ADDITIONAL OUTDOOR ACTIVITIES FOR AFTC:</u></b>  |
|  | A            | Verification and finalization of the site for each and every TU jointly with Railways.   |
|  | B            | Preparation of foundations for TUs as per standard drawing   |

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|  |              | issued by Railways.  |
|  | C            | Installation of TUs on the foundation.   |
|  | D            | Inserting the quad cables inside the TUs and connecting it to the designated terminals.        |
|  | E            | Drilling the holes in the Rails for S-bonds and site connections.                              |
|  | F            | Installation of S-bond as per the plan.  |
|  | G            | Installation of site connections as per the instructions of site in-charge.                    |
|  | H            | Tuning of the TUs as per the manuals and RDSO guidelines.                                      |
|  | I            | Providing Earth connections as per the manual and RDSO guidelines.                             |
|  | J            | Painting of the details as per the site engineer.  |
|  | K            | Any other activity defined by Officer In Charge of the work mutually agreed by the contractor. |
|  | <b>2.3.6</b> | <b><u>ADDITIONAL OUTDOOR ACTIVITIES FOR DAC:</u></b>   |
|  | A            | Verification and finalization of the site for each and every DP jointly with Railways.         |
|  | B            | Preparation of foundations for DPs as per standard drawing issued by Railways.                 |
|  | C            | Installation of DPs on the foundation.   |
|  | D            | Inserting the quad cables inside the DPs and connecting it to the designated terminals.        |
|  | E            | Drilling the holes in the Rails for site connections.  |
|  | F            | Installation of site connections as per the instructions of site in-charge.                    |
|  | G            | Tuning and adjustment of the DPs as per the manuals and RDSO guidelines.                       |
|  | H            | Providing Earth connections as per the manual and RDSO guidelines.                             |
|  | I            | Painting of the details as per the site engineer.  |
|  | J            | Sealing the DP with approved sealant to prevent entry of insects etc.                          |
|  | K            | Any other activity defined by Officer In Charge of the work mutually agreed by the contractor. |
|  | <b>2.3.7</b> | <b><u>SUBMISSION OF DRAWINGS AND RECORDS:</u></b>  |
|  | A            | The contractor shall submit all the details/drawings for all                                   |



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|  |                | items pertaining to this work before, during and after the commissioning of the installation as mentioned:  |
|  | B              | Detailed technical description and design of the systems offered.   |
|  | C              | Detailed Operating Instructions of the systems offered.   |
|  | D              | Details of test accessories, test and measuring instruments required. Test facilities required for the installation, testing & commissioning maintenance of the system along with a write-up of testing and troubleshooting procedures. |
|  | <b>2.3.7.1</b> | <b>Following Indoor Installation Documents to be Submitted Before and During Installation:</b>  |
|  | A              | Route Section Plan  |
|  | B              | Control Panel Diagram   |
|  | C              | Locking Table   |
|  | D              | Selection Table   |
|  | E              | Square sheet  |
|  | F              | Wiring Diagram/Interface and logic circuit.   |
|  | G              | Relay Rack/ Relay Arrangement   |
|  | H              | Bus Bar Details   |
|  | I              | Fuse Analysis   |
|  | J              | Contact Analysis  |
|  | K              | Panel Tag-block Analysis  |
|  | L              | Power Panel Diagram   |
|  | M              | Auto change-over Diagram  |
|  | N              | Power Equipment with Program Switches   |
|  | O              | K-Rack Details  |
|  | P              | K-Rack Tag-block Analysis   |
|  | Q              | Block Circuits Wiring Details etc   |
|  | <b>2.3.7.2</b> | <b>Following Outdoor Installation Documents to be Submitted Before and During Installation:</b>   |
|  | A              | Track Circuit Insulation Plan   |
|  | B              | Cable Route Plan  |

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|  | C              | Cable Chart  |
|  | D              | Cable Core Chart   |
|  | E              | Junction Box Details etc.  |
|  | F              | Frequency plans for AFTCs  |
|  | G              | DP plans for DAC   |
|  | <b>2.3.7.3</b> | <b>Following test reports made available after testing of the Signaling Installation before commissioning of the system:</b> |
|  | A              | <b>For Indoor:</b>   |
|  | I              | One Wire / Two Wire Test record.   |
|  | II             | Contact break test Record [In WD after soldering (applicable to Metal to Metal)]   |
|  | III            | Simulation test Record for   |
|  | IV             | Locking Test ( as per Locking Table)   |
|  | V              | Selection Test ( as per Selection Table)   |
|  | VI             | Sub-route release ( Short train/ Long Train)   |
|  | VII            | Back Locking Test  |
|  | VIII           | Approach Locking Test ( as per Selection Table)  |
|  | IX             | Track Locking of Points.   |
|  | X              | Indication Locking of Points.  |
|  | XI             | Emergency Operation of Points with controlling track Circuits failed.  |
|  | XII            | Square Sheet test Record.  |
|  | XIII           | Cascading of Signal Aspect.  |
|  | XIV            | Aspect Control test ( as per Control Chart in Signalling Plan)   |
|  | XV             | Red Lamp Protection.   |
|  | B              | <b>For Outdoor :</b>   |
|  | I              | Cable Test Reports of Main Cable/ tail cable.  |

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|  | II             | Earth Test Record.  |
|  | III            | Track Circuits Parameters.  |
|  | IV             | Operating parameters of Points and Correspondence Test.   |
|  | V              | Cable Test reports of Tail Cable Including TL-JB/ Boot Leg cable.   |
|  | C              | <b>For Power Equipments :</b>   |
|  | I              | Load / No Load Currents and Voltages of Power Equipments and all its modules.   |
|  | II             | Battery History records.  |
|  | <b>2.3.7.4</b> | Pre commissioning checklist jointly signed by Railways and OEM's representative and Contractor's representative for AFTC and/or DAC.  |
|  | <b>2.3.7.5</b> | After commissioning of station, six sets of Documents/drawings along with two copies of tracings, four set of soft copy in CD/Pendrive/Hard disc. shall be submitted within 15 days.  |
|  | <b>2.3.7.6</b> | All the drawings shall be supplied in a good quality folder for each station. During installation, a folder containing all the drawings, testing procedures, commissioning procedure shall be kept at the stations.   |
|  | <b>2.3.7.7</b> | <b>Fault diagnostic Chart:</b> Important aspect of trouble shooting & adjustments along with parameters & its range shall be prepared in colored A1 size in glossy paper & framed to be displayed in Relay room. Above chart shall be provided in the Relay room & SI/ESM duty room at least one day in advance of commissioning. Contractor shall obtain the approval of Railways before supplying the same. 5 copies of the charts shall be submitted for each station. |
|  | <b>2.3.7.8</b> | For all type of electronic system like EI, AFTC, DAC, UFSBI, MUX, Data-logger, FAS, Fuse Monitoring & change over system, Earth leakage detector etc following documents shall essentially be provided in six copies.   |
|  | A              | Manual for installation, Testing, Commissioning and maintenance of the system for Technicians/Jr. Engineers (Installation & Maintenance level).   |
|  | B              | Technical & system module for diagnostic & trouble shooting for repair center (Engineers level).  |
|  | C              | Functioning and system overview, Manufacturer's System Manual in soft and Hard copy. (Higher management level).<br><br>Detailed technical description and design of the systems   |

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|            |                | offered Detailed Operating Instructions of the systems offered.   |
|            | <b>2.3.7.9</b> | <b>For the EI system the AS MADE Documents shall be provided as follows:</b>  |
|            |                | Before testing and commissioning of the entire installation, eight copies of final 'as made' details as hereunder shall have to be supplied duly incorporating all particulars for the station. All 'As made' shall be prepared by the contractor in Auto-cad 2010 or latest and submitted in compact discs in duplicate. All 'As made' documents/plans shall be made by the contractor as per Central Railway practice only and shall be handed over to the Railways, duly signed. |
|            | A              | 'As made' circuit diagram   |
|            | B              | 'As made' power supply layout diagram   |
|            | C              | 'As made' contact analysis chart  |
|            | D              | 'As made' relay disposition chart   |
|            | E              | 'As made' Termination particulars of all locations & FTOT.  |
| <b>2.4</b> |                | <b><u>RAILWAY SHALL PROVIDE FOLLOWING:</u></b>  |
|            | A              | Approved Signalling Plan  |
|            | B              | Building for the Installations if not covered in the schedule of materials and work.  |
|            | C              | Electric power supply for the installation and testing purpose as per the extant rules and annexure-X chapter-V.  |
|            | D              | All types of outdoor cables if not covered in the schedule of materials and works.  |
|            | E              | Laying and terminations of outdoor cables if not covered in schedule of material and works as per scope of the schedule.  |
|            | F              | Uncharged batteries of different capacities, which are to be charged by the contractor as a part of installation of batteries.  |
|            | G              | All types of Apparatus case if not covered in schedule.   |
|            | H              | All types of LED signal lighting units.   |
|            | I              | All types of Electric point machines.   |
|            | J              | IPS system if not covered in schedule.  |
| <b>2.5</b> |                | <b><u>COMPLETION PERIOD:</u></b>  |
|            |                | The entire work shall be completed within the completion period as specified in clause 1.0 of chapter-I from the date of issue of LOA of the tender. Extension of completion period shall be granted by the competent authority on mutually   |

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|     |      | agreed basis.   |
| 2.6 |      | <b><u>BID SECURITY DEPOSIT :</u></b>  |
|     |      | <b><u>As Per GCC clause and latest amendments.</u></b>  |
| 2.7 |      | <b><u>PERFORMANCE GUARANTEE:</u></b>  |
|     |      | <b><u>As Per GCC clause and latest amendments.</u></b>  |
| 2.8 |      | <b><u>SECURITY DEPOSIT:</u></b>   |
|     |      | <b><u>As Per GCC clause and latest amendments.</u></b>  |
|     | NOTE | If the EI portion is taken in a separate schedule completely (i.e. supply and installation) the Warranty period is as per RDSO specifications. Hence the proportionate amount of SD of the accepted value of separate EI schedule shall be retained till the expiry of warranty of EI. The balance amount of SD shall be released after one year (generally warranty/maintenance period) after the issue of completion certificate.   |
| 2.9 |      | <b><u>PROGRAMME OF WORK EXECUTION:</u></b>  |
|     | A    | The Contractor shall have a competent project team with adequate resources to execute the work so that the entire work is completed within the completion period as mentioned in Clause 2.5 above (Chapter II, Special Conditions of Contract).   |
|     | B    | The Contractor is expected to have worked out a tentative programme for execution of the work well before issue of "Letter of Acceptance", by Railway. Within 15 days of the date of issue of the LOA Contractor shall commence the work by way of submitting a <b><i>Detailed Time and Activity Schedule</i></b> for the execution of work aiming at completing the entire work within the stipulated completion time. The schedule shall thereafter be approved by the Engineer-In-Charge normally within 5 working days. |
|     | C    | Railway reserves the right to modify the activity schedule while approving the same as well as at any stage during execution if situation so warrants. Once approved, in the event of any slippage from the time schedule especially when   |

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|      |   | resulting into time over-run of the work the contractor shall submit revised schedule duly justifying the circumstances without any delay. The revised schedule shall be approved by the Engineer-In-Charge only when considered justified in his opinion otherwise it will attract penal action on the contractor as per provision of this contract.   |
| 2.10 |   | <b><u>Quantum of Work, Recommended Spares &amp; Optional Items:</u></b>   |
|      | A | The estimated quantities of various items required to be installed and commissioned are mentioned in the Tender Schedule. It should be clearly noted that the items and the quantities mentioned have been worked out by Railways as per the estimated requirements. However if the Tenderer feels that the desired features cannot be achieved or some of the essential features cannot be obtained through the quantities provided in the Tender Schedule, then quantity as required for the work in the opinion of the Tenderer shall be quoted as additional items and/or quantity. In such cases, Tenderer shall give, full justification for such variation, clearly mentioning the consequences of procuring the quantities suggested by the contractor instead of quantities indicated in schedule. |
|      | B | Similarly for any other item(s) necessary for satisfactory completion/functioning of the tendered work in accordance with the objective of requirement, rates and quantities of such item(s) shall be quoted separately, along with detailed justification for the need of the item(s) to achieve end objective.  |
|      | C | Costs for additional items mentioned above shall be quoted separately wherever necessary which shall not be taken into account for evaluation criteria of the offers.   |
|      | D | <i>Railway reserves the right to include any of the additional items which shall be binding on the contractor.</i>  |
| 2.11 |   | <b><u>RECORDS &amp; REGISTERS:</u></b>  |
|      | A | The Contractor/s shall maintain accurate records, plans and charts showing the dates and progress of all main operations and the Engineer shall have access to this information at all reasonable times. Records of tests made shall be handed over to the engineer's Representative after carrying out the tests. The following registers will be maintained at site by the Contractor/s, which should be seen and signed by the Contractor or his authorised representative on daily basis for compliance of instructions recorded therein for satisfactory   |



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|             |          | completion of work.   |
|             | B        | <p><b><u>Site order Register :</u></b></p> <p>The Contractor/s shall properly sign in site order register, Orders given by the Engineer or his representative or his superior officers and comply with them. The Contractor/s shall report the compliance to the Engineer in good time so that it can be checked.</p>   |
|             | C        | <p><b><u>Labour Register :</u></b></p> <p>This register will be maintained to show daily strength of labour in different categories by the contractor/s.</p>  |
|             | D        | <p><b><u>Daily progress register :</u></b></p> <p>It shall indicate daily progress of work done by the contractor shall be got signed at least once in three days from Engineer in token of acceptance. The format of the Register will be advised by the Engineer.</p>   |
|             | E        | <p>Any other register considered necessary by the Engineer shall be maintained at site in which the representative to the Engineer and the Contractor/s or his/their authorised representative will have to sign. The registers, programs, charts etc. will be the property of the Railway.</p>   |
| <b>2.12</b> | <b>A</b> | <p><b><u>DEALING WITH STORES BY THE CONTRACTOR:</u></b></p>   |
|             | I        | <p>All materials mentioned in the schedule of material and works required for the execution of the contract, shall be arranged and supplied by the Contractor in the stores Depot. of the consignee as defined in clause 2.2 of chapter-II or as advised by the Engineer In charge to realize the end objective.</p>  |
|             | II       | <p>The material mentioned in the schedule shall be delivered by the Tenderer at various locations depending on requirement, which is to be issued by Engineer In charge at appropriate time on receipt of a written request from the contractor.</p>  |
|             | III      | <p>Once the material is issued to the contractor, the contractor shall be responsible for the security of material irrespective of the fact that the material is kept in Railway premises. The contractor shall make adequate arrangements at site as deemed necessary for guarding the same from the thefts by outsiders or his labour or damage of any sort. The contractor will be responsible for the safety of the material at site from the date of issue to the date of return of the unutilized material.</p> |
|             | IV       | <p>Authorized representative(s) of engineer in-charge will keep record of material on day-to-day basis in summarized form and shall convey monthly position of store supplied by and</p>  |

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|  |      | issued to the contractor to the engineer in-charge of the work.  |
|  | V    | The cost of stores lost shall be realized by the Railway out of any payments due to the contractor in this contract or from any other contract executed by Govt. of India.   |
|  | VI   | The contractor shall transport the material required from Mumbai Railway stores or BYCULLA Workshop to the work site by its own means of transportations.  |
|  | VII  | After commissioning of works the contractor shall return all the leftover material to the Railways' store by its own transportation.   |
|  | VIII | Empty cable drums and balance materials after completion of work, if any should be returned back at the nominated Depot of the nominated Senior Section Engineer (Sig).  |
|  | IX   | The material released as per the schedule of material and works shall also be handed over back to the consignee incharge with the contractor's own means of transportations. Released material shall be handed over to Consignee in systematic manner Proper care should be taken while releasing & transporting the stores. |
|  | X    | The cost of transit insurance required as per rules will be borne by the tenderer.   |
|  | B    | <b><u>FOREIGN EXCHANGE AND IMPORT LICENSE:</u></b>   |
|  |      | Any foreign exchange or Import License, if required, for supply of goods and service under the contract will have to be arranged by the contractor at his cost. Railway shall make all payment due, under the contract, in Indian Rupees only.   |

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|  | C | <b><u>ROYALTIES AND PATENTS RIGHTS:</u></b>   |
|  |   | The Contractor is forbidden to use any patents or registered drawings, processor patterns in fulfilling his contract without the previous consent in writing of the owner of such patents drawings, patterns or trademarks, except where these are specified by the purchaser himself. Royalties where payable for the use of such patented processes, registered drawings or patterns shall be borne exclusively by the Contractor. The Contractor shall advise the purchaser of any proprietary rights that may exist on such Processes, drawings or patterns which he may use of his own accord. |
|  |   | The contractor shall defray the cost of all Royalties fees and other payment in respect of patents, patent rights and licenses  |



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|  |  | <p>which may be payable to patentee,licenser or other person or corporation and shall obtain all necessary licenses. Incase of any breach (whether willfully or inadvertently) by the contractor on thisprovision, the contractor shall indemnify the Railway and their officers, servantand representative against all claims, proceeding, damages, cost charges, expenses, loss and liability which they or any of them may sustain, incur or beput to, by reason or in consequence, directly or indirectly of any such breach andagainst payment of any royalties, damages or other moneys, which the Railwaymay have to make, to any person or holder entitled to patent rights in respect ofthe users of any machine, instruments, process, article, matter or thing,constructed, manufacturing supplied or delivered by the contractor or to hisorder under this contract. The tenderer is deemed to have accepted this clause,in regard to indemnifying the railway as stated above, when his tender has beensubmitted to the Railway.</p> |
|  |  | <p>In the case of patents taken out by the Contractor of the drawings or patternsregistered by him, or of those patents, drawings or patterns for which he holds alicense, the signing of the contract automatically gives the Purchaser the right torepair by himself the purchased articles covered by the patent or any person orboddy chosen by him and to obtain from any sources he desires the componentparts required by him for carrying out the repair work. In the event of infringementof any patent rights due to above action of the purchaser, he shall be entitled toclaim damages from the contractor on the grounds of any loss of any naturewhich he may suffer.</p>   |

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| <b>2.13</b> |   | <p><b><u>MATERIALS &amp;QUALITY ASSURANCE DOCUMENTATION (FOR SUPPLY OF MATERIALS):</u></b></p>   |
|             | A | <p>The Tenderer shall submit the quality control plan alongwith the tender including full details of in-house quality assurance organization, procedures and documentation. During the manufacturing process, proper record shall be maintained for the purpose of inspections and all the tests should be carried out according to that.</p>  |
|             | B | <p>The equipments / materials as per RDSO specifications are to be procured from the RDSO approved sources only. The guidelines stipulated for stores procurement will hold good for procuring these items form RDSO approved Part “I” and Part “II” sources, where both sources are available. The major / bulk procurement shall be done from RDSO approved Part “I” and only education orders should be</p> |

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|             |   | placed on RDSO approved Part “II” Present stipulations states that maximum 15% of the total quantities can be procured from RDSO approved part “II” source. The items so procured from RDSO approved Part “I” and Part “II” firm in 17:3 proportion should strictly match in their specification, size, quality, configuration so that they are interchangeable / replaceable. The equipments / materials as per RDSO specifications can be taken fully from RDSO Part “II” approved sources only if there are no Part “I” RDSO approved sources for the same. However, the distribution of quantities between Part “I” and Part “II” sources shall be ascertained by the Contractor as per latest guidelines before placing the order. |
|             | C | RDSO has a recommended list of vendors for the supply of Mechanical items/equipments.Mechanical items to be supplied by the tenderer for which RDSO has recommended vendors, should essentially be procured from these vendors only. Any relaxation with respect to procurement / inspection shall be with the prior approval of the competent authority. The Railways’ decision shall be final and binding on the contractor.  |
|             | D | In the event of Railways waving off the inspection, all tests provided in the test schedules approved by Railways shall be carried out by the quality assurance organization and proper record of all such tests and results thereof shall be maintained and supplied to railways on demand along with the supply.  |
|             | E | It is desirable that Tenderer has to submit detail list of acceptance test & procedure, method of test required to be carried out by the railway for the assurance of the quality and real functionality of the system.   |
| <b>2.14</b> |   | <b><u>FUTURE AVAILABILITY OF SPARES AND ADDITIONAL PARTS:</u></b>   |
|             |   | This clause is applicable to the highly technological items like EI, Axle Counters, AFTC, UFSBI, MUX etc.   |
|             | A | The Contractor / manufacturer shall ensure the availability of all components/ subsystems,if required by the Railways from time-to-time on mutually agreed termsand conditions after warranty is over.  |
|             | B | The manufacture shall guarantee that spare parts for the system shall be availablefor a minimum of ten years after expiry of the warranty period and thereafter atleast two years notice shall be given to the Railways before any equipment orcomponents are discontinued or phased out from the manufacturing plans. Thiswill enable the Railways to assess the lifetime requirement of spares needed andorder  |

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|             |   | in sufficient quantity prior to stoppage of the manufacture.  |
|             | C | The successful tenderer shall further guarantee that if OEM goes out of production, he shall supply the specifications of materials at no cost to the purchaser, if and when required in connection with the equipment to enable the purchaser to fabricate or procure from other sources.  |
|             | D | The contractor shall undertake to supply on payment of all maintenance spares and tools required for the equipment during lifetime. He shall also undertake to supply additional equipment required for replacement or expansion of the network; that may become necessary due to additional traffic requirements. The price variation formula adopted in pricing such maintenance spares and additional supply that may be ordered in future shall be provided by mutual discussion.   |
| <b>2.15</b> |   | <b><u>INSPECTION OF MATERIAL:</u></b>   |
|             | A | The inspection of material shall be done by RDSO / RITES/ Railways (Engineer In charge of the work or Railway representative nominated by Central Railway) in the factory premises / assembling unit of the contractor. No material shall be dispatched from manufacturer's premises/assembling unit prior to inspection/ approval by the Railways.   |
|             | B | All equipment, materials, fittings and components will be subject to inspection by the RDSO/RITES/ Railways at the manufacturer's factory premises/assembling unit, before dispatch and no materials shall be dispatched from the manufacturer's factory/assembling unit prior to inspection and/or approval by the Railways. The Railway may also inspect the materials again at the contractor's depot or with consignee. The Railways shall have the right to be present during all stages of manufacturing and test process and shall offer reasonable facilities for inspection and testing of the material at all the stage so as to satisfy himself that the materials are in accordance with the specifications and approved drawing/designs. Any unreasonable delay in inspection will be on reasonable ground for extension of time for completion of the work. |
|             | C | For the items having RDSO specifications; and for which RDSO has approved sources for procurement; the material shall be purchased from the RDSO approved firms only. Any relaxation with respect to procurement / inspection shall be with the prior approval of the competent authority. The Railways' decision shall be final and binding on the contractor.   |

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| D | Materials put up for inspection shall be exactly of the type, quality (chapter-III, IV) and quantity laid down in the schedule of materials (chapter-V). Any variation shall require the prior approval of the Railway before the material is manufactured, tendered or offered for inspection.   |
| E | In the event of waive off of Inspection at Manufacturer's premises, The contractor has to arrange all the OEM's test certificate along with certification that the equipment under supply are as per Railways' specification.   |
| F | All materials that are not covered under the specifications, designs and drawings of RDSO etc. shall be procured from the manufacturers of repute/their-authorized dealers. Such materials are to be approved by the engineer. The contractor is required to produce test certificate from the manufacturer. In such cases, if the Tenderer/Contractor is not able to furnish manufacturer's guarantee certificate /test certificate for eg. for items procured through open market the Tenderer/Contractor shall furnish his guarantee & warranty for these items. |
| G | Whenever materials are inspected by Authorized Representatives of the Railways / Consignee, the Contractor will be required to furnish manufacturers/supplier's Guarantee Certificate (along with test report) and performance guarantee for such items. The contractor has to also furnish proof of purchase / dispatch from manufacturer.   |
| H | The cost of services of Railway Engineers or other personnel (RDSO/RITES) for inspection of material will be on Railway's account subject to other provisions herein contained. The Contractor shall give at least two weeks' notice to the RDSO / Railways to arrange necessary inspection.  |
| I | During the execution of the contract, samples may be taken from all the materials employed for the purpose of test and or analysis, under the conditions laid down in specification; such samples to be prepared for testing and forwarded to the testing entity shall be free of cost to the Railways.   |
| J | The decision of the Railway in respect of acceptability of any material, equipment etc. required for the work. The cost of equipment and materials, all tests and or analysis performed for inspection shall be borne by the Contractor.  |
| K | Materials which are not inspected by RDSO/RITES for any reason will be inspected by Consignee/Authorised representatives of Railways.   |

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|      | L | The Tenderer/Contractor shall furnish guarantee of material/equipments supplied by him for a period of one year after commissioning for trouble free performance. Any defects noted during this period will have to be rectified by him promptly at his own cost.   |
| 2.16 |   | <b><u>LIST OF MATERIAL FOR RDSO INSPECTION:AS PER SCHEDULE.</u></b>   |
| 2.17 |   | <b><u>CONSIGNEE'S RIGHT OF REJECTION:</u></b>   |
|      | A | Notwithstanding any approval which the inspecting officer may have given in respect of the stores or any materials or the work or workmanship involved in the performance of the contract (Whether with or without any test carried out by the contractor or the Inspecting officer or under the direction of the Inspecting officer) and notwithstanding delivery of the stores where so provided to the interim consignee, it shall be lawful for the consignee, on behalf of the purchaser, to reject the stores or any part, portion of consignment thereof within a reasonable time after actual delivery thereof to him at the place or destination specified in the contract. If such stores or part, portion of consignment thereof is not in all respects in conformity with the terms and conditions of the contract whether on account of any loss, deterioration or damage before dispatch or delivery or during transit or otherwise whatsoever. |
|      | B | When any stores delivered at the consignee's depots are rejected, this shall be removed by the contractor within 15 days from the date of rejection. Such rejected stores shall lie at the contractor's risk from the date of rejection. If the stores are not removed by the contractor within this period, the purchaser or his nominee shall have the right to dispose of such stores, as deemed fit, at the contractor's risk and account.  |
|      | C | The Railways shall also be entitled to recover from the contractor, handling and ground rent/demurrage and any other charges for the period the rejected stores are not removed after the aforementioned period.  |
|      | D | Stores that have been dispatched by rail and rejected after arrival at destination may be taken back by the contractor either at the station where they were rejected or at the station where they were dispatched. If the contract is placed for delivery F.O.R. station of dispatch, the contractor shall pay the carriage charges on the rejected consignment at Public Tariff Rates from the station of dispatch to station where they were rejected. If the contractor prefers to take   |



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|             |   | back the goods at the station from which they were dispatched, the goods shall, in addition, be booked back to him, freight to pay at Public Tariff Rates and at owner's risk.   |
| <b>2.18</b> |   | <b><u>CONSEQUENCES OF REJECTION:</u></b>   |
|             |   | If on the stores being rejected by the Inspecting Officer or Consignee at the destination, the contractor fails to make satisfactory supplies within the stipulated period of delivery, the purchaser shall be at liberty to: -  |
|             | A | Request the contractor to replace the rejected store forthwith but in any event not later than period of 21 days from the date of rejection and the contractor shall bear all the cost of such replacement, including freight, if any, on such replacing and replaced stores but without being entitled to any extra payment on the or any other account.  |
|             | B | Purchase or authorize the purchase of quantity of the stores rejected or others of a similar description (when stores exactly complying with the particulars are not readily available, in the opinion of the purchaser, which shall be final), without notice to the contractor action will be taken as per Clause 2.54 of Chapter II, Special Conditions of Contract, OR   |
|             | C | Cancel the contract and purchase or authorise the purchase of the stores or others of a similar description (when stores exactly complying with the particulars are not readily available, in the opinion of the purchaser, which shall be final) and action will be taken as per Clause 2.54 of Chapter II, Special Conditions of Contract.   |
| <b>2.19</b> |   | <b><u>MOBILIZATION ADVANCE:</u></b>  |
|             |   | No mobilization advance shall be paid to the contractor.   |
| <b>2.20</b> |   | <b><u>RIGHT TO RAILWAY TO KEEP BACK FROM THE CONTRACT OR ANY PORTION OF THE WORK:</u></b>  |
|             |   | The successful tenderer will however, have no claim or right in the execution of work which in the opinion of the Engineer should be carried out departmentally or otherwise and the Railway reserves the right that any time after acceptance of the tender, to keep back from the contract and carry out the work or any portion of work, through any other agent. No claim for compensation/loss or whatsoever on this account will be entertained by the Railways. |

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| <b>2.21</b> |   | <b><u>SUBLETTING AND ASSIGNMENT:</u></b>   |
|             |   | <b><u>As per GCC clause and latest amendments.</u></b>   |
| <b>2.22</b> |   | <b><u>EXECUTION OF WORK:</u></b>   |
|             | A | All the work shall be executed in strict conformity to the provisions of the contract document; specifically, chapter-III and chapter-IV; and with such explanatory detailed drawings, specifications and <b>instructions as</b> may be approved from time to time by the Railways, based on detailed design and engineering carried out by the contractor in line with requirements as per contract document. The contractor shall be responsible for ensuring that the work throughout are executed in the most substantial, proper and workmanlike manner with the quality of material and workmanship in strict accordance with the specifications and as per sound industrial practices and to the entire satisfaction of the Railways. |
|             | B | All the materials and workmanship used in this work shall be of extremely good quality and high class in every respect and is expected to give trouble free service.   |
|             | C | The personnel deputed for soldering should have adequate soldering skills and competency certificate issued by ITIs / reputed institutions.  |
|             | D | Installation and commissioning of EI, Digital Axle Counter Equipments, AFTC& Universal fail Safe Block Interface Equipments and other highly technical items to be carried out under supervision of authorized representative of RDSO approved Equipment Manufacturer. <b>The pre-commissioning check list shall be jointly signed by representative of RDSO approved Original Equipment Manufacturer, Railways &amp; Contractor.</b>  |
| <b>2.23</b> |   | <b><u>PROGRESS REPORTING:</u></b>  |
|             |   | The Contractor shall submit the periodic progress reports at regular intervals regarding the state and progress of work to the Railways. The details and Performa of the report will mutually be agreed after award of the contract. Such reports shall be for daily manpower, equipment and plant development, weekly work progress and monthly progress review reports. All actions as directed by Railways, pursuant to such reports shall be promptly attended to by Contractor.   |
| <b>2.24</b> |   | <b><u>INSPECTION OF WORKS:</u></b>   |



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|      | A | The responsibility of providing facilities for inspection lies with the contractor. He shall be responsible for providing required facilities i.e. tools, equipments for inspection at the place of work, for which no additional payments shall be made. The contractor will also provide facilities for carrying Railways supervisors to the sight of work and back when convenient train is not available. For the purpose of inspection, the contractor shall make a written request for inspection of sites to be done next day.  |
|      | B | The completed installation at all stages shall be subjected to checks and test as decided by Railways and the contractor shall be liable to remedy such defects as discovered during these checks and test and make good all deficiencies brought out. However, complete installation will be taken over finally on completion of the full system. It will be the responsibility of the contractor to rectify any discrepancy noticed within a period of one month from the date the complete system is taken over. For the purpose of taking over, joint inspection will be carried out by DSTE / ADSTE and Section Engineer/Jr. Engineer. The contractor should make himself or his representative available at the time of joint inspection. The decision of the Engineer shall be final in the matter. |
|      | C | The contractor will be called upon to pay all the expenses incurred by the Railway in respect of any work found to be defective or of inferior quality, adulterated or otherwise unacceptable.   |
|      | D | During the execution of the contract, samples may be taken for the purpose of test and/or analysis under the conditions laid down in specification, such samples to be prepared for testing and forwarded free of all cost to the Railway.   |
|      | E | The contractor will keep a logbook at the work site. The inspecting officer of the Railway may in addition to oral instruction to the representative of the contractor at the work site, enter such instruction as he deems fit in this logbook. The contractor will be responsible to note necessary action and remedy the defects and ensure that the instructions either oral or written are complied with. His non-noting the logbook entries shall not be considered sufficient grounds for non-compliance of the instructions.   |
| 2.25 |   | <b><u>TEST &amp; MEASURING INSTRUMENTS, SPECIAL TOOLS AND INSTALLATION MATERIAL:</u></b>   |
|      | A | All tests and measuring instruments and other arrangements required for all the acceptance tests shall be  |

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|             |   | made available by the contractor free of cost for conducting the tests.   |
|             | B | Special tools required for installation and maintenance of all the equipments shall be arranged by the contractor in adequate quantities. The contractor shall provide all installation material for complete commissioning of the system.  |
| <b>2.26</b> |   | <b><u>INSPECTING OFFICER – POWER OF REJECTION:</u></b>  |
|             | A | To reject any items submitted as not being in accordance with the tendered technical specification.   |
|             | B | To reject the whole of the installation offered for inspection, if after inspection the inspection authority is satisfied that the material offered for inspection is unsatisfactory.   |
|             | C | To mark the rejected stores with a rejection mark, so that they can be easily identified if resubmitted.  |
|             | D | The inspecting officer's decision as regards the rejection shall be final and binding on the contractor.  |
| <b>2.27</b> |   | <b><u>EXTENSION OF COMPLETION PERIOD:</u></b>   |
|             |   | <b><u>As per GCC clause and latest amendments.</u></b>  |
| <b>2.28</b> |   | <b><u>DETERMINATION OF CONTRACT:</u></b>  |
|             |   | <b><u>As per GCC clause and latest amendments.</u></b>  |
| <b>2.29</b> |   | <b><u>MEASUREMENT OF WORKS:</u></b>   |
|             | A | Payments for the works shall be made in accordance with approved designs and drawings and measured in relevant units. The measurements will be made generally in accordance with standard engineering practice and in conformity with the General Condition of Contract. All the measurements taken shall be jointly recorded and signed by the contractor's and Railway's representatives in the measurement books. Bills shall be prepared on the basis of these measurement books. |

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|             | B      | The contractor will obtain written approval of the supervision after completion of the various sub-items of each work mentioned in the Schedule wherever applicable).   |
|             | C      | The contractor shall sign the measurement as a token of acceptance of the measurement entered by the supervisor in-charge of the work (wherever applicable).  |
|             | D      | The contractor should ensure that measurement has been recorded for such work, which is not possible to measure subsequently after completion of the activity and shall remain hidden. For example:   |
|             | I      | after trenching is done   |
|             | II     | after RCC trunking is placed in trench and properly aligned.  |
|             | III    | after the above is laid properly  |
|             | IV     | after the earth is filled   |
|             | V      | after brick/slab/capping is laid  |
| <b>2.30</b> |        | <b><u>MEANING AND INTERPRETATION BY RAILWAYS TO BE FINAL:</u></b>   |
|             |        | All measurement, method of measurement, meaning and intent of specifications and interpretation of Special Conditions of Contract, given and made by the Purchaser or by the Purchaser Engineer shall be final and binding and shall be considered “excepted matters” in terms of conditions laid down in the General Conditions of Contract. |
| <b>2.31</b> |        | <b><u>TERMS OF PAYMENT:</u></b>   |
|             |        | Subject to any deduction which the Railway will be authorized to make under the terms of contract that may be applicable while accepting the tender, the Contractor shall be entitled for payment as follows:   |
|             | 2.31.1 | <b><u>For SUPPLYITEMS of Schedule ‘A’ and ‘B’</u></b>   |
|             | A      | 80% of the accepted cost of the supply items of the Schedule [duly inspected by the nominated Inspection Authority] will be paid on receipt of the equipment by the Consignee.  |
|             | B      | 10% of the accepted cost of supply items (in addition to the 80% released above) shall be paid after installation / erection of that particular equipment.  |
|             | C      | The balance 10% of accepted cost of the supply items will be paid after commissioning of each station/installation AND  |

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|  |        | submission of OEM's Site Installation Certificate (as per Annexure XI of Chapter V) prior to Commissioning for EI , AXLE COUNTERS, AFTCs UFSBI/BPACs, IPS, DATA LOGGER.   |
|  | D      | 100% will be paid for spares & for items, which are not required to be erected by the contractor on receipt of the equipment and no loss certificate by consignee.  |
|  | 2.31.2 | <b><u>For EXECUTION ITEMS of schedule 'A' &amp; 'B':</u></b><br><b>The payment can be released after the compliance of clause 2.37.</b>   |
|  | A      | 90% of the accepted cost of execution items shall be made on the basis of the measurements recorded.  |
|  | B      | The balance 10% of the accepted cost of execution itemsshallbe paid after the Completion of work AND submission of OEM's Site Installation Certificate (as per Annexure XI of Chapter V) prior to Commissioning for EI, AXLE COUNTERS, AFTCs UFSBI/BPACs, IPS, DATA LOGGER.   |
|  | C      | <b>NOTE:</b> For mixed items where supply & erection cost is taken together under Schedule, 70% of the accepted cost shall be paid on the installation of the item and balance 30% will be paid after completion of the work.   |
|  | 2.31.3 | The balance (10%) payment may be released against Bank Guarantee of an equal amount on the discretion of the competent authority, if commissioning is held up on Railway's account for a period of more than three months after the installation is tested and kept ready for commissioning by the contractor to the full satisfaction of Railways. |
|  | 2.31.4 | <b>The TAXES as per clause 2.37 shall be deducted from the running bills.</b>   |
|  | 2.31.5 | <b><u>PAYMENT THROUGH ECS / EFT.</u></b>  |
|  | A      | Tenderer to give consent in a mandate from for receipt of payment through ECS/EFT.  |
|  | B      | Tenderer to provide the details of Bank A/c in line with RBI guidelines for the same. These details will include Bank Name, Branch Name & address, Account type, Bank A/C No. and Bank & Branch Name & address. Account type, Bank A/c No. And Bank & Branch Code as appearing on MICR cheque issued by bank.                                       |
|  | C      | Tenderer to attach certificate from their bank certifying the correctness of all above mentioned information (as mentioned in Para (ii) above)  |

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|  | 2.31.6 | <b><u>PAYMENT THROUGH LC.</u></b>  |
|  | I      | For all the tenders having advertised cost of Rs. 10 lakh or above, the contractor shall have the option to take payment from Railways through a letter of credit (LC) arrangement.  |
|  | ii     | This option of taking payment through LC arrangement has to be exercised in IREPS( Indian Railway Electronic Procurement System- the e-application on which tenders are called by Railways) by the tenderer at the time of bidding itself, and the tenderer shall affirm having read over and agreed to the terms and conditions of the LC option  |
|  | iii    | The option so exercised, shall be an integral part of the bidder's offer   |
|  | iv     | The above option of taking payment through LC arrangement, once exercised by tenderer at the time of bidding, shall be final and no change shall be permitted, thereafter, during execution of contract.   |
|  | v      | In case tenderer opts for payment through LC, following shall be the procedure to deal release of payment through LC:  |
|  | a)     | The LC shall be a sight LC.  |
|  | b)     | The contractor shall select his Advising/Negotiating bank for LC. The incidental cost towards issue of LC and its operation thereof shall be borne by the contractor   |
|  | c)     | SBI, New Delhi, Main Branch will be the nodal branch for issue of LCs based on online requests received from Railway Accounts Units for tenders opened in financial year 2018-19. SBI branches where the respective Railway Accounts Office has its Account(Local SBI branch) will be the issuance/reimbursing branch for LC issued under this arrangement. The Bank shall remain same for this tender till completion of contract. The incidental cost @ 0.15% per annum of LC value, towards issue of LC and operation thereof shall be borne by the contractor and shall be recovered from his bills. |
|  | d)     | The LC shall be opened initially for duration of 180 to 365 days in consultation with contractor. The LC shall be extended time to time as per the progress of the contract, on the request of the contractor. The value of LC to be opened initially as well as extended thereafter shall be finalized by the engineer in consultation with the contractor on the basis   |

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|  |    | of expected progress of work.  |
|  | e) | The LC terms and conditions shall inter-alia indemnify and save harmless the Railway from and against all losses, claims and demands of every nature and description brought or recovered against the Railways by reason of any act or omission of the contractor, his agents or employees, in relation to the Letter of Credit(LC). All sums payable/borne by Railways on this account shall be considered as reasonable compensation and paid by contractor. |
|  | f) | The LC terms and conditions shall inter-alia provide that Railways will issue a Document of Authorisation after passing the bill for completed work, to enable contractor to claim the authorized amount from their bank.  |
|  | g) | The acceptable, agreed upon document for payments to be released under the LC shall be the Document of Authorisation   |
|  | h) | The Document of Authorisation shall be issued by Railway Accounts Office against each bill passed by Railways.   |
|  | i) | On issuance of Document of Authorisation, a copy of Document of Authorisation shall be posted on IREPS for download by the contractor. A digitally signed copy of Document of Authorisation shall also be sent by Railway Accounts office to Railway's bank (Local SBI Branch).  |
|  | j) | The contractor shall take print out of the Document of Authorisation available on IREPS and present his claim to his bank (advising Bank) for necessary payments as per LC terms and conditions. The claim shall comprise of copy of Document of Authorisation, Bill of Exchange and Bill.   |
|  | k) | The payment against LC shall be subject to verification from Railway's Bank(Local SBI Branch).   |
|  | l) | The contractor's bank (advising bank) shall submit the documents to the Railway's Bank (Local SBI Branch).   |
|  | m) | The railway's bank (issuing bank) shall, after verifying the claim so received w.r.t. the digitally signed Document of Authorisation received from Railway Accounts Office, release the payment to contractor's bank(advising bank) for  |



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|             |    | crediting the same to contractor's account.   |
|             | n) | Any number of bills can be dealt within one LC, provided the sum total of payments to contractor is within the amount for which LC has been opened  |
|             | o) | The LC shall be closed after the release of final payment including PVC amount, if any, to the contractor   |
|             | p) | The release of performance guarantee or security deposit shall be dealt directly by railway with the contractor i.e., not through LC.   |
| <b>2.32</b> |    | <b><u>DEDUCTION FROM ON ACCOUNT PAYMENT BILLS:</u></b>  |
|             | A  | All costs, damages or expenses, which Railways may have paid or incurred, which under the provisions of contract are Contractor's obligations will be deducted by Railways from progress payment Bills/Invoice of Contractor, as and when it is understood that such an expenses has been incurred or paid for. |
|             | B  | All such claims of Railways shall, however, be duly supported by appropriate and certified vouchers, receipts or explanations as are available to enable the Contractor to identify such claims.  |

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| <b>2.33</b> |        | <b><u>CONTRACTOR'S LIABILITIES FOR COSTS AND DAMAGES:</u></b>   |
|             | 2.33.1 | <b><u>WITHHOLDING AND LIEN IN RESPECT OF SUMS CLAIMED As Per GCC clause and latest amendments.</u></b>  |
|             | A      | Whenever any claim or claims for payment of a sum of money arises out of under the contract against the contractor, the Purchaser shall be entitled to withhold and also have lien to retain such sum or sums in whole or in part from the security, if any, deposited by the contractor and for the purpose aforesaid the purchaser shall be entitled to withhold the said cash security deposit or the security, if any, furnished as the case may be and also have lien over the sum pending finalization or adjudication of any such claim. |
|             | B      | In the event of the security being insufficient to cover the claimed amount or amounts or if no security has been taken from the Contractor, the purchaser shall be entitled to   |



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|             |             | withhold and have lien to retain to the extent of such claim amount or amounts referred to spura, from any sum or sums found payable or which at any time thereafter may become payable to the Contractor under the same contract or any other department of the Central Government pending finalization or adjudication of any such claims.   |
|             | C           | It is an agreed term of the contract that sum of money or moneys so withheld or retained under the lien referred to by the purchaser till the claim arising out of or under the contract is determined by the Arbitrator. (If the contract is governed by the Arbitration clause) or by the competent court as the case may be and that the contractor will have no claim for interest of damages whatsoever on any account in respect of such withholding or retention under the lien referred to spura and duly noted as such to the Contractor. |
|             | D           | For the purpose of this clause, where contractor is a partnership firm or a limited company, the purchaser shall be entitled to withhold and also have a lien to retain towards such claimed amount or amounts in whole or in part from any sum found payable to any partner/limited company, as the case may be, whether in his individual company or otherwise.  |
|             | 2.33.2      | <b><u>LIEN IN RESPECT OF OTHER CONTRACTS:- (as per GCC clause and latest amendments.)</u></b>  |
| <b>2.34</b> |             | <b><u>FINAL SETTLEMENT:</u></b>  |
|             |             | Security deposit and Performance bank Guarantee will be released as per clause 2.7 and 2.8 of chapter –II Special Conditions of Contract respectively, after adjustment of any dues payable by the Contractor.   |
| <b>2.35</b> |             | <b><u>COMPLETION CERTIFICATE / PROVISIONAL ACCEPTANCE:</u></b>   |
|             |             | <b><u>As per GCC clause (48) 1,2,3 and latest amendments.</u></b>  |
|             | A)          | <b>The completion certificate shall not be issued until all the pre commissioning check lists has been jointly signed by the representatives of Railways, contractor and OEM.</b>  |
|             | <b>2.36</b> | <b><u>WARRANTY:</u></b>  |
|             | A           | The contractor shall warrant that everything to be furnished here under shall be freefrom all defects and faults in material, workmanship and manufacture and shall bethe highest grade and consistent with the established and generally  |

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|             |   | accepted standards for materials of the type ordered in full conformity with the contract specifications, drawings, or samples, if any and shall if operable, operate properly.  |
|             | B | The Contractor shall, if required, replace or repair the goods or such portion thereof as is rejected by the Railway free of cost at the ultimate destination or at the option of the Railway and contractor shall pay to the Railway value thereof at the contract price and such other expenditure and damages as may arise by reasons of the breach of the condition herein, specified.   |
|             | C | All replacement and repairs that Railway shall call upon the contractor to deliver or perform under this warranty shall be delivered and performed by the contractor promptly and satisfactorily, if the contractor so desires the replaced parts can be taken over by him, or his representative in India for disposal as he deems fit within a period of three months from the date of replacement of goods / parts. At the expiry of this period, no claim whatsoever shall lie on the Railway.   |
|             | D | If the replacement or renewals are of such a character as may affect the efficiency of the system, the purchaser shall have the right to give the contractor within one month from such replacement or renewal notice in writing that test on completion will be carried out at his cost. Should such tests show that the plant sustains the guarantee in the contract; the cost of the tests shall be borne by the purchaser. Should the guarantees not be sustained, the cost of the tests shall be borne by the contractor.   |
|             | E | Until the final certificate shall have been issued, the contractor shall have the right to entry with permission of Railways, at his own risk and representatives, whose names shall have previously been communicated, in writing, to the purchaser at all reasonable working hours upon all necessary parts of the works for the purpose of inspecting the working and the records of the plant and taking notes therefrom and if he desires at his own risk and expense, making any tests, subject to the approval of the purchaser which shall not be unreasonably withheld. |
|             | F | <b>The warranty of the system shall start from the issue of date of completion certificate in full or part as per clause 2.35.</b>   |
|             | G | <b>Generally the warranty shall be of 12 months from the date of issue of completion certificate, however for items like EI and any other items the warranty shall be for the period as defined in the RDSO specifications.</b>  |
| <b>2.37</b> | I | <b><u>TAXES:</u></b>   |

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|             |   | <b><u>As per GCC clause and latest amendments.</u></b>   |
| <b>2.38</b> |   | <b><u>INDEMNITY BOND:</u></b>  |
|             | A | The Contractor will have to furnish an Indemnity Bond for all the value of materials (as per annexure-VI of chapter-V) for the Security of the Railway material issued to him.   |
|             | B | Indemnity Bond will be released after commissioning of work and when all balance material is returned by contractor; i.e. after signing the final material statement for closing the contract. The security of the material brought to the site of work will remain with the Contractor, till commissioning of the complete structure and same is handed over to Railway's nominated representative of Engineer-in-charge. |
| <b>2.39</b> |   | <b><u>VARIATION IN CONTRACT QUANTITIES:</u></b>  |
|             |   | <b><u>As per GCC clause and latest amendments.</u></b>   |
| <b>2.40</b> |   | <b><u>FORCE MAJEURE CLAUSE:</u></b>  |
|             |   | <b><u>As per GCC Clause and latest amendments</u></b>  |
| <b>2.41</b> |   | <b><u>Arbitration and SETTLEMENT OF DISPUTES:</u></b>  |
|             |   | <b><u>As per GCC Clause and latest amendments</u></b>  |

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| <b>2.42</b> |  | <b><u>Refund of Security Deposit:</u></b>                  |
|             |  | <b><u>As Per GCC clause and latest amendments.</u></b>     |
| <b>2.43</b> |  | <b><u>ENGAGEMENT OF QUALIFIED ENGINEER:</u></b>            |
|             |  | <b><u>As Per GCC Clause and latest amendments</u></b>      |
|             |  | <b><u>Deployment of Contractor's Technical staff:-</u></b> |

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|  |  | <ol style="list-style-type: none"> <li>1) The Contractor shall place and keep on the works at all the times efficient and adequate competent staff to give the necessary directions to his workmen and to see that they execute their work in sound &amp; proper manner and shall employ only such supervisors, workmen &amp; labourers in or about the execution of any of these works as are careful and skilled in the various trades.</li> <li>2) The contractor shall employ at least one qualified and competent Graduate Engineer at every worksite when cost of the work to be executed is Rs.2 Cr. or above and at least one Diploma holder Engineer where cost of the work to be executed is more than Rs.25 lakh but less than Rs.2 Cr. For large works numbers of Graduate Diploma Engineers shall be suitably increased to ensure effective supervision of worksites. The number of engineers to be deployed by the contractor will be decided by Railway's 'Engineer' and conveyed to the contractor in writing. His decision will be final and binding on the contractor. In this contract, the contractor shall deploy following nos. of Qualified staff:<br/> <b>a) Graduate Engineers- (1nos)</b><br/> <b>b) Diploma holders- (0 NOS)</b></li> <li>3) For non-deployment of Graduate Engineer and Diploma Engineer a penalty of Rs 40,000pm and Rs 25,000pm or part thereof respectively shall be imposed in addition to the action being taken against contractor for non-deployment as per terms &amp; conditions of the contract.</li> <li>4) The contractor will submit the CV of the Engineers and Supervisors to be deployed at the site 10 the 'Engineer' who (Sr.DSTE/Co/BB) will approve it based on the qualification, experience, past record etc. of the person, prevailing site conditions and the nature of the work to be executed. A certificate will be issued by the Contractor duly signed by him as well as by site Engineer to the effect that the site Engineer shall be deployed on the specific work only and is not deployed on any other site/project. The Contractor shall at once remove from the works any Engineer/supervisor who shall be objected to by the Engineer-in-charge. Fresh approval has to be taken for the contractor's Engineer/Supervisor in case of any change.</li> <li>5) 5. The name of the approved Engineer/s shall be reflected in the site registers/records</li> </ol> |
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| 2.44 |  | <b><u>SUPERVISION &amp; LABOUR:</u></b>               |
|      |  | <b><u>As Per GCC Clause and latest amendments</u></b> |
| 2.45 |  | <b><u>Compliance of Labour Laws:</u></b>              |
|      |  | <b><u>As Per GCC Clause and latest amendments</u></b> |
| 2.46 |  | <b><u>SAFETY OF WORK &amp; TRAINS:</u></b>            |
|      |  | <b><u>As Per GCC Clause and latest amendments</u></b> |

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| 2.47 |  | <b><u>EXCEPTED MATTERS:</u></b>  |
|      |  | All measurements, method of measurement, meaning and intent of specifications and interpretation of special conditions of contract, given and also made by the Railway or by the Engineer on behalf of the Railway shall be final and binding and shall be considered "Excepted Matters" in terms of condition No.63 of the General Conditions of Contract and will Strictly stay outside purview of any arbitrations limit and will not be arbitrable.  |
| 2.48 |  | <b><u>EMERGENCY WORKS:</u></b>   |
|      |  | In the event of any accident or failure occurring in or about the work or arising out of or in connection with the construction, completion or maintenance of the works which in the opinion of the Engineer requires immediate attention, the Railway may bring its own workmen or other agency to execute or partly execute the necessary work or carry out repairs if the Engineer considers that the contractor/s is/are not in a position to do so in time and charge the cost thereof, as to be determined by the Senior Divisional Signal & Telecom Engineer to the contractor. |
| 2.49 |  | <b><u>NIGHT WORK:</u></b>  |
|      |  | <b><u>As Per GCC Clause and latest amendments</u></b>  |
| 2.50 |  | <b><u>POWER SUPPLY:</u></b>  |

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|             | A | Testing of installation / equipments, Battery charging etc. shall be done under supervision of Railway officials or by Railway officials themselves, from the electric supply to be provided by the Railways. However, for any installation activity, like drilling, soldering etc., contractor, if so desires, to use tools / machines, electric power supply (230V) can be arranged by the Railways on usual payment, as per extant procedure as described in annexure-X, chapter-V.   |
|             | B | Non-availability of electricity will not be a reason for the slow progress of work. If power is not available, the contractor shall make his own arrangement for portable Generator set / electrical power.  |
| <b>2.51</b> |   | <b><u>PLYING OF ROAD VEHICLES IN RAILWAY LAND ADJOINING TO RUNNING LINES:</u></b>  |
|             | A | 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. earthwork 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-in-charge for permission giving the type and no. of individual vehicles, names and license particulars of the drivers, location, duration and timings for such work/movement. The engineer-in-charge or his authorized representative will personally counsel examine and certify, the road vehicle drivers, Contractor's flagmen 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: |
|             | B | The road vehicles will ply only between sunrise and sunset.  |
|             | C | Nominated vehicles and drivers will be utilized for work in the presence of at least one flagmen and one supervisor certified for such work.   |
|             | D | The vehicles shall ply 6m clear of track. Any movement/work at less than 6m and up to minimum 3.5m clear of track center shall be done only in the presence of Railway employee authorized by the Engineer-in-charge. No part of the road vehicle will be allowed at less than 3.5m from track center. Cost of such Railway employee shall be borne by the Railway.  |
|             | E | The Contractor shall remain fully responsible for ensuring safety and in case of any accident, shall bear, cost of all damages to his equipment and men and also damages to  |



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|             |   | railway and its passengers.  |
|             | F | The vehicles and equipments of contractors can be drafted by Railway administration in case of accidents / natural calamities involving human lives.   |
|             | G | Engineer-in-charge may impose any other condition necessary for a particular work or site.   |
| <b>2.52</b> |   | <b><u>Use of Railway Land/ Private Land:</u></b>   |
|             | A | Use of Railway land required by the contractor(s) for constructing temporary offices, quarters, hutments, etc. for the staff and for storing materials, etc. will be permitted to him/them free by Railway, if available. The location of these offices, hutments, stores etc., will be subject to the approval of the engineer or his representative. The land will be restored to Railway by the contractor(s) in the same condition as when taken over or in vacant condition as desired by the engineer, after completion of the work or at any earlier day, as specified by the Engineer. The failure to do so will make the contractor(s) liable to pay the cost incurred by the Railway for getting possession of land. Any structure if available can be given on license fees in force at the time of giving the structure for use. |
|             | B | The Contractor will have to make his/their own arrangements for use of private land, outside Railway limits for due fulfillment of contract or for borrow pits, approaches, etc., directly with the land owners or local authority and to pay such rents if any as are payable as may be mutually agreed upon between them.  |
| <b>2.53</b> |   | <b><u>Land, Service Roads, Approaches:</u></b>   |
|             | A | The rates for all items of the schedule shall be inclusive of the cost of all arrangements for crossing obstructions to be crossed in the course of the work over land or across water and the cost of providing and maintenance of approach and/or service roads that may be necessary for bringing and removing the plants, machinery and material to and from the site of work including rent for use and /or compensation for damage if any to intervening private land reversed by such approach/service roads, and including cost of acquisition of land, if required for the purpose. The contractor will be permitted to make use of available service roads of the Railways free of cost. Railway reserves the right to make use of the contractor service road without paying any charges to him.                                  |
|             | B | After completion of the work, the Contractor shall clear all the land under his temporary occupancy to useable condition without any cost to Railway and over to the concerned parties before the completion of Maintenance period.  |



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| <b>2.54</b> |   | <b><u>Rescind of contract</u></b>  |
|             |   | <b><u>As per GCC clause and latest amendments.</u></b>   |
| <b>2.55</b> |   | <b><u>Contractor's Responsibility to arrange Tools, Plants, Machinery etc.:</u></b>  |
|             | A | The contractor shall make his own arrangements for all plant and machinery other facilities equipments, tools, including spare parts, fuel and consumable stores, and all labour and other facilities required to ensure efficient methodical execution of the work. The rates quoted and accepted shall be deemed to be inclusive of all charges of such items. If, however, the plant and machinery/other facilities, equipments, and tools requisitioned by the contractor are not available in Railway's stock or the Railway decides not to supply the same for reasons whatsoever, neither the Railway shall be bound to arrange for the supply thereof nor will the Railway's inability to supply them be accepted as an excuse for delay in the completion of the works/or for any claims thereof. |
|             | B | The contractor(s) shall supply along with his/their offer a list of special tools, plants and equipments required for proper Inspection/maintenance of work. The detailed descriptions/specification of these with full cost of each and the sources of availability thereof shall be indicated along with the offer.  |
|             | C | Either at the contractor/s request or suo-moto in order to prevent possible delay in the execution of the work or due to contractor/s inability to make adequate arrangements for plant or machinery tools and other equipments or due to any other reasons, the Railway may give such plant and machinery, tools and other equipments on hire as can be readily made available and as can be conveniently spared from Railway's Stock on usual hire charges but this is not binding on the railway.   |
|             | D | The decision of the Engineer in regard to hiring of equipment will be final and binding on the Contractor/s and the non-supply of such equipment shall not be entertained as a reason for delay in the execution of works or the cause of any claims.  |
| <b>2.56</b> |   | <b><u>INTERRUPTION OF WORKS DURING MONSOON:</u></b>  |

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|             | A | The contract period may extend over a few monsoon seasons. Normal period of monsoon in the area is from 15th June to 14th October with local variation. The contractor should therefore, plan and program his work bearing this fact in mind. However, the contractor shall not take a plea for not adhering to the programme of work and completion period due to the seasonal variations or any interruptions due to monsoon etc. |
| <b>2.57</b> |   | <b><u>GENERAL:</u></b>  |
|             | A | All the consumables and sundry installation materials required for execution of this work like Nut and Bolts, Welding Rods, Sleeves, Lugs etc., and not listed as per the detailed schedule will have to be brought by the contractor at his own cost.  |
|             | B | Cement & Steel for use in the works should be procured by the Contractor at their own cost from the main producers / their authorized dealers / authorized stock yards which should confirm to IS specification.  |
|             | C | The contractor shall do no work that may interfere with train traffic until adequate protection has been arranged as per the instruction of the Site in charge.   |
|             | D | All the tools & Measuring Instruments, required for installation & Testing will have to be brought by the contractor at his own cost.   |
|             | E | The Railway Officers / staff will be associated with the Testing & commissioning of the work. Contractor should make adequate arrangement for the inspection of concerned work site for Railway officer.  |
|             |   | <b>For Senior Divisional Signal &amp; Telecom Engineer,</b><br><b>Central Railway, Mumbai-400001.</b><br><b>For and on behalf of the President of India</b>   |

# CHAPTER-III

## TECHNICAL

### SPECIFICATIONS&

### REQUIREMENTSFO

### R SUPPLY ITEMS

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| 3.1 | 3.1.1 | <b><u>General Requirements for circuit designing:</u></b>   |
|     | A     | The circuit shall be designed as per the approved Signalling plan, Route section plan, Selection table and Locking table.   |
|     | B     | The contractor shall also submit one copy of the square sheet. All the aspects covered in GR, SEM of Indian Railways shall be taken care off while designing the circuit. Contractor shall ask from the Railways about the design practice to be followed (i.e. Siemens practice or British practice). <b>Whether EI or Relay Interlocking, the circuit shall be designed as per the practice of Route setting type interlocking.</b> |
|     | C     | While designing the circuit it shall be kept in mind until and otherwise advised by the Railways engineer in charge, one front contact of each and every relay shall be kept spare for data logger purposes.  |

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|  | D       | The circuit shall be designed for metal to metal relays with the contact numbering following SIEMENS pattern. For EI system the circuit shall be designed considering the interfacing relays in mind.  |
|  | 3.1.2   | <b><u>Technical Specifications for Circuit Designing:</u></b>  |
|  | 3.1.2.1 | <b>Interlocking and circuit Requirements</b>   |
|  |         | The requirements given in IRS: S36-87, Signal Engineering Manual (of Indian Railway) for Route-setting type Relay interlocking with IDF shall be complied. Any other design practice followed by Central Railway as per Headquarter policy circular should also be incorporated. In addition, the following requirements shall also be met.  |
|  | 3.1.2.2 | <b>General Circuit requirements</b>  |
|  | A       | The internal circuits shall be suitably protected and electrically isolated from external circuits.  |
|  | B       | Signal circuits shall be so designed as to prevent display of signal aspect less restrictive than intended and also prevent setting up of unsafe conditions when signaling supply voltage or frequency fluctuates or the supply is restored following a failure of normal supply.  |
|  | C       | Cross-over between tracks and diamond crossings shall be provided with protection that will eliminate the possibility of a train, engine or wagon occupying the cross-over or diamond and signal on either track displaying other than the most restrictive indication.  |
|  | D       | Relays controlling double yellow and green aspects of signals shall have arrangements of cutting in relays similar to track repeater relay, where such relays are fed from outside locations.  |
|  | E       | With reference to Para 4.3.1 of IRS S-36-87, sectional route release facility shall be provided.   |
|  | F       | With reference to Para 4.3.6 of IRS:S-36-87, Emergency full route / sub-route cancellation in case of track circuit failures with sealing facility and emergency operation for throwing signal to danger, shall be provided along with non-re-settable counters for recording the operation. It shall be ensured that the counter shall record the operation, just before the operation is affected. Emergency sub-route cancellation facility as referred in Para 4.3.6 of IRS: S-36-87 shall be provided. Also facility for Emergency operation of points (under track relay down condition) shall be provided which shall be counted. |

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|  | G       | The circuit shall be so made that the vital operation of throwing back the cleared signal to the least restrictive aspect shall be possible and the circuits shall be so prepared to effect the operation, even if its original supply fuse is blown off.   |
|  | H       | The lamp lighting circuit for all lamps including shunt signals shall be on double cutting principle.   |
|  | I       | Care should be taken during design of circuits and installation, so as to contain repercussion of any failure to the minimum possible gears and equipments. The contractor shall be bound to amend his design, if the Railways suggest another design for achieving the above.                                  |
|  | J       | Initiation and cancellation circuits should be drawn as per geographical layout of the yard.  |
|  | 3.1.2.3 | <b>Route setting and interlocking circuit:</b>  |
|  | A       | Setting of conflicting routes shall not be permitted.   |
|  | B       | Necessary back locking of the intended route shall become effective, when all concerned points have taken up their final position and route is set and approach track has been occupied and the signal is cleared or the 'Calling on' is lit.   |
|  | C       | Approach and time locking shall be provided for all controlled signals. Approach and time locking shall be continuously effective from the pre-determined point in rear of the signal concerned. Dead approach locking should be provided where no suitable track circuits are available in rear of the signal. |
|  | D       | Time release for approach locking / dead approach locking shall be provided so that 2 minutes shall elapse after the signal has been put to 'ON' position, before the route can be released.  |
|  | E       | The overlaps shall set only when the last sub-route leading towards the overlap is set.   |
|  | 3.1.2.4 | <b>Route Release circuits:</b>  |
|  | A       | Route release circuit shall be designed on the principle of automatic route release by the passage of the train as provided in (Para 4.3.1 of IRS: S-36-87).  |
|  | B       | Circuits which release routes for interlocking shall be controlled by slow operating relays, so that any inadvertent operation of track circuit due to a surge or other factors will not result in the release of the routes or the interlocking.   |
|  | C       | All circuits shall be designed in such a way, that the relays picked up for clearing any signal are proved to have de-energized or normalized before the route or route section restored to normal. Also it shall not be possible to re-clear the   |

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|  |                | route, if the entire route or part of the route set is not released.   |
|  | D              | It shall be possible to release a route in emergency after suitable time delay, with the approach track occupied, provided the train has not passed the signal during the time interval. The operation of the time relay shall commence upon the operator restoring the signal or calling on signal to 'ON'. The emergency releases must be provided with electric counter.  |
|  | E              | It should be possible to release an entire route, including overlap portion, in emergency when all controlling track circuits (except berthing track circuit) are clear. This emergency operation should be counted in an electric counter.  |
|  | F              | It should be possible to release a complete route or individual sub-routes with controlling track circuits energized / de-energized with a separate emergency button which should be kept sealed. Such emergency operations will be counted on a separate electric counter.  |
|  | G              | The delay time as mentioned in Para 3.10.5.1 of IRS Specification no.S-36-87 shall be between 60 to 120 secs. Facility shall be provided to set the delay time in between 60 to 120 seconds.   |
|  | H              | It shall not be possible to cancel any set route or cancel any portions of the route by any button other than the signal button used to clear the route initially and by the emergency full route cancellation button.   |
|  | I              | Overlap points shall be released only after the lapse of two minutes of occupation and clearance of the last point track circuit on the route. On cancellation, the overlap points may be released simultaneously along with the main route.   |
|  | <b>3.1.2.5</b> | <b>Signal Control Circuits:</b>  |
|  | A              | Signal control circuits should be so designed that after train passes a signal, the signal will resume 'ON' aspect and it will not clear again unless the conditions for clearing the signal are available.  |
|  | B              | Signal should not get clear unless — <ul style="list-style-type: none"> <li>i) All points in the route isolation and overlap are correctly set and locked.</li> <li>ii) Concerned route is set and locked.</li> <li>iii) All tracks are clear not only up to the next signal ahead but also 120 mtr. beyond the next stop signal.</li> <li>iv) All concerned level crossing gates in the path and in the overlap are closed against the Road traffic.</li> <li>v) All other conditions of taking off signal as specified in</li> </ul> |



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|  |   | GR & SR are fulfilled.   |
|  |   | In Junction Route Indicators the Yellow aspect of the signal applicable to the diverging route must be displayed only after proving that at least 3 out of 5 junction indicator bulbs/ route LED lamps are lit. The signal shall be maintained at, or returned to 'ON' aspect in case 3 or more lamps / route LED lamps are not lit.   |
|  | C | <p><b>Calling on Signal</b></p> <p>Calling on signal shall be capable of being taken 'OFF' only when the main signal cannot be taken 'OFF' due to track relay not picking up due to any reason and the train has come to a stop and has been waiting for a pre-determined time of 2 minutes. The 'Calling on' signal shall comply with all conditions governing the clearing of a main signal, except the following:—</p> <p>Calling on signal should be capable of being taken 'OFF' without setting of points in the overlap.</p> <ol style="list-style-type: none"> <li>Every operation to take 'OFF' the 'Calling on' signal shall be counted by an electric counter on the panel.</li> <li>'Calling on' signal shall be restored to 'ON' automatically when the track circuit immediately in rear of the stop signal below which the 'Calling on' signal is placed is cleared by the train or all sub-routes over which the 'Calling on' reads have been released after the passage of the train. It shall not assume the 'OFF' aspect again unless the process of clearing it is repeated.</li> <li>Calling on signal shall display miniature Yellow light for the 'OFF' aspect and shall show no light for 'ON' aspect.</li> <li>The calling-on signals shall use the LED signal lamp as per latest RDSO specification RDSO/SPN/153/2011 (Rev.4.1) or latest with latest amendments.</li> </ol> |
|  | D | <p><b>Shunt Permitted Indicator (SPI)</b></p> <p>Shunt Permitted Indicators are used to facilitate un-interrupted shunting over a fixed route. It shall display no light both by day and night in each direction when shunting is prohibited. It shall exhibit an illuminated Yellow diagonal cross both by day and night in both directions when shunting is permitted.</p> <p><b>NOTE:</b> In spite of what is contained in these specifications, if the Railway's desire any thing in deviation to this, the same shall be conveyed to the contractor in writing and it shall be binding on the contractor to implement the same.</p>   |
|  | E | <b>Main Signal Lighting:</b>   |



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|  |         | (I) Main Signal light supply shall be alternating current at 110 Volts 50 Hz. LED Signal Lamps as per RDSO specification RDSO/SPN/153/2011 (rev 4.1) (with latest amendments) shall be used for 'OFF' & 'ON' aspects respectively.  |
|  |         | (II) The circuits shall be so designed that —<br>i) The failure of a lamp of a colour light signal shall always cause the signal to display a more restrictive aspect than intended. (Cascading).<br>ii) In the event of a lamp of the Red aspect of the signal failing, the signal next in rear shall display a Red aspect. (Red lamp protection).   |
|  | F       | All other requirements as per the manual of instructions for installation of S&T equipment on 25 KV 50 C/s electrified sections should be followed.   |
|  | 3.1.2.6 | <b>Point Interlocking, Control circuits and Interlocking of Emergency Point Crank Handle.</b>   |
|  | A       | Individual operation of points shall be possible only when the interlocking is free and relevant point track circuit/circuits are clear.<br><br>Individual operation of points shall also be possible when the interlocking is free and relevant point track circuit/circuits are de-energized. Such emergency operation of a point should be counted in an electric counter. This emergency point operation button should be provided with sealing facility. |
|  | B       | Cross - over's will be operated by separate point machines, one at each end. The detection of setting and locking of the points at the two ends shall be connected in series, after the operation circuit is cut-off. The initiation of points should be staggered to avoid excessive drain on the power equipment.   |
|  | C       | Point circuitry shall ensure that once a point movement is initiated, it must be completed even if the controlling track circuit / circuits fail in the mean time.  |
|  | D       | While changing a point control relay or unit, if the points in the field and the control relay or unit in the relay room are not in correspondence, no operation of point should occur. To bring the point to the corresponding position, the operator shall have to operate the respective push button as in the case of individual operation of points.   |
|  | E       | The NX key for the point / points should be released from the control panel. The key lock relay to be used for this purpose, shall be located in the cabin ASM's office / in the field.   |

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|            | 3.1.2.7  | <b>Interlocking of Crank Handles:</b>   |
|            |          | The grouping of crank handles for point operation is as detailed in the Signaling plan. There shall be two common controlling buttons for each group for releasing control / taking back control.   |
|            | 3.1.2.8  | <b>Cross Protection:</b>  |
|            |          | For all external circuits, cross protection with double cutting shall be provided to prevent unsafe operation due to a cross, break or both.  |
| <b>3.2</b> |          | <b><u>Specifications and Requirements for the supply of EI:</u></b>   |
|            |          | The EI system shall be supplied as per the RDSO specifications numbered <b>RDSO/SPN/192/2005 VER.1</b> OR LATEST WITH ANY AMMENDMENT for smaller yards and RDSO/SPN/203/2011 VER.01 FOR BIGGER YARDS. The system shall be supplied with the following minimum requirements. |
|            | <b>A</b> | <b><u>ARCHITECTURE</u></b>  |
|            | I        | The system shall be a microprocessor-based system with the configurations of redundancy as approved by the RDSO.  |
|            | II       | The system shall be supplied <b>with 100% HOT STANDBY</b> at all level.   |
|            | III      | The system shall be supplied with OBJECT CONTROLLERS OR AS SPECIFIED IN THE TENDER as per the tentatively approved SIP.   |
|            | IV       | The interlocking logic shall be implemented at the centralized unit only. Object Controllers shall have no interlocking unit.   |
|            | V        | The system shall be capable of working with the CCIP and /or with DUAL VDU.   |
|            | VI       | It shall be possible to synchronize the RTC of EI system with external sources like Data Logger, STM equipments or any other source of clock.   |
|            | VII      | It should have space to expand in I/O cards as per RDSO specifications.   |
|            | <b>B</b> | <b><u>OBJECT CONTROLLERS</u></b>  |
|            | I        | The Object Controllers (O.C.) shall be without interlocking logic.  |
|            | II       | All the inputs and outputs of an O.C. shall be fully isolated.  |
|            | III      | The O.C. shall be kept at strategic locations as decided by the Railways to meet its requirements.  |

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|  | IV       | The O.C. shall drive the output and input functions either directly or through interface relays.  |
|  | V        | The O.C. shall drive the field gears and take the feedback from gears without any modifications / change.   |
|  | VI       | Each O.C. shall be fully independent from the other O.C.  |
|  | VII      | In case of any error or unsafe failure the O.C. shall withdraw all the output commands and remove the source supply to outputs.   |
|  | VIII     | The O.C. shall communicate with the Central Interlocking Units on OFC with redundant ports (i.e. ring basis).   |
|  | IX       | The (24+24) Fibre FDMS system shall be supplied as a part of EI system as per RDSO specifications no. RDSO/SPN/TC/37/2000 (Ver.3) Amendment.1 or latest with latest amendments.   |
|  | <b>C</b> | <b><u>CONTROL TERMINALS WITH DUAL VDU</u></b>   |
|  |          | Following minimum requirements shall be fulfilled by the Maintenance and control Terminals.   |
|  | I        | Embedded Industrial grade fanless PC system, with latest PC configuration and configured in HOT STANDBY (1+1) configuration shall be provided and suitable Compact Flash Disc memory space shall be catered for the backup requirements.                                  |
|  | II       | Shall have Ethernet/OFC communication with the CIU either on copper cable or OFC, with suitable isolators.  |
|  | III      | It shall have key board/mouse operation.  |
|  | IV       | It shall be possible to disable the menus in case of emergency.   |
|  | V        | It shall synchronize the counters/clocks all the time and particularly when resuming from a failure.  |
|  | VI       | Shall support buzzers/alarms as in CCIP.  |
|  | VII      | The monitor shall be of high resolution (minimum 1920 x 1080), the minimum size of monitor shall be 42 inches minimum.  |
|  | VIII     | A flashing indication shall be provided on the VDU to indicate healthy condition of the main system, communication channel.   |
|  | IX       | The current position/ status of various field equipments and track circuits shall be displayed on the VDU using different colors/ symbols.  |
|  | X        | Three dot markers in Red, Blue & Green colours respectively shall also be displayed prominently at conspicuous location on the VDU terminal to indicate that the colour monitor is healthy and all the three colours (Red, Blue & Green) are present in right proportion. |
|  | XI       | The control terminal shall work with 230V $\pm$ 10%, 50Hz AC  |

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|  |          | power supply, for which an UPS of adequate capacity shall be supplied along with the system.  |
|  | XII      | If VDU and CIU are in separate building (which is generally the case), then they shall be interfaced using FOM (Fiber Optic Modem) to protect against lightning and surges. Railway shall allow only underground OFC for its use if the CIU and VDU are in different rooms. Patch-cords shall be allowed only in case where both are in the same room.  |
|  | XIII     | Operation of signal gear shall not be possible simultaneously through both VDUs. In case of VDU's used in Hot standby, VDU switch over is required in the following conditions:<br>a) VDU to EI communication failure.<br>b) VDU computer failure.<br>c) VDU monitors failure.<br>d) One VDU is not controllable due to mouse failure.  |
|  | XIV      | To circumvent any unauthorized operation inadvertently, <b>logic equivalent to Stop collar function of Panel system</b> to be incorporated through software.  |
|  | <b>D</b> | <b><u>POWER SUPPLY REQUIREMENTS</u></b>   |
|  | I        | The power supply requirements are as defined below.   |
|  | II       | The system shall be capable to work in 25 KV AC environments.   |
|  | III      | Railway shall provide 230/110 Volt, AC/DC.  |
|  | IV       | The requirements of Earthing and lightening and surge protections shall be provided by the tenderer as per the RDSO specification no. RDSO/SPN/197/2008 or as latest defined by the RDSO.   |
|  | <b>E</b> | <b><u>WARRANTY (to be read alongwith clause 2.36 of chapter-II)</u></b>   |
|  | I        | The EI system including its equipment and subsystems shall be under warranty for the period as per RDSO specifications from the date of commissioning of complete system.   |
|  | II       | During the Warranty period the contractor should make availability of serviceengineers of RDSO approved manufacturer of EI and spares at mutually agreedlocations to achieve system availability. Themaintenance engineer of the contractor will visit all the stations at least twice ina month for ensuring implementation of maintenance plan and attend to anyfault on the systems. <b>No separate charges shall be paid for visit ofengineers for attending to faults and repairs or towards</b> |

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|            |          | <b>the supply of spare parts.</b>  |
|            | III      | During the Warranty period, the system with standby must be maintained in such a manner that both the systems shall be available normally. In case of failure of one system, urgent & immediate action shall be taken to rectify that fault within 24 hours. In case there is complete breakdown of interlocking provided at a station, the contractor must arrange for rectification of the same within 3 hours, failing which a penalty will be imposed. The contractor must keep adequate spares as well as skilled manpower so that defects if any are rectified promptly. |
|            | <b>F</b> | <b><u>INFORMATION TO BE FURNISHED BY THE RAILWAY</u></b>   |
|            | I        | The information to be furnished by the Railways is as  |
|            | II       | Tentative SIP is enclosed with the tender.   |
|            | III      | VDU shall be DUAL VDU of requirements as defined in 3.2-C above.   |
|            | IV       | Datalogger is a separate item in the schedule.   |
|            | V        | The system shall be supplied with the O.Cs.  |
|            | VI       | Signal Lamp lighting circuits shall use 110 Volts AC supply to light the LED units.  |
|            | VII      | Size of VDU is as defined in 3.2-C above.  |
|            | VIII     | The point operation shall be on 110 Volt DC. Point circuit shall be implemented with QL1 relays and QBCA relays.   |
|            | IX       | All the cables connecting to the outdoor gears shall be either 1.5 sq mm copper signaling cables or quad cables as approved for the Railways.  |
| <b>3.3</b> |          | <b><u>Relays:</u></b>  |
|            |          | In addition to the requirements of <b>IRS S-36-87</b> , the following requirements shall also be met.  |
|            | A        | The circuits should be developed using signal groups suitable for LED signal lamps, point groups, route groups, and shunt groups etc. which are already approved and are in use on the Railways.   |
|            | B        | The circuitry should take care detecting of the contingency of the contact welding.  |
|            | C        | D.C. relays used in signal cabin, when controlled from an outside source, shall be wired on double cutting principle coupled with cross protection. Similarly, D.C. relays located in the field shall be wired on double cutting principle coupled with  |

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|            |   | cross protection.  |
|            | D | A.C. immunized relays shall be used for controlling outside functions.   |
|            | E | Relay shall be furnished with contact arrangements as approved by the Railway.   |
|            | F | In case of A.C. Electrified areas, the Relays shall be in conformity with R.E. Manual.   |
|            | G | The relays or relay groups shall be repeated suitable illuminated indicators the proper functioning or otherwise of each unit which it controls. This facility will be useful to the maintainer at a glance in the relay room to have a clear picture of the functioning of each unit at any stage. Such indications shall also include indications for failure or functions which are incomplete. |
|            | H | Where feasible all relays except track relays, shall have 10% of working contacts as spare subject to a minimum of one front and one back to facilitate addition and alteration to the circuits at a later date. Extra space to accommodate repeater relays shall be provided in the relay rack to cater for future expansion.   |
|            | I | THE BASE PLATES FOR ALL THE RELAYS AND GROUPS SHOULD ALSO BE PURCHASED FROM THE OEM OF RELAY/GROUP.  |
| <b>3.4</b> |   | <b><u>BLOCK INSTRUMENTS/ UFSBI:</u></b>  |
|            | A | The system shall be supplied as per the latest RDSO specifications for Block Instruments.  |
|            | B | For Single Line the specifications are IRS S 98-2001.  |
|            | C | For Double Line the specifications are IRS S 22-2016 ver 1.0.  |
|            | D | For Single/Double Line UFSBI with Mux the specifications are IRS S 105/2012 or RDSO/SPN/175/2005 as defined in the schedule of material.   |
|            | E | For UFSBI Multiplexer independently the specifications shall be IRS S 104/2012 or latest with latest amendments.   |
|            | F | The block Instruments or block panel as may be the case shall be supplied in pairs (complete sets).  |
|            | G | The system shall be supplied with all its sub modules/cards including of power supply. Railway shall provide only one power supply preferable 24 volt.   |
|            | H | The system shall be supplied complete with all types of relays fitted with in the instrument or separately but duly inspected by RDSO.   |



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| <b>3.5</b> |    | <b><u>Specifications for Control cum Indication Panel:</u></b>  |
|            | A  | The Control-cum-indication panel shall broadly comply with the requirements of IRS: S 36-87, chapter XXI of Signal Engineering Manual (of Indian Railway) and Central Railway practices (if any) as approved by Engineer –In-Charge. It is preferred that the control panel should be slanting convenient for the operator's view. Domino size shall be either 54mm x 34mm or 40mm x 40mm. Panel should be route setting type and as per approved panel diagram issued from the Railways. |
|            | B  | The control-cum-indication panel shall be of 40x15 interchangeable dominos but if the requirement demand more the corresponding size shall be supplied by the contractor. Accordingly the variation shall be paid to the contractor. However for the L.C gates the size of the panel shall be 15x10. The L.C gate panel shall preferably of wall mounted type with wago type terminals (two in two out) in place of tag block.  |
|            | C  | The panel should show the quality workmanship and treatments like anti-rust coating, powder coating etc. to give it decent look and robust for usage for long life [i.e to withstand continuous use and heat (due to indication LEDs etc.)].  |
|            | D  | The functions should be so placed to be convenient for operation. The Control- cum-indication panel shall be easily accessible for operation. The inside wiring etc. should be such that it is easily accessible for maintenance staff.   |
|            | E  | Before supply of the Control cum indication panel, contractor should ensure that it has been jointly tested by contractor, supplier and nominated representative of Railway. A joint test certificate should be prepared and submitted to Engineer-In charge.   |
|            | F  | The LEDs used of panel indication shall work on 24V DC. All the metallic parts inside the panel shall be provided with the insulating sleeves so that wires should not be in direct contact with the metallic parts.  |
|            | G  | Control-cum-indication panel shall also comply with the following requirements:   |
|            | I  | The surface of the illuminated diagram and console shall be built with anti-corrosive and anti - rust materials and it should be so treated as to be possible to clean without deterioration.   |
|            | II | In case of incoming slots from adjoining station / L.C. gate, a <b>White Light</b> shall be displayed to indicate that the slot is released by the adjacent station / L.C. gate.  |



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|            | III | In case of outgoing slots from the control panel to adjacent station / L.C. gate — a white steady light shall be displayed when slot is not given to the adjacent cabin / G.F. / L.C. gate. When the given slot is not accepted the white light steady indication shall start flashing. When the given slot is accepted by the adjacent station / L.C., a <b>Red Light</b> will start flashing. |
|            | IV  | The flasher's indication shall be repeated on the panel.  |
|            | V   | The number of the L.C. Gate shall be <b>engraved</b> on the panels conspicuously.   |
|            | VI  | Panel tag block analysis and tool kit for panel containing two bulb extractors, two magnets etc. shall also be supplied along with the panel. Two sets of tool kits for panel shall be supplied.  |
| <b>3.6</b> |     | <b><u>Specifications for Time Element Relays:</u></b> The timer relays may be of two types.   |
|            | A   | Q series based time element relays working on 24 V DC as per RDSO specifications for relay.   |
|            | B   | Motor type time element relays. These motor type relays should work on 110 V AC supply. Relay should have at least one NO and one NC contact. The relays should have features for setting the time from 0-240 seconds. The setting of time should be possible only after breaking the sealing arrangement of relays.  |
| <b>3.7</b> |     | <b><u>Specifications and Requirements for Relay/CT Racks:</u></b> The racks shall be supplied as per the drawings mentioned in annexure-X. In addition to the drawing parameters following shall also be complied.  |
|            | A   | Until and unless it is specifically mentioned, all the racks shall be supplied with IDF arrangements.   |
|            | B   | IF THE CONTRCATOR WISH TO SUPPLY RELAYS OF Ms INTEGRA MAKE THEN HE SHALL SUPPLY ADDITIONAL QUANTITY OF RELAY RACKS (1.2 TIMES QUANTITY IN THE SCHEDULE) <b>AT HIS OWN COST</b> AS THESE RELAYS REQUIRE MORE SPACE.  |
|            | C   | The Scaffolding should include 20% extra (with minimum 2 Relay Rack positions).   |
|            | D   | The G type fuse base and links in the fuse strips shall be of any of the following make <b>MALNAD or RAPID or SYSTEM ENGINEERING WORKS.</b>   |
|            | E   | The value and ratings of resistances and capacitors shall be advised at the time of installation. The capacitors shall be <b>RESCON make Long Life grade.</b>   |

|      | F             | All the cables shall be guided on proper ladders. All these ladders shall be supplied by the contractor.   |  |                            |  |  |                            |  |                |   |   |    |     |     |     |    |   |    |     |     |     |      |    |   |    |     |     |     |      |    |  |    |     |     |     |      |    |   |    |     |     |     |      |    |  |  |     |     |     |      |    |
|------|---------------|--|--|----------------------------|--|--|----------------------------|--|----------------|---|---|----|-----|-----|-----|----|---|----|-----|-----|-----|------|----|---|----|-----|-----|-----|------|----|--|----|-----|-----|-----|------|----|---|----|-----|-----|-----|------|----|--|--|-----|-----|-----|------|----|
|      | G             | The cable supporting L-angles on the back side of the Relay Racks shall be of sufficient length (minimum 250 mm) to cover all the cables.  |  |                            |  |  |                            |  |                |   |   |    |     |     |     |    |   |    |     |     |     |      |    |   |    |     |     |     |      |    |  |    |     |     |     |      |    |   |    |     |     |     |      |    |  |  |     |     |     |      |    |
|      | H             | For all the relay racks each row shall be supplied with one string rod (properly insulated by sleeves) for the cable dressings.  |  |                            |  |  |                            |  |                |   |   |    |     |     |     |    |   |    |     |     |     |      |    |   |    |     |     |     |      |    |  |    |     |     |     |      |    |   |    |     |     |     |      |    |  |  |     |     |     |      |    |
|      | I             | All the guide plates for major groups shall be supplied by the contractor.   |  |                            |  |  |                            |  |                |   |   |    |     |     |     |    |   |    |     |     |     |      |    |   |    |     |     |     |      |    |  |    |     |     |     |      |    |   |    |     |     |     |      |    |  |  |     |     |     |      |    |
|      | J             | The CT Racks shall also be supplied with proper size string rods to support cables at the back side.   |  |                            |  |  |                            |  |                |   |   |    |     |     |     |    |   |    |     |     |     |      |    |   |    |     |     |     |      |    |  |    |     |     |     |      |    |   |    |     |     |     |      |    |  |  |     |     |     |      |    |
| 3.8  |               | <b><u>Specifications and Requirements for Tag Blocks:</u></b>  |  |                            |  |  |                            |  |                |   |   |    |     |     |     |    |   |    |     |     |     |      |    |   |    |     |     |     |      |    |  |    |     |     |     |      |    |   |    |     |     |     |      |    |  |  |     |     |     |      |    |
|      |               | All types of tag blocks shall be provided as per the RDSO specifications no. IRS(S)-77/2006 (Rev.1) and drawing no. SA-24751 & 52.   |  |                            |  |  |                            |  |                |   |   |    |     |     |     |    |   |    |     |     |     |      |    |   |    |     |     |     |      |    |  |    |     |     |     |      |    |   |    |     |     |     |      |    |  |  |     |     |     |      |    |
| 3.9  |               | <b><u>Specifications and Requirements for Indoor Cables:</u></b>   |  |                            |  |  |                            |  |                |   |   |    |     |     |     |    |   |    |     |     |     |      |    |   |    |     |     |     |      |    |  |    |     |     |     |      |    |   |    |     |     |     |      |    |  |  |     |     |     |      |    |
|      |               | All types of Indoor cables shall be supplied as per the specifications IRS (S) 76/89 (Amendment 3) or latest with latest amendments.   |  |                            |  |  |                            |  |                |   |   |    |     |     |     |    |   |    |     |     |     |      |    |   |    |     |     |     |      |    |  |    |     |     |     |      |    |   |    |     |     |     |      |    |  |  |     |     |     |      |    |
| 3.10 |               | <b><u>Specifications and Requirements for Power Wire of Copper (multi-strand):</u></b>   |  |                            |  |  |                            |  |                |   |   |    |     |     |     |    |   |    |     |     |     |      |    |   |    |     |     |     |      |    |  |    |     |     |     |      |    |   |    |     |     |     |      |    |  |  |     |     |     |      |    |
|      |               | All the power wires shall be supplied as per IS specification no. IS 2465/1984 & IS 694/1990 with test parameters as per IRS (S) 76/89.  |  |                            |  |  |                            |  |                |   |   |    |     |     |     |    |   |    |     |     |     |      |    |   |    |     |     |     |      |    |  |    |     |     |     |      |    |   |    |     |     |     |      |    |  |  |     |     |     |      |    |
|      |               | <table><tr><th>Sr</th><th>Area in Sq mm</th><th>Total no. of conductors</th><th>Dia of each conductor in mm (+/_ 0.01)</th><th>Insulation thickness in mm</th><th>Nominal conductor resistance in Ohm/Km</th><th>Current rating</th></tr><tr><td>1</td><td>6</td><td>85</td><td>0.3</td><td>0.8</td><td>3.3</td><td>35</td></tr><tr><td>2</td><td>10</td><td>141</td><td>0.3</td><td>0.8</td><td>1.91</td><td>45</td></tr><tr><td>3</td><td>16</td><td>226</td><td>0.3</td><td>1.0</td><td>1.21</td><td>62</td></tr><tr><td></td><td>16</td><td>126</td><td>0.4</td><td>1.0</td><td>1.21</td><td>62</td></tr><tr><td>4</td><td>25</td><td>354</td><td>0.3</td><td>1.2</td><td>0.78</td><td>80</td></tr><tr><td></td><td></td><td>196</td><td>0.4</td><td>1.2</td><td>0.78</td><td>80</td></tr></table> | Sr                                     | Area in Sq mm              | Total no. of conductors                | Dia of each conductor in mm (+/_ 0.01) | Insulation thickness in mm | Nominal conductor resistance in Ohm/Km | Current rating | 1 | 6 | 85 | 0.3 | 0.8 | 3.3 | 35 | 2 | 10 | 141 | 0.3 | 0.8 | 1.91 | 45 | 3 | 16 | 226 | 0.3 | 1.0 | 1.21 | 62 |  | 16 | 126 | 0.4 | 1.0 | 1.21 | 62 | 4 | 25 | 354 | 0.3 | 1.2 | 0.78 | 80 |  |  | 196 | 0.4 | 1.2 | 0.78 | 80 |
| Sr   | Area in Sq mm | Total no. of conductors  | Dia of each conductor in mm (+/_ 0.01) | Insulation thickness in mm | Nominal conductor resistance in Ohm/Km | Current rating                         |                            |  |                |   |   |    |     |     |     |    |   |    |     |     |     |      |    |   |    |     |     |     |      |    |  |    |     |     |     |      |    |   |    |     |     |     |      |    |  |  |     |     |     |      |    |
| 1    | 6             | 85   | 0.3                                    | 0.8                        | 3.3                                    | 35                                     |                            |  |                |   |   |    |     |     |     |    |   |    |     |     |     |      |    |   |    |     |     |     |      |    |  |    |     |     |     |      |    |   |    |     |     |     |      |    |  |  |     |     |     |      |    |
| 2    | 10            | 141  | 0.3                                    | 0.8                        | 1.91                                   | 45                                     |                            |  |                |   |   |    |     |     |     |    |   |    |     |     |     |      |    |   |    |     |     |     |      |    |  |    |     |     |     |      |    |   |    |     |     |     |      |    |  |  |     |     |     |      |    |
| 3    | 16            | 226  | 0.3                                    | 1.0                        | 1.21                                   | 62                                     |                            |  |                |   |   |    |     |     |     |    |   |    |     |     |     |      |    |   |    |     |     |     |      |    |  |    |     |     |     |      |    |   |    |     |     |     |      |    |  |  |     |     |     |      |    |
|      | 16            | 126  | 0.4                                    | 1.0                        | 1.21                                   | 62                                     |                            |  |                |   |   |    |     |     |     |    |   |    |     |     |     |      |    |   |    |     |     |     |      |    |  |    |     |     |     |      |    |   |    |     |     |     |      |    |  |  |     |     |     |      |    |
| 4    | 25            | 354  | 0.3                                    | 1.2                        | 0.78                                   | 80                                     |                            |  |                |   |   |    |     |     |     |    |   |    |     |     |     |      |    |   |    |     |     |     |      |    |  |    |     |     |     |      |    |   |    |     |     |     |      |    |  |  |     |     |     |      |    |
|      |               | 196  | 0.4                                    | 1.2                        | 0.78                                   | 80                                     |                            |  |                |   |   |    |     |     |     |    |   |    |     |     |     |      |    |   |    |     |     |     |      |    |  |    |     |     |     |      |    |   |    |     |     |     |      |    |  |  |     |     |     |      |    |

|      |    |   |     |     |       |     |     |       |     |  |  |     |     |     |       |     |
|------|----|---|-----|-----|-------|-----|-----|-------|-----|--|--|-----|-----|-----|-------|-----|
|      |    | <table><tr><td>5</td><td>35</td><td>495</td><td>0.3</td><td>1.2</td><td>0.554</td><td>102</td></tr><tr><td></td><td></td><td>276</td><td>0.4</td><td>1.2</td><td>0.554</td><td>102</td></tr></table>  | 5   | 35  | 495   | 0.3 | 1.2 | 0.554 | 102 |  |  | 276 | 0.4 | 1.2 | 0.554 | 102 |
| 5    | 35 | 495   | 0.3 | 1.2 | 0.554 | 102 |     |       |     |  |  |     |     |     |       |     |
|      |    | 276   | 0.4 | 1.2 | 0.554 | 102 |     |       |     |  |  |     |     |     |       |     |
| 3.11 |    | <p><b><u>Specifications and technical requirements for LT power panel:</u></b>In addition the drawings issued by the Officer in charge of the work, following parameters shall also be satisfied. The LT power panel shall be of capacity 125A.</p>   |     |     |       |     |     |       |     |  |  |     |     |     |       |     |
|      | A  | First of all load calculations shall be done and got it verified from Railway officials; accordingly designing of power panel shall be planned.   |     |     |       |     |     |       |     |  |  |     |     |     |       |     |
|      | B  | All the contactor relays shall be of SIEMENS or reputed make.   |     |     |       |     |     |       |     |  |  |     |     |     |       |     |
|      | C  | All the MCBs if used shall be of make SIEMENS or LA GRAN. These MCBs shall be of self restoring type i.e. restoring to initial position after normalization of current to its normal value.   |     |     |       |     |     |       |     |  |  |     |     |     |       |     |
|      | D  | All the fuses shall be D type fuses.  |     |     |       |     |     |       |     |  |  |     |     |     |       |     |
|      | E  | All the program switches shall be of SIEMENS make.  |     |     |       |     |     |       |     |  |  |     |     |     |       |     |
|      | F  | For a 4-6 line station all the wirings shall be carried out by min 25sq-mm multi-strand flexible copper wire. The neutral shall be wired by 25 sq mm multi-strand flexible copper wire. In addition to this iff load requirements justify higher grade wiring, contractor shall be bound to provide as per the drawing issued to him at the time of supply. |     |     |       |     |     |       |     |  |  |     |     |     |       |     |
|      | G  | All the wires shall be terminated with proper copper lugs on WAGO type terminals of proper size.  |     |     |       |     |     |       |     |  |  |     |     |     |       |     |
| 3.12 |    | <p><b><u>Specifications and Requirements for Generator Set:</u></b></p>   |     |     |       |     |     |       |     |  |  |     |     |     |       |     |
|      | A  | The generator system shall be minimum 15 KVA. For bigger yards the capacity shall be separately defined.  |     |     |       |     |     |       |     |  |  |     |     |     |       |     |
|      | B  | The system shall be a low noise type generator.   |     |     |       |     |     |       |     |  |  |     |     |     |       |     |
|      | C  | The system shall be supplied as per the latest environmental standards.   |     |     |       |     |     |       |     |  |  |     |     |     |       |     |
|      | D  | The system shall be supplied alongwith automatic start and stop panel.  |     |     |       |     |     |       |     |  |  |     |     |     |       |     |
|      | E  | The sufficient capacity battery shall be supplied alongwith the generator system.   |     |     |       |     |     |       |     |  |  |     |     |     |       |     |
| 3.13 |    | <p><b><u>Specifications and Requirements for Power Supply Equipments:</u></b></p>   |     |     |       |     |     |       |     |  |  |     |     |     |       |     |
|      | A  | All the power supply equipments shall be supplied as per  |     |     |       |     |     |       |     |  |  |     |     |     |       |     |

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|             |   | the concerned RDSO specifications WITH LATEST AMMENDMENTS.  |
|             | B | All the programme switches shall be supplied alongwith the covers.  |
| <b>3.14</b> |   | <b><u>Specifications and Requirements for Batteries:</u></b>  |
|             |   | All the batteries shall be supplied as per the RDSO specifications IRS (S) 88/2004 for LMLA or IRS S 93/96 for VRLS WITH LATEST AMMENDMENTS.  |
| <b>3.15</b> |   | <b><u>Specifications and Requirements for Earth Leakage Detector:</u></b>   |
|             |   | All the batteries shall be supplied as per the RDSO specifications RDSO/SPN/256/2002 OR LATEST WITH LATEST AMMENDMENTS  |
| <b>3.16</b> |   | <b><u>Indicating type low voltage non deteriorating fuse links:</u></b> all the fuses and base shall be supplied as per the technical specification IRS (S) 80/92 OR LATEST WITH LATEST AMENDMENTS. For 0.6V and 1.6 V the fuse links shall be of the same make as of the fuse base supplied. For 6 A the specifications to be followed are IRS (S) 80/92 OR LATEST WITH LATEST AMENDMENTS. |
| <b>3.17</b> |   | <b><u>Technical specifications and requirements for Data Logger System:</u></b>   |
|             | A | Each data loggers shall be supplied as per RDSO specifications IRS: S-99/2006 (Amendment 3) or latest with latest amendments.   |
|             | B | The each data logger shall be supplied for the Digital inputs and analog inputs as mentioned in the schedule of materials.  |
|             | C | While supplying the data logger it shall be kept in mind that only those data logger shall be supplied which can be programmed to be a part of network of the existing data loggers.  |
|             | D | Each data loggers shall be supplied alongwith the online UPS as per 3.17.4 below.   |
|             | E | Each data loggers shall be supplied with the Fault diagnostic software (as per clause 3.17.5) and Failure analysis system as per the requirements issued by the HQ from time to time.   |

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|  | F             | Each data logger shall be supplied along-with the printer as mentioned in 3.17.2. The suitable connecting cable shall also be supplied for connecting the data logger with the printer.                                  |
|  | G             | The Failure analysis system shall be supplied as per 3.17.1.   |
|  | H             | The servers if a part of schedule shall be supplied as per 3.17.3.   |
|  | I             | The Front end Processor shall be supplied alongwith the Data Logger IFF specifically has been asked in the schedule of materials.  |
|  | <b>3.17.1</b> | <b><u>The Minimum Specifications and Requirements for the failure Analysis system are as:</u></b> Following are the minimum specifications, however actual should be confirmed before the supply from Officer in Charge. |
|  | A             | The Failure analysis system shall be Industrial grade computer.  |
|  | B             | The system shall have minimum 4 GB RAM upgradable upto 8GB.  |
|  | C             | The system shall have minimum 500 GB HDD.  |
|  | D             | The system shall be supplied with minimum 17" LCD monitor.   |
|  | E             | The system shall be supplied with Optical mouse and keyboard alongwith USB connections.  |
|  | F             | The system shall have minimum 4 USB ports.   |
|  | G             | The system shall have minimum 2 PCI express slots.   |
|  | H             | The system should have DVD read/write features.  |
|  | I             | The system should have Ethernet port of minimum 10/100 Mbps.   |
|  | J             | The system shall be supplied with licensed windows 8 or the latest as decided by the Officer in charge.  |
|  | K             | The system should also have loaded licensed antivirus valid for minimum 36 months from the date of installation.   |
|  | L             | The system shall be supplied with licensed MS office 2010 or the latest as decided by the Officer in charge.   |
|  | M             | The system should be supplied with standard computer table with chair of Godrej make.  |
|  | <b>3.17.2</b> | <b><u>Specifications and Requirements for the Printers:</u></b> Following are the minimum specifications, however actual should be confirmed before the supply from Officer in Charge.                                   |
|  | A             | The printer shall be heavy duty printer with laser Black and White printing.   |
|  | B             | The printer shall have USB connections.  |
|  | <b>3.17.3</b> | <b><u>Specifications and Requirements for the Servers:</u></b>   |

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|--|---------------|---|
|  | A             | The server shall be supplied in 100 % HOT STANDBY configuration.  |
|  | B             | The servers shall be Rack Mounted servers.  |
|  | C             | The each server of the configuration should have minimum Of 16GB RAM, extendible upto 32GB.   |
|  | D             | Each server of the configuration should have minimum 1 TB HDD with RAID 0-5.  |
|  | E             | The monitors supplied should be minimum 19" LCD monitor.  |
|  | F             | The servers should be supplied alongwith mouse and keyboards with USB connectivity.   |
|  | G             | The system should have DVD read/write features.   |
|  | H             | The system shall have minimum 4 USB ports.  |
|  | I             | The system should have Ethernet port of minimum 10/100 Mbps.  |
|  | J             | The system shall be supplied with licensed windows 8 or the latest as decided by the Officer in charge.   |
|  | K             | The system should also have loaded licensed antivirus valid for minimum 36 months from the date of installation.  |
|  | L             | The system shall be supplied with licensed MS office 2010 or the latest as decided by the Officer in charge.  |
|  | <b>3.17.4</b> | <b><u>Specifications and Requirements for the UPS:</u></b>  |
|  | A             | The UPS system for the servers and Failure analysis system should be online UPS of reputed make.  |
|  | B             | The UPS system for the servers and Failure analysis system should be able to supply minimum 1/2 Hr back-up.   |
|  | <b>3.17.5</b> | <b><u>Specifications and Requirements OF FAULT DIAGNOSIS SOFTWARE:</u></b>  |
|  |               | Some Logic for Report generation are defined as under as per Central Railway Practice.  |
|  | <b>A</b>      | <b><u>LOGIC FOR FAULT ALARMS:</u></b>   |
|  | I             | <b><u>Signal Bobbing:</u></b> The time difference between ECR (UP to DN to UP) is in between 500 ms to 2 seconds which should be taken as 1 count and for satisfying the fault logic 2 to 3 counts should happen within 10 seconds. |
|  | II            | <b><u>Track Bobbing:</u></b> The time difference between TPR (UP to DN to UP) is in between 50 ms. to 1 seconds which should be taken as 1 count and for satisfying the fault logic 2 to 3 counts should happen within 10 seconds.  |
|  | III           | <b><u>Point Bobbing:</u></b> The time difference of (NWKR/RWKR) (UP to DN to UP) is in between 500 ms. to 2 seconds which should be taken as 1 count and forsatisfying the fault logic 2 to 3 counts                                |



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|  |      | should happen within 10 seconds.   |
|  | IV   | <b>Point failure:</b> When WNR/WRR) picks UP it has to wait for 20 seconds, if NWKR or RWKR is not picking UP then it should trigger this message.   |
|  | V    | <b>Point Loose packing:</b> With TPR DN the time difference of (NWKR/RWKR) (UP to DN to UP) is in between 250 ms to 2 seconds.   |
|  | VI   | <b>Timer Setting Less:</b> The time difference between JSLR UP and NJPR Up is less by more than 10% (less than 108 seconds for 120 seconds timer) of the prescribed time.  |
|  | VII  | <b>Timer Setting More:</b> The time difference between JSLR UP and NJPR Up is greater by more than 10% (more than 132 seconds for 120 seconds timer) of the prescribed time.   |
|  | VIII | <b>Check for Charger:</b> The time difference between present voltage and previous voltage is greater than 5% and it should continue beyond that range for at least 30 seconds and LVR relay is UP.  |
|  | IX   | <b>Blanking of Signals:</b> Concerned LVR (AC power supply for signal available) relay is Up and all ECRs are DN for that particular signal for more than 20 seconds.  |
|  | X    | <p><b>Fusing of Signal Lamp:</b> Concerned LVR (AC power supply for signal available) relay is UP</p> <p>(b) <b>Yellow (three aspect):</b>-After HR picks Up and DR is down, if HECCR is not picked Up within 10 seconds. HR is triggering signal.</p> <p>(c) <b>Green (three aspects):</b>-After HR and DR picks UP, if DECCR has not picked UP within 10 seconds. HR is triggering signal.</p> <p>(d) <b>Red:</b> - After HRDR is DN, if RECCR has not picked UP within 10 seconds, HRDR is triggering signal.</p> <p>(e) <b>Yellow/Green (two aspects):</b>-After HR/DR picks Up, if HECCR/DECCR has not picked Up within 10 seconds. HR/DR is triggering signal.</p> |
|  | XI   | <p><b>Track circuit Failure:</b> T1, T2, T3 are sequential tracks.</p> <p>(a) When T2 is DN.</p> <p>(b) T1 and T3 UP</p> <p>(c) The time difference between T1 UP and T2 DN is more than 5 second.</p> <p>(d) The time difference between T3 UP and T2 DN is more than 5 second.</p> <p>(e) T2 is not bobbing and is DN for more than 10 seconds.</p>  |
|  | XII  | <b>Power Supply failure:</b> LVR is DN for more than 100 ms.   |

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|  | XIII | <b><u>Power Supply restored:</u></b> LVR is Up for more than 100 ms.  |
|  | XIV  | <b><u>Signal Flying Back to Danger:</u></b><br>(a) UCR UP and<br>(b) RECR UP and<br>(c) HR DN and<br>(d) TSR UP or (TSR DN and Control track Up or Approach track UP).          |
|  | XV   | <b><u>Route section not released:</u></b> Previous route section released sequential route release relays of route section. UP but sectional route release relay not picked UP. |
|  | XVI  | <b><u>Sluggish Operation of Point:</u></b> After WNR/WRR picks UP, NWKR/RWKR picks UP after a delay of 10 to 20 seconds.  |

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|  | <b>B</b> | <b><u>LOGIC FOR UNUSUAL INCIDENT ALARMS:</u></b>   |
|  | I        | <b><u>Late Start of Train:</u></b><br>(a) Berthing track DN and<br>(b) HECR/DECR/UP and<br>(c) Signal difference track DN and<br>(d) Time difference between time of occurrence (b) and (c) is more than time defined by user.   |
|  | II       | <b><u>Over Speeding of Train:</u></b> T1, T2 & T3 are track circuits in sequence Length of 1,2 is fed in the logic option.<br>(a) Counter starts when T2 goes DN with T1 already DN.<br>(b) Counter starts when T3 goes DN with T2 already DN.<br>(c) Time interval between (a) and (b) is less than length of T2 divided by maximum permissible speed by more than 10%. |
|  | III      | <b><u>Clearing of Signal without Route Locking:</u></b><br>(a) HECR/DECR UP and<br>(b) ASR UP  |
|  | IV       | <b><u>Signal Assuming Green Aspect with One or more points in Route in Reverse Condition:</u></b><br>(a) DECR UP and<br>(b) RWKR of any point in the route UP.   |
|  | V        | <b><u>Home/Main Line Starter Signal Assuming Green Aspect with AdvanceStarter Danger:</u></b><br>(a) Home Signal DECR UP or Main Line Starter DECR UP and<br>(b) Advanced Starter RECR UP.   |

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| VI  | <b><u>Point Burst:</u></b> If the arrives on the track 2 proving the sequence of track 1 DN and the point setting in the unfavourable position and then the NWKR/RWKR both are DN for 20 seconds.   |
| VII | <b><u>Check for passing of defective/danger signal:</u></b><br>(a) When track 2 is DN after Track 1 is DN, RECR UP.<br>(b) The time difference between T2 DN and T3 UP is more than 5 Seconds.<br>(c) The time difference between T2 DN and RECR UP is more than 5 Seconds.<br>(d) T2 is not bobbing and is DN for more than 1.2 seconds. |

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| <b>C</b> | <b><u>LOGIC FOR UNUSUAL SEQUENCE ALARMS:</u></b>   |
| I        | <b><u>Picking Up of track circuit when adjacent track circuits are DN:</u></b> T1, T2 & T3 are consecutive track circuits in sequence.<br>(a) T1 & T3 are DN and<br>(b) T2 is UP and not bobbing & remains continuously UP for more than 10 seconds.   |
| II       | <b><u>Route getting released without all the sequential route relays in the route picking Up:</u></b><br>(a) ASR UP and<br>(b) Concerned Route TSSLR DN or TPZR DN or TLSR DN or TRSR DN and<br>(c) Emergency Route cancellation, NJPR DN  |
| III      | <b><u>Block getting released without picking up of sequential train arrival relays:</u></b> Block clearing relay picks UP without picking UP of sequential track relay.<br>NOTE: - This will require change in wiring of block instrument so that the pickup contacts of Block TAR are brought the Block Instrument. |
| IV       | <b><u>Advance Starter OFF without Line Clear:</u></b> HR UP and concerned Line Clear relay DN.   |
| <b>D</b> | <b><u>FAULT ANALYSIS REPORT OF VARIOUS SIGNALLING GEARS:</u></b>   |
| I        | Battery Low Voltage.   |
| II       | Battery Charger Defective  |
| III      | Signal lamp failure.   |
| IV       | Blanking of Signals.   |

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|             | V      | Track circuit failure.   |
|             | VI     | Sluggish relay operation.  |
|             | VII    | Axle Counter RX low.   |
|             | VIII   | Fusing of Signal lamp.   |
|             | IX     | Bobbing<br>(i) Track circuit<br>(ii) Signal bobbing.   |
|             | X      | Signal passing at danger.  |
|             | XI     | Analog voltage.  |
|             | XII    | Late start.  |
|             | XIII   | Calling on operation.  |
|             | XIV    | Train speed etc  |
| <b>3.18</b> |        | <b><u>Specifications and Requirements for AFTC/DAC:</u></b>  |
|             | 3.18.1 | All the AFTC material shall be supplied as per the RDSO specifications RDSO/SPN/146/2001 OR LATEST WITH LATEST AMENDMENTS.   |
|             | 3.18.2 | All the SSDAC material shall be supplied as per the RDSO specifications RDSO/SPN/177/2003 (Ver.-1 amendment 2) or RDSO/SPN/177/2012 Ver-3 directed by the Officer in charge.   |
|             | 3.18.3 | All the material shall be supplied as per the RDSO specifications RDSO/SPN/176/2013 Ver.-3& Firm's Spec.   |
|             | 3.18.4 | For both AFTC and DAC, all the material supplied shall be according to the list of material supplied by the OEMs of the equipments.  |
|             | 3.18.5 | Apart from the RDSO specifications the MSDAC system should necessarily satisfy the following specifications and requirements   |
|             | A      | In the MSDAC system each evaluator must have inbuilt facility of event logging as per RDSO specifications. If the facility is not available inbuilt, the facility should be provided as an add-on separate for each evaluator. The event logger should necessarily comprise of a server as one of its component which is meant for 24x7 hr application. The technical specifications of server are as defined below. |
|             | B      | The system should provide the Diagnostic feature software to study the system behavior, to analyze the various events like why the track section was failed, when it was failed, when it was cleared with time stampings.  |

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|             | C             | All these facilities of diagnostic software should be capable of providing information even after the track section has been resetted.  |
|             | D             | The system should have facility to use system diagnostic features remotely on a network.  |
|             | E             | ONE DIAGNOSTIC PC SHOULD BE SUPPLIED FOR EVERY 10 DP'S.   |
|             | F             | <b>Earthing of outdoor sensor/DP, if required for system and necessitated by RDSO shall be done by firm including supply and installation of earthing as part of DP installation.</b> |
|             | G             | <b>Provision of Preparatory resetting and auto-resetting to be done by firm including arrangement of required material as per CR practice.</b>  |
|             | <b>3.18.6</b> | <b><u>Specifications and Requirements for the Servers:</u></b>  |
|             | A             | The server shall be supplied in 100 % HOT STANDBY configuration.  |
|             | B             | The servers shall be Rack Mounted servers.  |
|             | C             | The each server of the configuration should have minimum Of 16GB RAM, extendible upto 32GB.   |
|             | D             | Each server of the configuration should have minimum 1 TB HDD with RAID 0-5.  |
|             | E             | The monitors supplied should be minimum 19" LCD monitor.  |
|             | F             | The servers should be supplied alongwith mouse and keyboards with USB connectivity.   |
|             | G             | The system should have DVD read/write features.   |
|             | H             | The system shall have minimum 4 USB ports.  |
|             | I             | The system should have Ethernet port of minimum 10/100 Mbps.  |
|             | J             | The system shall be supplied with licensed windows 8 or the latest as decided by the Officer in charge.   |
|             | K             | The system should also have loaded licensed antivirus valid for minimum 36 months from the date of installation.  |
|             | L             | The system shall be supplied with licensed MS office 2010 or the latest as decided by the Officer in charge.  |
| <b>3.19</b> |               | <b><u>Specifications and Requirements for Prefabricated structure:</u></b>  |
|             | A             | The prefab structures shall be supplied and installed as per the  |

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|  |   | Railway's drawings and size as per the tender schedule.  |
|  | B | The foundation shall be prepared as per the drawing with the contractor's own material.  |
|  | C | The electric appliances shall be supplied and fixed as per the drawing.  |
|  | D | The structure shall be made with prefabricated Aero-con type panels of 75 mm thickness. The thickness of partition wall shall be of 50mm.  |
|  | E | The windows shall be provided with MS grills and steel wiremesh shall be provided for safety.  |
|  | F | <b>Doors</b> of size 900mm x 2000mm made from kit having Aluminum framework, hinges, rubber seal, door handle, door closure and bolt etc shall be provided. Rain protection shroud shall be provided above the outer door opening. Double locking arrangement to be provided in the door of relay room.  |
|  | G | <b>WATERPROOFING:</b> After erection, roof panel shall be waterproofed with elastomeric material rubberize polyurethane based brush applied type waterproofing material having Aluminum finish.  |
|  | H | <b>SUN/RAIN GUARDS:</b> Made from profiled color coated sheets supported on fabricated 'C' channels. The rain guard shall at slope from front to back and extended by 450 mm on all sides of shelter. This feature provides additional safety / waterproofing. Gap between rain guard and shelter roof shall be closed with folded sheets to impart good finish and minimize water entry.  |
|  | I | <p><b>BASE:</b>Prefabricated structure shall be erected on raised platform / plinth up to 600 mm height above ground level, filling above ground level &amp; the plinth shall be made with soil / murum filling duly compacted with 100 mm coping of PCC / RCC above as shown in the diagram. Required steps shall be provided in front of the entry door. Wall panels shall be placed between inverted fabricated channels, which will be fixed to plinth by expansion bolts. These fabricated channels shall have web height of 100 mm and shall be manufactured from 2 mm thick MS sheet and the channel shall be provided with sealant to avoid ingress of water due to seepage.</p> <p>RCC columns of approximately 300 mm x 300 mm of 2000 mm shall be cast with proper base footing as given in drawing. Each RCC column / footing shall be reinforced by providing 4 nos. MS rods of 12 mm dia. These footing shall rest on PCC (100 mm) thick. At ground level RCC Beam of 230mm x 230mm cross section shall be provided. Prefab structure shall be approximately 600 mm above ground level to safe guard against water logging. At plinth level RCC coping of 230mm x 230 mm cross-section is foreseen around 100 mm thick PCC plinth / shelter floor. Before casting PCC plinth the void between ground</p> |



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|  |   | level and plinth shall fill with soil / murum duly rammed. All four sides of foundation shall be covered by brick masonry duly finished with plaster.  |
|  | J | <b><u>FLOOR COVERING:</u></b> PCC floor shall be covered with 2 mm thick PVC floor covering fixed with suitable adhesive to impart attractive floor finish. For Battery room acid proof ceramic tiles should be provided.  |
|  | K | <b><u>ELECTRICAL FITTINGS:</u></b> All rooms shall be provided with complete internal wiring. Arrangement for providing fittings shall be made ready. Firm has to supply & install Tube light, Fan, Exhaust fan and Switches as per Diagram attached. Two nos. sockets 15 amps shall also be provided in each room. The electrical equipments fitting shall be of standard supplies like Phillips, Crompton, Anchor, Havells etc. Electrical wiring of all electrical fittings mentioned shall be done with wiring materials from standard companies like Finolex etc. having ISI certifications, using casing/capping. All the materials required for wiring including casing/capping has to be supplied by the agency.   |
|  | L | <b><u>VENTILATIONS/EXHAUST:</u></b> Ventilators and exhaust fans as indicated in layout of Porta cabin shall be provided. Ventilator shall be of size 400mm x 600mm. These shall have internal provision for glass off set on top and bottom. Proper wire mesh / grill shall also be provided at the end of the ventilator. Additionally, Prefab building shall be provided with exhaust fan on one wall and an air entry system complete with filter on opposite wall. This system helps in reducing temperature rise in the rooms, which is inevitable in the rooms housing electronic equipment. Canopy shall be provided above each ventilator / exhaust fan etc. Ventilator shall be of RDSO type (CSTE-DRAWING NO. 6152). Protection shed for ventilators shall be extended by 450mm outwards. Ventilator should have slope towards outside, so that no rain water can enter into rooms. |
|  | M | <b><u>CORNER PANELS:</u></b> Pre cast corner panels to be provided as strength members. They also define shelter co-ordinates.   |
|  | N | <b><u>STEEL WORK:</u></b><br>I) All structural steel shall confirm to IS 2062 & IS 2262.<br>II) All structural MS Pipes shall confirm to IS 1239 PART II.<br>III) All Steel work shall be galvanized after full fabrication and should be confirmed to IS 4759 0 1984.<br>IV) Minimum coating thickness to be better than 127 microns.<br>V) All welding will be as per IS 816.<br>VI) All hardware used in the structure work will be galvanized.<br>VII) All bolted connections between sheet to sheet or sheet to structure must be ensured with nut inserted in the metal sheet.   |

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|      |   | VIII. Sheet metal screws are not permitted. All the screws and nuts & bolts to be of stainless steel as far as possible.   |
|      | O | The entire building structure shall be painted with insultech paint on the exterior of the walls and roof.   |
| 3.20 |   | <b><u>Specifications of Fuse Alarm system of various types of Fuses with Automatic Changeover System along with Audio-Visual Indication:</u></b>   |
|      |   | The system shall be supplied as per the RDSO specifications numbered RDSO/SPN/209/2012 rev 1.0.  |
|      |   | <b>OUTDOOR SUPPLY</b>  |
| 3.51 |   | <b><u>Specifications and Requirements for Colour Light Tubular Post:</u></b>   |
|      |   | The signal post shall be supplied as per the specifications IRS: S6. The drawing for Signal base (140mm Tube) shall be S 2011M and the drawing for the Anchor bolts shall be SA-116A/M. In addition to the drawing the maintenance Platform shall also be supplied at the time of installation. All the MS structures like maintenance platform, bracket, ladder etc shall be of MS with thickness not less than 5mm.          |
| 3.52 |   | <b><u>Specifications and Requirements for Colour Light Signal Unit:</u></b>  |
|      |   | The signal units shall be supplied as per the RDSO specifications RDSO/SPN/194/2006 rev 2.0 or latest with latest amendments. The signal unit shall be NON-METALLIC (FRP) COLOUR LIGHT SIGNAL HOUSING, MULTI-UNIT TYPE. The RDSO drawings for the signal units are <ul style="list-style-type: none"> <li>a. Four aspect unit SA23001.</li> <li>b. Three aspect unit SA23002.</li> <li>c. Two aspect unit SA 23003.</li> </ul> |
| 3.53 |   | <b><u>Specifications and Requirements for Shunt Signal Unit:</u></b>   |
|      |   | The shunt signal unit, whether with CI base/Hood or with Offset bracket shall be provided as per the RDSO specifications RDSO/SPN/194/2006 or latest with latest amendments and as per the RDSO drawing no.SA-23840 or latest with latest amendments.  |
| 3.54 |   | <b><u>Specifications and Requirements for CO Unit/ A-sign Unit:</u></b>  |
|      |   | The material shall be supplied as per the RDSO specifications RDSO/SPN/194/2006 or latest with latest amendments as per  |

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|      |   | the RDSO drawing no.SA-23840 or latest with latest amendments.  |
| 3.55 |   | <b><u>Specifications and Requirements for Route Indicators:</u></b>   |
|      |   | All the Route Indicators shall be supplied as per the RDSO specifications RDSO/SPN/194/2006 or latest with latest amendments AND AS PER THE FOLLOWING DRAWING or latest with latest amendments. |
|      | A | 1 WAY Route Indicator- Drawing no. SA 23401   |
|      | B | 2 WAY Route Indicator- Drawing no. SA 23402   |
|      | C | 3 WAY Route Indicator- Drawing no. SA 23403   |
|      | D | 4 WAY Route Indicator- Drawing no. SA 23404   |
|      | E | Multilamp Route Indicator as per drawing no. SA 23761   |
| 3.56 |   | <b><u>Specifications and Requirements for Track Feed Battery Charger</u></b>  |
|      |   | The material shall be supplied as per the RDSO specifications NoIRS: S-89/2013 ver 1.0 or latest with latest amendments.  |
| 3.57 |   | <b><u>Specifications and Requirements for Track Feed Resistance:</u></b>  |
|      |   | The material shall be supplied as per the SA 20161-66/M or Latest with latest amendments.   |
| 3.58 |   | <b><u>Specifications and Requirements for B type choke:</u></b>   |
|      |   | The material shall be supplied as per the RDSO specifications IRS (S) 65/83 (Amendment 3) or latest with latest amendments.   |
| 3.59 |   | <b><u>Specifications and Requirements for TLJB:</u></b>   |
|      |   | The material shall be supplied as per the specifications and Drawing as issued by Officer in charge.  |
| 3.60 |   | <b><u>Specifications and Requirements for Insulation material for Block Joint</u></b>   |
|      |   | The material shall be supplied as per the RDSO specifications RDSO/SPN/168/2005 (Rev.2) or latest with latest Amendments.   |
|      |   | 60 Kg Rail to drawing SA 22181 (Alt.2)  |
|      |   | 52 Kg Rail to drawing SA 22101 (Alt.6)  |
|      |   | 90 R Rail to drawing SA 22191 (Alt.2)   |
|      |   | Point Insulation complete.  |
| 3.61 |   | <b><u>Specifications and Requirements for Cable Jointing Material:</u></b>  |

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|  |  | The cable jointing material for copper cable shall be supplied as per the specifications issued by CSTE of Central Railway vide number CR/SPN/TC/57(A) 2015 dtd 06-01-2015 or latest with latest Amendments; and the cable jointing material for OFC shall be Supplied with specification IRS.S.TC 81/2000 or latest with latest Amendments. |
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| <b>3.62</b> |   | <b><u>Specifications and Requirements for Cable Markers:</u></b>   |
|             |   | The galvanized metallic cable markers shall be supplied as per as per the drawings mentioned in annexure-X. The RCC based cable markers shall be supplied as per the RCIL drawing no 4014/00/CC4 or latest with latest Amendments. |
| <b>3.63</b> |   | <b><u>Specifications and Requirements for Apparatus Case:</u></b>  |
|             |   | The apparatus case shall be supplied as per drawings mentioned in annexure-X.  |
| <b>3.63</b> |   | <b><u>Specifications and Requirements for Battery Box:</u></b>   |
|             |   | The battery box shall be supplied as per drawings mentioned in Annexure-X.   |
| <b>3.64</b> |   | <b><u>Specifications and Requirements for ARA Terminals:</u></b>   |
|             |   | The material shall be supplied as per drawing no. 23741 Alt IV As per specifications no. IRS.S.75/2006 (Rev.2) or latest with latest amendments.   |
| <b>3.65</b> |   | <b><u>Specifications and Requirements for FUSES and FUSE BLOCKS:</u></b>   |
|             | A | The fuse blocks of 2A shall be supplied as per RDSO drawing no. SA-23478 Alt 4 specification no. IRS.S 75/2006 or latest with latest amendments.   |
|             | B | ND type fuse of 2A shall be supplied as per IRS (S) 78/2006 or latest with latest amendments.  |
|             | C | HRC fuse blocks complete with 2A links shall be supplied as Per specifications IRS(S) 9224/79.   |
| <b>3.66</b> |   | <b><u>Specifications and Requirements for E-Type locks:</u></b>  |
|             |   | The material shall be provided as per the following drawings.  |
|             | A | E-type locks as per drawing no. RDSO SA-3473, 3377 and specifications IRS (S). 30/64.  |
|             | B | Miniature E-type locks as per drawing no. RDSO SA-3473,  |

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|             |   | 3373 and specifications IRS (S). 30/64.   |
| <b>3.67</b> |   | <b><u>Specifications and Requirements for Earth Electrodes:</u></b>   |
|             | A | The normal Earth electrode shall be supplied as per drawings mentioned in annexure-X.   |
|             | B | Safe earth as per Annexure-XIII.  |
|             | C | The Maintenance free earth electrode and Bonding Practices, associated compounds shall be supplied and executed as per the RDSO specifications no. RDSO/SPN/197/2008. |
| <b>3.68</b> |   | <b><u>Specifications and Requirements for RCC pipes/Half round RCC pipes:</u></b>   |
|             | A | The RCC pipe shall be supplied as per the IS specifications no. IS 458/2003.  |
|             | B | Full round RCC pipes should be of 150 mm internal and 200 mm external diameter.   |
|             | C | Half round RCC pipes should be of 300 mm outer diameter and 250 mm internal diameter.   |
|             | D | The manufacturer, supplier must have valid IS license.  |
| <b>3.69</b> |   | <b><u>Specifications and Requirements for GI Troughings:</u></b>  |
|             |   | The GI Troughings shall be supplied as per drawings mentioned in annexure-X.  |
| <b>3.70</b> |   | <b><u>Specifications and Requirements for Desk Type Magneto Telephone and Accessories:</u></b>  |
|             | A | The desk type magneto telephone shall be supplied as per the specifications IRS TC: 79/2000 (Amendment.2) or latest with latest amendments.                           |
|             | B | The battery block for magneto telephone shall be supplied as per the specifications n. IRS TC: 79/2000 (Amendment.2) with latest amendments.                          |
| <b>3.71</b> |   | <b><u>Specifications and Requirements for Two wire DTMF omnibus telephones:</u></b>   |
|             |   | The material shall be supplied as per the specifications IRS TC: 80/2000 (Amendment.1) or latest with latest amendments.  |
| <b>3.72</b> |   | <b><u>Specifications and Requirements for DTMF based Electronic Block Bell and Telephone equipment:</u></b>   |
|             |   | The material shall be supplied as per the RDSO specifications No RDSO/SPN/191/2005/or latest with latest amendments.  |



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| <b>3.73</b> |   | <b><u>Specifications and Requirements for Electric Point Machines:</u></b>   |
|             | A | The electric point machines shall be supplied as per the Specifications IRS-S-24/2002 or latest with latest amendments.  |
|             | B | The point machine shall be supplied with one junction box and two no. of telescopic pipes for each machine.  |
|             | C | One set of machine tool kit shall be supplied with every 8 no of machines.   |
|             | D | The point machines shall be supplied after receiving the Confirmation about the type of machines to be used in the section from the Officer in Charge of the work. It shall be kept in mind that the machine shall be so supplied that it should not require to change the track side arrangements in the holes and other assemblies of the point. |
| <b>3.74</b> |   | <b><u>Specifications and Requirements for Trunking and Capping:</u></b> The trunkings and Cappings shall be supplied as per drawings mentioned in Annexure-X.  |
| <b>3.75</b> |   | <b><u>Specifications and Requirements for Electrically Operated Lifting Barrier:</u></b>   |
|             | A | The electrical lifting barrier shall be supplied as per the specifications RDSO/SPN/208/2012 (Ver.2) or latest with latest amendments.   |
|             | B | The working voltage of gate machine shall be advised at the time of supply whether 110 V DC or 24 V DC or 110 V AC.  |
|             | C | Each set consisting of 2 nos. of Lifting barrier pedestal (32 feet long booms) each with 8 band circuit controller with Siemens switches, hand crank.  |
|             | D | 2 boom made up of GI sheet & octagonal in shape with telescopic structure 32 feet length in four sections of 8 feet long each  |
|             | E | 2 STOP boards, Boom Light box, M.S Counter Weight, dual tone bell/buzzer WITH 2 nos 25W horn working voltage 110V AC and 2 nos. of boom support without fringes.   |
|             | F | Type of boom locking whether solenoid / motorized shall be decided by Engineer in-charge. In either case latest modifications as suggested / approved by RDSO shall be applicable.   |
|             | G | Crank Handle for Emergency / Manual operation along with one no. gate panel with buttons and indicating lamps, motor contractor and MCB shall be supplied separately.  |
|             | H | It includes supply of spares as per RDSO and latest amendments.  |
| <b>3.76</b> |   | <b><u>Specifications for HYLAM sheets/</u></b>   |



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|             |       | <b><u>Boards:</u></b> In addition the specifications mentioned in the schedule of material, it is to be noted that all the Hylam sheets/boards shall be of <b>grade P-II</b> .   |
| <b>3.77</b> |       | <b><u>Specifications and Requirements for Power Distribution Board:</u></b>  |
|             | A     | The power distribution board shall be made as per the supplies/ bus bars as described by the officer in charge.  |
|             | B     | The 12 mm Hylam board shall be supply by the contractor.   |
|             | C     | This board shall be fixed on a rack supplied by the Railway.   |
|             | D     | Rack shall be erected by the contractor. This erection shall not be counted in the erection of relay/CT rack items.  |
|             | E     | The fuses with base and copper lugs of sizes (may vary from 6-35 sq mm) shall be supplied by the contractor.   |
|             | F     | All the fuses shall be of D-type.  |
|             | G     | All other types of links except the ARA terminals shall be supplied by the contractor.   |
|             | H     | Necessary holes in the board for the fuses, wires shall be done by the contractor.   |
|             | I     | The material which has to be supplied in this item is as:  |
|             | (I)   | One 12 mm thick P-II grade hylam board as per 3.77-B above.  |
|             | (II)  | 6-16 sq mm lugs, quantity 100 no.  |
|             | (III) | 25-35 sq mm lugs, quantity 100 no.   |
|             | (IV)  | D-type fuses with base 2-25 A, quantity 75 in no.  |
|             | (V)   | D-type fuses with base 36-63A, quantity 45 in no.  |
|             | (VI)  | Any other miscellaneous material.  |
| <b>3.78</b> |       | <b><u>Specifications and Requirements for Earthing of Signalling System:</u></b>   |
|             |       | The code of earthing practice shall be followed as per the RDSO specifications RDSO/SPN/197/2008 or latest with latest amendments.   |
| <b>3.79</b> |       | <b><u>Specifications and Requirements for Terminal Blocks, Fuse Terminal Blocks and miniature Fuse links:</u></b><br>The material shall be supplied as per the RDSO specifications no. RDSO/SPN/189/2004.  |
| <b>3.80</b> |       | <b><u>Specifications and Requirements for Solder wire:</u></b><br>The solder wires shall be supplied with "No clean, Inbuilt flux, SN/Pb ration of 63/37". The wire shall be of make COOKSON Electronics India or as specified by officer in charge at the time of supply. |

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|  |  | <b>For Senior Divisional Signal &amp; Telecom Engineer,<br/>Central Railway, Mumbai-400001.<br/>For and on behalf of the President of India</b> |
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## CHAPTER-IV

# **TECHNICAL SPECIFICATIONS AND REQUIREMENTS FOR EXECUTION OF WORKS**

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|            |   | <b>In addition to the briefings given in schedule of material and works, following points shall also be satisfied.</b>   |
| <b>4.1</b> |   | <b><u>General Requirements and Specifications for installation of EI system:</u> The EI system shall be commissioned conforming all the TANs issued by the RDSO time to time.</b> However following items shall also be complied.              |
|            | A | The design of the EI system shall be as per the Signalling plan issued to the contractor.  |
|            | B | The contractor shall submit the other required diagrams like ST/LT/RSP etc for further approval.   |
|            | C | Any alteration in the interlocking plan to be done during the course of execution shall be carried out by the contractor expeditiously without any extra cost.   |
|            | D | The system shall be commissioned with 100% HOT STANDBY configuration of all levels as approved by RDSO.  |
|            | E | Until and unless specifically advised, the EI system shall be commissioned with the dual VDU for the operation of signaling gears.   |
|            | F | All the execution/wiring of the system shall be carried out as per the standards defined by RDSO.  |
|            | G | All the terminations on the Racks or back-plane, shall be tagged both ways i.e. the origin and destination of the wire can be understood.  |
|            | H | The signal flow diagram for diagnostic purposes shall also be supplied alongwith the execution.  |
|            | I | The earthing shall be provided as per the latest standards of RDSO as mentioned in item 3.2 of chapter-III.  |
|            | J | All the cables connected to the EI system, O.C. shall be properly laced and described.   |
|            | K | The optical fibre connecting the different subsystems shall be connected through FDMS (as mentioned in 3.2 of chapter-III). All these connections shall be housed in required telecom racks which are protected against interference and dust. |
|            | L | The contractor shall supply the AS MADE DOCUMENTS as per the clause 2.3.7.9 of the chapter-II.   |
|            | M | Pre-commissioning checklist shall be jointly signed by the Railway's and OEM's representative.   |
|            | N | In addition to para3.2-E of chapter-III, the warranty clause shall be operated as  |

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|     | (I)  | The contractor shall inform names of qualified Service Engineers deputed at the location approved by Railway's Engineer and their contact numbers, so that they can be contacted during failure. The failure is to be attended and rectified within least possible time from the time of reporting of failure.   |
|     | (II) | All replacement and repairs that Railway shall call upon the contractor to deliver or perform under this warranty shall be delivered and performed by the contractor promptly and satisfactorily, if the contractor so desires the replaced parts can be taken over by him, or his representative in India for disposal as he deems fit within a period of three months from the date of replacement of goods / parts. At the expiry of this period, no claim whatsoever shall lie on the Railway.   |
|     | N    | <b>QUALITY AUDIT OF INSTALLATIONS:</b>   |
|     |      | The Contractor shall arrange for a quality audit of installation by authorized representative of manufacturer for Electronic Equipments like Electronic Interlocking (EI), AXLE COUNTERS, AFTC, UFSBI, MUX, Data-logger etc. who will certify that the installation has been done as per OEM's specification & standard practices and pre-commissioning check list / guidelines issued by RDSO from time to time.<br>The Contractor should also submit certificate issued by OEM Stating "That quality and integrity of the installation <b>(Electronic Interlocking System)</b> remain complete responsibility of the OEM, Any deficiency pointed out later should be rectified free of cost by OEM." |
| 4.2 |      | <b><u>Specifications for installation of Operating and Indication panel:</u></b>   |
|     | A    | All the cables from Relay Room tag block to the panel tag block shall be laid inside the DWC pipe and that DWC pipe shall be buried in the sand before flooring of the panel room.   |
|     | B    | In the relay room side the indoor cables shall not be tied in a bunch, instead as far as possible all the cables shall be dressed in a single or at most two layers so that each cable can be identified.  |
|     | C    | After dressing of the cables, the cable path shall be covered inside a proper casing with transparent cover.   |
|     | D    | The material for this activity shall be supplied by the contractor as a part of installation of operating panel.   |
| 4.3 |      | <b><u>Specifications and requirements for the erection of relay rack and cable termination rack:</u></b>   |
|     | A    | All the relay racks shall be installed as per the scheme approved by the engineer in charge. All the erection fittings shall be supplied by the contractor as a part of installation.  |

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| B | It is to be ensured that all the major groups shall be installed with proper guide plates. These guide plates shall be supplied by the contractor of its own.   |
| C | Full hylam board shall be used for the cable termination racks to fix the multi-way isolating blocks/ wago terminals.   |
| D | Outdoor Cable supporting rack shall be supplied (in numbers) and erected in such a manner that all the cables shall be terminated preferably in one layer. The termination can be done in maximum two layers.   |
| E | All the cables terminated with the cable supporting racks shall have armory earthed.  |
| F | The armory shall be made exposed at a point and a copper flexible twisted wire (total area 1.5 sq mm) shall be wrapped around the armory at one end and to the GI/copper rod at the other end.  |
| G | All the armories whether be a steel wires or GI sheets shall be bent at the end where cable is extracted so that it may not damage the cable conductors in the long run.  |
| H | At the cable armory end the copper wire shall be soldered in such a manner such that it is tied tightly and is not loose.   |
| I | At the other end also all these earth wires shall be soldered on the copper/GI rod.   |
| J | All these copper/GI rods shall be finally connected to the earthing terminal through 25/16sq mm copper wire through an ARA terminal.  |
| K | The 25/16sq mm copper wire shall be arranged by the Railway.  |
| L | The earthing and lacing if all the cables shall be done in such a way that each and every cable earth shall be separately identifiable.   |
| M | The area where all earthings of cables are terminated (i.e. area behind the CT rack) shall be filled with sand at the cable entry point. The sand shall be filled just upto bottom of cable terminations. All the earthing terminations shall be outside the sand and shall be clearly visible.   |
| N | Full hylam boards shall be fixed on the front side of the CT rack. The hylam boards are covered in the schedule of supply. On the hylam board the holes shall be done to suit the fixing of wago/other terminals.   |
| O | On the back side of the hylam board the cable conductors shall be supported by the string rod on which insulation sleeves have been provided. The string rods with insulation sleeves shall not be covered in supply items separately. The string rods with insulation sleeve shall be supplied by the contractor as a part of installation of CT rack. |



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|            | P | Sufficient space as per site in-charge shall be left between two rows of cable terminations so that description-writing work can be furnished.  |
|            | Q | All the tag blocks shall be fixed on the Racks.   |
| <b>4.4</b> |   | <b><u>Specifications and requirements of Running of Indoor cables, Jumpering, installation, testing and commissioning:</u></b>  |
|            | A | By default (iff not advised by the Railways otherwise) the wiring shall be IDF based rack wiring.   |
|            | B | All the cables (60/40 core) shall be neatly laid from the relay rack to the IDF rack.   |
|            | C | The cable supporting angles should be of sufficient length (min 250mm) to support the cables such that there is no pressure on the cables due to short length of the angles.          |
|            | D | The tag blocks shall be installed as per the instructions of site in-charge.  |
|            | E | The wiring on bus bar shall be done in such a manner (in looping way) that after breakage from one side the supply shall be extended from the other side.                             |
|            | F | All the cables shall be dressed properly and tied with the dressing threads only. It is to be mentioned that cables wires shall not in any case be used for the dressing of cables.   |
|            | G | The capacitors shall be of RESCON make with long life features.   |
|            | H | Before starting the jumpering, jumper sheets shall be prepared.   |
|            | I | All the jumper wires shall be dressed with the dressing threads only.   |
|            | J | On the bus bar the power wires from the power room shall be terminated with the proper lugs with soldering.   |
|            | K | All the power wires shall be dressed above the Bus bar terminals on L-shape angles with insulation sleeves.   |
|            | L | The soldering material shall be of as per clause 3.80 of chapter-III. However the soldering material shall be got approved from the engineer in-charge before starting the soldering. |
| <b>4.5</b> |   | <b><u>Specifications and Requirements for the Installation of Data Logger System:</u></b>   |
|            | A | The data logger system shall be installed at a place as decided by the Officer in charge.   |
|            | B | All the wires shall be terminated inside the data logger and at the   |

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|            |   | data logger tag block at IDF by the contractor of data logger.   |
|            | C | The Railway shall terminate the data logger contact wirings (i.e. wirings of potential free contacts) up-to the data logger tag block at the IDF rack.   |
|            | D | All the subsystems and interfaces required to monitor the digital and analog inputs shall be supplied by the contractor.   |
|            | E | The contractor shall also validate all the contacts of digital inputs and all the analog supplies before the signing of RDSO's check list with the OEM.  |
|            | F | All the necessary Operating and Application softwares shall be loaded in Failure Analysis system and Servers.  |
|            | G | Pre-commissioning checklist shall be jointly signed by the Railway's and OEM's representative.   |
| <b>4.6</b> |   | <b><u>Specifications and requirements for Digging of Trenches in the Soft Soils, Asphalted area and Track Crossings: as per drawings mentioned in Annexure-X.</u></b>  |
|            | A | All locations shall be erected with one coat of paint before trenching and laying of cables.   |
|            | B | The contractor shall depute proper and competent supervisor for trenching and cable laying work.   |
|            | C | Before starting the trenching foot by foot survey shall be done along-with the Railway's representative.   |
|            | D | The cable route shall be jointly finalized by the contractor's and Railway's representatives.  |
|            | E | The proposed cable route plan shall be submitted to the Railways and it shall be got approved (also by the engineering and electrical branches).   |
|            | F | In addition to the main cable plan, a track crossing plan shall also be got approved before starting the work.   |
|            | G | The cable shall be laid at the Railway's boundary (one meter inside the outermost boundary).   |
|            | H | While trenching it shall be kept in mind the depth of the trench <b>shall be 1 meter</b> until and otherwise specified by the engineer in charge. Whenever the dimensions of cable trenches as mentioned in the tender schedule are not easily achievable due to terrain conditions, then payment will be made on a pro-rate basis, for the dimensions achieved. |
|            | I | While trenching the contractor shall clear the temporary obstructions like roots of tree if any, some foundation if any. If it is  |

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|  |   | not feasible to clear the route the route shall be diverted accordingly with the prior permission of the engineer in-charge.   |
|  | J | All excavated earth shall be staked by the contractor away from the track and not on ballast or shoulders.   |
|  | K | <p>In case digging is to be done in between tracks the excavated earth shall be carried manually beyond the adjacent track/tracks and stacked completely outside.</p> <p>In case the trench gets filled up with water from the surrounding area due to rain etc, the Contractor shall have to make his own arrangement to pump it out without any extra charges payable for the same.</p>  |
|  | L | If during the trenching, any cable markers, obstruction such as pipes or cables or any bricks or warning covers which appear to be deliberately placed in the location is noticed, the digging should be stopped immediately and the Railway Supervisor should be called. Further excavation will be done in his presence very carefully with the help of wire claws and digging can be further resumed only with the permission of the Engineer/Supervisor-in-charge. |
|  | M | Where the cable route is on uneven ground, reasonably long section of consistent grounding shall be dug, rather than following every undulation of the ground.   |
|  | N | Before starting the trenching in the asphalted area the contractor shall got prior approval of competent authority.  |
|  | O | During the trenching and cabling work in the asphalted areas the contractor shall cordon off the area with proper means of barricading and warning board for the user of that area.  |
|  | P | After the cabling or the laying of suitable pipes or ducts the asphalted area shall be restored back to its earlier state of surface by proper means.  |
|  | Q | While restoring back the contractor shall take care that the level of this area must match with the nearby areas.  |
|  | R | Before the track crossing it shall be ensured that a commencement notice shall be given to P-way supervisor.   |
|  | S | During trenching the muck in the form of soil or ballast shall be filled in gunny bags and kept away from the track area.  |
|  | T | After the track crossing is done and the trench is refilled, the leftover muck shall be taken far from the track area.   |
|  | U | No muck in any form like soil shall be left in the track areas.  |
|  | V | <b>The contractor shall keep one additional man to look for the trains while the trenching and cabling work is being done in track areas. The duties of this person shall be to look for the trains and warn the labours working in the track</b>  |

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|            |   | <b>areas.Railwayshall in any case not be responsible for any mis-happening on the track areas.</b>   |
|            | W | The contractor shall ensure that all safety features have been arranged for its labour.  |
|            | X | The contractor shall also apply for and got issue the ID card for its labour supervisor and associated labour.   |
|            | Y | Railway shall not be responsible for the staying facility of the labour during the work.   |
|            | Z | <b>IN CASE OF ANY CONFUSION BETWEEN THE DRAWING AND INSTRUCTIONS OR BETWEEN ANY TWO CLAUSES OF THE TENDER DOCUMENT THE DECISION OF ENGINEER IN CHARGE SHALL BE FINAL.</b>  |
| <b>4.7</b> |   | <b><u>Specifications and Requirements for placing of pipes/RCC duct in trenches: As per drawings mentioned in Annexure-X.</u></b>  |
|            | A | All the pipes/ducts to be placed in the trenches for laying of cables shall be transported to site by the contractor by its own means.                                     |
|            | B | All the trenches shall be properly and thoroughly cleaned before laying the pipes/ducts.   |
|            | C | While laying of ducts it shall be utterly cared that there is no damage to the duct due to mishandling.  |
|            | D | If more than one pipe or duct, are to be laid in the same trench then both should be laid side by side.  |
| <b>4.8</b> |   | <b><u>Specifications and Requirements for fixing of pipe on the bridges and culverts: As per drawings mentioned in Annexure-X.</u></b>                                     |
|            | A | First all the bridges shall be surveyed before commencing this item.   |
|            | B | After surveying it shall be jointly finalized by the Railway's and contractor's representative that what are the feasible spots where angles and channels can be provided. |
|            | C | The fixing of GI/RCC./PVC pipe (with contractors on clamp) on culverts shall be <b>as per drawings mentioned in Annexure-X.</b>  |
|            | D | As per schedule item all the concerned material that is the angles and channels required shall be supplied by the contractors alongwith GI fitting bolts and nuts.         |
|            | E | All the angles and channels shall not be of material (MS) having thickness less than 5 mm.   |
|            | F | The shape and size of the angles and channels shall be jointly   |

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|            |   | finalized by the Railway's and contractor's representatives.   |
|            | G | It should be kept in consideration while finalizing the size of angles and channels that there should be sufficient space extra after providing the pipes.   |
|            | H | The plans and drawing, to fit the channels and angles on the bridge, shall also be got approved by the bridge organization of the concerned jurisdiction.  |
|            | I | While laying the cables in the pipe/troughings the corners of the bridges shall be covered with solid concreting to prevent any access of the cables to the unwanted outsiders.  |
|            | J | All the pipes shall be properly coupled through couplers.  |
|            | K | In troughings the BITUMIN compound shall be filled as per proper procedures.   |
|            | L | <b>IN CASE OF ANY CONFUSION BETWEEN THE DRAWING AND INSTRUCTIONS OR BETWEEN ANY TWO CLAUSES OF THE TENDER DOCUMENT THE DECISION OF ENGINEER IN CHARGE SHALL BE FINAL.</b>  |
| <b>4.9</b> |   | <b><u>Specifications and Requirements for laying of Cables: As per drawings mentioned in Annexure-X.</u></b>   |
|            | A | All the cables shall be transported to the site by the contractor by its own means.  |
|            | B | The cables at site shall be stored properly, fully protected against harsh environmental conditions like rains etc.  |
|            | C | All the cables shall be meggered before laying of the cables and a proper record shall be handed over to the Railway's engineer in charge.   |
|            | D | Cable drums mounted on Jackscrew stand shall be used for cable laying to avoid any kinks or pressure on the cable during cable laying. Sufficient manpower should be arranged by the contractor to lay the cable manually so that it does not rub on the ground. |
|            | E | Cable shall be laid with due caution so as not to cause any damage due to rough handling.  |
|            | F | While laying the cable, precautions shall be taken to avoid any kind of pressure on the cable.   |
|            | G | The Cable drum should be mounted on a jackscrew stand and the cable should be pulled while laying. During this care must be taken to support the cable manually so that it does not rub on the ground and also to avoid any twist in the cable.                  |
|            | H | After laying of the cables before the terminations in the location boxes it shall be ensured that all the cables are covered with the  |

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|      |   | insulating tape at their ends.  |
|      | I | All the cables shall be taken inside the location boxes marked for the concerned cables.  |
|      | J | While entering the location boxes it shall be ensured that the pit near the location box is of sufficient size such that after coiling the cable, the uppermost portion (top) of the cables is atleast 0.8 meter below the surface level.   |
|      | K | As a matter of practice, until and otherwise, not more than 1-2 meter of coils are left for all the cables as a loop after considering the length required for the termination.   |
|      | L | Before the back filling is done, the cable markers will be provided in such a way as to keep the top portion visible after filling.   |
|      | M | The marker should be so placed as to be clearly visible and shall not project above rail level of the nearest track and shall not be more than 200 mm from the top surface of ground level.   |
|      | N | There will be one cable route marker at every thirty meters interval in addition to additional cable markers to be provided at bends and at such other locations which will be indicated by the supervisor-in-charge.   |
|      | O | One cable route marker shall be placed at the point of divergence.  |
|      | P | One cable marker at either end shall be placed at each track crossing.  |
|      | Q | One cable marker at each side of culvert/bridge etc.  |
|      | R | When Signaling and Main Telecom cables are laid in the same trench, a distance of 100 mm is to be maintained between them.  |
|      | S | When Signaling and L.T. or H.T. power cables are placed in the same trench, they must be separated by a row of bricks (any pipe RCC/DWC) between them.  |
|      | T | <p>In case several cables of different Categories are laid in the same trench, these should be placed in the following order starting from the main track end, so that in case of accidents the maintenance staff may easily recognize the damaged cables from sight.</p> <p>1<sup>st</sup> ..... Main Telecom cable.<br/> 2<sup>nd</sup> ..... Signalling Cable.<br/> 3<sup>rd</sup> ..... L.T. Power cable.<br/> 4<sup>th</sup> ..... H.T. Power cable.</p> |
|      | U | <b>IN CASE OF ANY CONFUSION BETWEEN THE DRAWING AND INSTRUCTIONS OR BETWEEN ANY TWO CLAUSES OF THE TENDER DOCUMENT THE DECISION OF ENGINEER IN CHARGE SHALL BE FINAL.</b>   |
| 4.10 |   | <b><u>Specifications and Requirements for</u></b>   |



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|  |   | <b><u>Termination of the Cables:</u></b>  |
|  | A | As a practice until and otherwise specified by the engineer in charge, in a location not more than 20-25 cables shall be terminated.  |
|  | B | <b>If the number of cables are more than 25, prior approval of the officer incharge shall be taken.</b>   |
|  | C | All the cables shall be terminated on the ARA terminals as per engineer in charge.  |
|  | D | While terminating the cables it shall be ensured that the cables incoming to the location from one side shall be taken and dressed in one side (i.e. LHS or RHS) in the backside of the location.                 |
|  | E | The cables going out of the locations shall be taken and dressed in the opposite side to the upper one in the back side of the location.  |
|  | F | All the cables shall be neatly dressed and terminated with help of proper support.  |
|  | G | It shall be ensured that the cable conductors shall be supported by string rods at each row of the cables in the back side.   |
|  | H | The string rods for the above shall be supplied by the contractor along-with insulation sleeves.  |
|  | I | All the conductors of the cables shall be dressed by threads also.  |
|  | J | At the bottom of the location box, all the cables shall be dressed in one row only. No jumble of cable is allowed to be formed. Each and every cable should be separately identifiable.                           |
|  | K | At the bottom side the armory of all the cables shall be removed and bent outwards so that no sharp edge of the armory is in direct contact of the cable.   |
|  | L | At the folded portion of the armory a twisted copper wire (1.5 sq mm) shall be turned around and soldered (by brazing) to connect it to the earth points.   |
|  | M | All these twisted copper wires shall be connected to the GI (bonding) wire at the other end and soldered there properly for earth connections.  |
|  | N | From that GI wire a min 6 sq mm copper flexible wire shall be connected and at the other end it shall be terminated on an ARA terminal. The flexible wire and the ARA terminal shall be supplied by the Railways. |
|  | O | This ARA terminal shall be connected to the external earth through a 12/6 core signalling cable. The signalling cable pieces shall be supplied by the Railways.   |
|  | P | After this the bottom portion of the location shall be filled with sand and a layer of PCC shall be done to prevent entry of rodents  |

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|      |   | and reptiles.   |
|      | Q | All the cable cores shall be megged at the time of terminations. A report shall be submitted to the Railways in proper format of Railways.  |
|      | R | At the front side of the location, sufficient gap should be left between two rows.  |
|      | S | In the gap, the details of the cables shall be painted, which is a separately covered item in schedule.   |
|      | T | <b>All the records about the cable laying and megging shall be prepared and submitted as per drawings mentioned in Annexure-X.</b>  |
| 4.11 |   | <b><u>Specifications and Requirements for Digging of cable pit:</u></b>   |
|      | A | The cable pit shall be dug near to the room where all the cables are entering the CT rack room.   |
|      | B | The cable pit shall be of dimensions (minimum 2x2x1 meter) as per schedule of material and works.   |
|      | C | Before concreting the cable pit shall be filled with sand.  |
|      | D | It shall be kept in considerations that the top of the cable coils shall be minimum one meter below the top of the concreting.  |
|      | E | The cables shall be coiled approximately five meters per cable.   |
| 4.12 |   | <b><u>Specifications and Requirements for the Casting of CC foundation for apparatus case or any other FOUNDATION (like foundation for DP of Axle Counter or of AFTC) :</u></b>   |
|      | A | The foundations shall be made as per the standard drawing issued to contractor or as per drawings mentioned in annexure-X.  |
|      | B | Before starting the digging work for foundation, the location of the foundation shall be jointly verified and signed by the representatives of Railways and Contractor.   |
|      | C | While finalizing the location of foundation it must be taken care that the schedule of dimensions are strictly adhered to. It means that the distance of apparatus case with door fully opened should be minimum 2.36 meter from the centre of tracks on all sides. |
|      | D | It must be taken care that the foundation of apparatus case shall not be in any case on the banking of the terrain.   |
|      | E | If the foundation on the bank is unavoidable due to site  |

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|      |   | conditions, the apparatus case shall be supported from the bank side by a piece of rail grouted in the ground with concrete.  |
|      | F | The pit around the apparatus case shall be dug so that the top of the cable is minimum 0.8 meter below the ground surface level i.e. the depth of the pit near the apparatus case shall be increased as per the site requirement.   |
|      | G | In addition to this and also even if the required depth is available, the contractor shall make a brick chamber like structure and fill the chamber with sand. The whole pit shall be covered with concreting. This brick chambering and concreting must be done even if the required depth is available. For this activity the concreting and brick work shall be paid by Railways as actual form the scheduled quantity of items. |
|      | H | The PCC work shall be done for the finishing in the ration of 1:4.  |
|      | I | Plastering should be done to level the surface at sides 75 mm below the ground level after the cable is taken inside the A / case.  |
|      | J | Aggregate, cement, sand , holding down bolts, nuts shall be supplied by contractor.   |
|      | K | Due to local condition in very special circumstances if the size of the foundation for all the above items required to be increased / decreased, the extra payment /deduction for variation of the CC work shall be calculated on volumetric basis and paid to the contractor from the schedule of cement concreting.   |
| 4.13 |   | <b><u>Specifications and Requirements for the foundation for the signal post:</u></b>   |
|      | A | The foundations shall be made as per drawings mentioned in annexure-X.  |
|      | B | Before starting the digging work for foundation, the location of the foundation shall be jointly verified and signed by the representatives of Railways and Contractor.   |
|      | C | While finalizing the location of foundation it must be taken care that the schedule of dimensions is strictly adhered to.   |
|      | D | It must be taken care that the foundation of signal shall not be in any case on the banking of the terrain.   |
|      | E | If it is not feasible at site for the foundation to be on bank portion, the signal foundation should be shifted on the RHS of the concerned track.  |
|      | F | While shifting the signal foundation to the RHS of the concerned track, the schedule of dimensions must be strictly adhered to. The outermost portion/part of the complete signal shall be minimum 2.36 meter away from the centre of tracks of both sides.   |
|      | G | While erecting the signal foundation the GI bolts of proper size  |

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|      |   | should be grouted.  |
|      | H | Item includes curing and plastering with 1 : 4 cement - sand mixture ( Aggregate not exceeding 3 : 8 cm ).  |
|      | I | Agregate, cement, sand and holding down bolts, nuts shall be supplied by the contractor.  |
|      | J | Due to local condition in very special circumstances if the size of the foundation for all the above items required to be increased / decreased, the extra payment /deduction for variation of the CC work shall be calculated on volumetric basis and paid to the contractor from the schedule of cement concreting. |
| 4.14 |   | <b><u>Specifications and Requirements for the Installation of all types of apparatus Case:</u></b>  |
|      | A | The apparatus case shall be first rubbed to remove the rust in a complete way both inside, outside and all the interiors and corners.   |
|      | B | Then one coat of red oxide shall be painted on the complete body of the apparatus case including the base area.   |
|      | C | The apparatus case shall be fixed properly carefully without damaging it.   |
|      | D | Slotted angles (drawing is mentioned in clause3.63) shall be properly fixed for complete length of the apparatus case with the help of angles and clamps.   |
|      | E | One coat of silver paint on the outer side of the walls of apparatus case and one coat of white/silver paint on the interior sides shall be painted before fixing the hylam board/strips.   |
|      | F | Both E-type locks shall be fitted before the painting.  |
|      | G | If somehow both E type locks are not covered in schedule due to some reason, the other side shall be covered with GI sheet of minimum 3mm thickness to prevent entry of rodents and other reptiles. The piece of sheet shall be supplied by the contractor.   |
|      | H | The holder and location lighting switch shall be supplied and fixed on a piece of hylam sheet by the contractor. This piece of hylam sheet shall be supplied by the Railways.   |
| 4.15 |   | <b><u>Specifications and Requirements for Installation of signal post and Unit:</u></b>   |
|      | A | The signal poles shall be first cut in to the required lengths.<br><br>For loop line starter, advanced starter and Distant signal the length is 3.5 meters.<br><br>For main line starter and home signal the length is 4.5 meters.  |

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|  |   | For the Home signals on curve the length is 5.5 meters.  |
|  |   | The signal post shall primarily be erected as per the drawings issued to the contractor.   |
|  | B | The cable shall be inserted in such a way that it is not bent sharply.   |
|  | C | The armory of the cable shall be peeled off at the base of the signal unit. After that all the conductors shall be terminated on the ARA terminals.  |
|  | D | From these ARA terminals the colour coded flexible wires shall be taken to the respective LED unit/signal lamp. The flexible wire shall be provided by the Railways.                                     |
|  | E | All the clamps and angles shall be as per the standard drawings of Signal Units or as advised by the engineer in charge.   |
|  | F | The ladder should be grouted in the ground properly.   |
|  | G | Maintenance platform shall be fixed as per the engineer in charge of the work.   |
|  | H | The signal unit shall be fixed on the signal poles with all of its fixtures and clamps with the help of pulley and supporting pipe.  |
|  | I | The maintenance platform shall be supplied and fixed as per the site in charge; it shall be kept in mind that this platform shall be away from the track side to avoid any infringement to the SOD.      |
|  | J | If found necessary the signal unit shall be installed with the offset bracket to improve the visibility of the signal.   |
|  | K | The calling on, A- sign and the shunt signal as required at the site shall be fixed and installed with proper clamps and fixtures. The clamps and fixtures shall be supplied as a part of commissioning. |
|  | L | All the LED lighting units shall be installed in the signal units by the contractor as per the instructions of the site incharge.  |
|  |   | 'X' arms to be provided by the contractor till the signals are introduced.   |

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| <b>4.16</b> |   | <b><u>Specifications and Requirements for the various Boards/ Markers and Number Plates:</u></b>                     |
|             | A | All the boards, number plates and marker plates/boards shall be supplied as per the drawings mentioned in Annexure-X |
|             | B | For Good's warning board the referred drawing shall be RDSO DRG SA 2380 (adv) or latest with latest amendments.      |

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| <b>4.17</b> |   | <b><u>Specifications and Requirements for the Installation of the Point Machines:</u></b>   |
|             | A | The Point machines shall be fixed by the contractor as per the RDSO drawing no. SA 91 51-52 OR 9710 OR 9161 as per the site requirements.       |
|             | B | All the material required for installations shall be supplied by the contractor as per schedule.  |
|             | C | Prior drawing and permission should be taken from the Railways about the Ground Connection, ME-34 box and other items.                          |
| <b>4.18</b> |   | <b><u>Specifications and Requirements for the Installation of DC track circuits:</u></b>  |
|             | A | First of all, the contractor shall prepare and submit the track insulation plan as per the signaling plan issued.                               |
|             | B | For the installation of track circuits double TLJB system shall be used.  |
|             | C | The tail cables connecting the TLJB to the location boxes shall be 6-core signaling cable. This cable shall be supplied by the Railways.        |
|             | D | This 6-core shall be terminated with lugs in the TLJBs.   |
|             | E | The bonding wire shall be covered by a flexible insulating tube. The thickness of material of this insulating tube should not be less than 1mm. |
|             | F | All the TLJBs shall be painted as per the polarity (i.e. positive shall be painted with Red and negative shall be painted Green).               |
|             | G | The TLJBs shall also be painted with details i.e. number/nomenclature of track circuit number.  |
|             | H | The required channel pins shall be supplied by the contractor.  |

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| <b>4.19</b> |   | <b><u>Specifications and Requirements for the Wiring of DC Track Circuits:</u></b>  |
|             | A | The wiring practice shall be as per the instructions given by engineer in charge.   |
|             | B | The wiring from one equipment to another like choke to charger, resistance etc shall be done with flexible wires of 1.5 sq mm. This wiring shall be terminated with lugs. |
|             | C | The wiring material like wires, lugs shall be supplied by the contractor as a part of execution.  |



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|      | D | The choke, charger, resistance shall be installed in such a manner that there should not be any congestion on the base.                                     |
|      | E | The floor on which these equipments shall be installed shall be of 20mm thick hylam board. This hylam board shall be supplied by the Railways.              |
|      | F | All the fuses shall be of D-type fuse. The necessary fuse base and fuse links shall be supplied by the contractor as a part of the execution of this item.  |
|      | G | The chokes and chargers shall be fixed with the help of screws on the hylam base.   |
|      | H | On a single hylam base not more than three equipments (chokes and chargers, apart from resistances) shall be installed.                                     |
|      | I | All the flexible wires shall be properly dressed so that none of the wire is loose and hanging.   |
|      | J | The batteries inside the battery box shall be placed on a hylam board. The necessary hylam board shall be supplied by the Railways.                         |
|      | K | Inside the termination of battery box the wiring shall be done with flexible wires (1.5 sq mm) with proper lugs.  |
|      | L | The batteries inside the battery box shall be fixed with antisliding arrangement of wood fixed on the hylam board.  |
| 4.20 |   | <b><u>Specifications and Requirements for the Crank Handle Relay Box:</u></b>   |
|      | A | The crank handle Relay box shall be fixed inside the ASM office.  |
|      | B | The crank handle Relay box shall be made of plywood of thickness not less than 15mm.  |
|      | C | The box shall be provided with vinear cover.  |
|      | D | All the CH relays shall be fixed inside the box as per the instructions of engineer in charge.  |
|      | E | The necessary angles required to fix the box on the wall shall also be supplied by the contractor. These shall be of MS and of thickness not less than 5mm. |
|      | F | One RED colour LED of 11 mm diameter shall be provided for each relay on the CH box. This LED shall also be supplied by the contractor.                     |
|      | G | The pressing button shall also be supplied by the contractor. The pressing button shall be of L&T make.   |
|      | H | The supporting angles of MS shall be fixed on the wall and the wall shall be re-masoned with proper mixture of cement.                                      |

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| <b>4.21</b> |   | <b><u>Specifications and Requirements for the fixing and wiring of QNA1 relays for cutting-In purposes:</u></b>  |
|             | A | The relays shall be fixed in the locations in the TOP rows.  |
|             | B | The relays shall be fixed in a manner that there should be gap of one relay after every two relays.  |
|             | C | The relays shall be fixed on square bars which shall be supplied by the contractor as a part of this item.   |
|             | D | For the wiring the flexible wires (16/0.2) shall be supplied by the contractor i.e. the contractor shall carry out the wiring with his own wires.  |
|             | E | All the contacts used shall be made parallel with one additional contact.  |
|             | F | The fixing material like square bars, nut/bolts etc shall be supplied by the contractor.   |
| <b>4.22</b> |   | <b><u>Specifications and Requirements for Painting, Varnishing and writing works:</u></b>  |
|             | A | All the equipments which need painting shall be fixed/installed with coating of Red Oxide i.e. Red Oxide should be coated before fixing/installation.  |
|             | B | After fixing/installations one coat of paint shall be applied on all the location boxes, signal units, signal posts and fittings, apparatus cases, point machines etc.   |
|             | C | The final coat of paint shall be applied just before the commissioning.  |
|             | D | The description writing work shall be carried out before the commissioning of the station.   |
|             | E | This description writing work includes writing the details in the Relay Room. This also includes varnishing, letter writing on terminal Nos. apparatus cases, point machine, Signal Nos. and other details as per S.E.M. part II |
|             | F | All the location boxes and the signal posts shall be painted with the distance of installation from the centre of the track.   |
| <b>4.23</b> |   | <b><u>Specifications and Requirements for the Panel cum Block Instrument table:</u></b>  |
|             | A | The block tables shall be provided as per the drawings and specifications of the concerned engineer in-charge.   |
|             | B | The block table shall be made of 15 mm plywood. The plywood shall be waterproof and termite proof.   |

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|      | C | The block table shall be provided with a cover of sunmica sheet or veneer sheet as per the approval of the engineer in charge.   |
| 4.24 |   | <b><u>Specifications and Requirements for the Earthing of the Power Equipment room:</u></b><br>The earthing arrangements shall be provided as per RDSO specifications no. RDSO/ SPN/197/2008 or latest with latest amendments.   |
| 4.25 |   | <b><u>Specifications and Requirements for the Installation of Power supply equipments:</u></b>   |
|      | A | The IPS and other power equipments along with batteries shall be transported to the site.  |
|      | B | The IPS shall be installed by the IPS supplier.  |
|      | C | From the IPS the power wires shall be dropped on ladders or other casing/protection arrangements. The power wires shall be supplied by the Railways. The ladder or casing shall be supplied by the contractor as a part of installation.   |
|      | D | All the power wires shall be terminated in the IPS through proper lugs. The lugs shall be supplied by the contractor as a part of wiring.  |
|      | E | All the power equipments including the ELDs shall be terminated by the contractor on proper lugs. The lugs shall be supplied by the contractor as a part of wiring. If the base stand is not provided by the OEM of ELD, then this shall be arranged at site. The clamps shall be supplied by the contractor and the Hylam board for the base shall be supplied by the Railway.  |
|      | F | The wiring shall be terminated as per the wiring scheme approved by the Railways. All the programme switches installation is also a part of this wiring. The base to support the programme switches shall be made of Hylam sheets of required thickness. This sheet shall be supplied by the Railways. Contractor has to cut it for proper sizes and install with proper angles having thickness not less than 3 mm. these angles shall be supplied by the contractor. |
|      | G | The power wire for the termination shall be supplied by Railways.  |
|      | H | Necessary termination details shall be painted on all the equipments.  |
|      | I | All the masonry work required at site shall be done by the contractor with his own material as a part of installation.   |
|      | J | The earthing of power supply equipments shall be connected to the system as provided vide clause 4.24 above. The earthing wire (preferable 6/16 sq mm) shall be provided by the Railways.  |
| 4.26 |   | <b><u>Specifications and Requirements for the</u></b>  |

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|      |     | <b><u>Supply and Installation of Test Board:</u></b>  |
|      | A   | The test board shall be designed, made and installed by the contractor with his own material in the Relay Room.   |
|      | B   | The board shall be so made that it shall be able to test all the Bus Bar supplies available in the Relay Room.  |
|      | C   | The board shall be made from minimum 12mm thick waterproof plywood and the surface shall be made from sunmica sheet as approved by the engineer in charge of the work. The size of the board shall be minimum 2 feet x 2 feet x 9 inch. |
|      | D   | The design and terminations shall be so that it shall be able to test both positive and negative parts of supplies.   |
|      | E   | For the Indication purposes the size of LEDs shall be of 10-12 mm for both positive and negative supply.  |
|      | F   | All the wiring material, fuses with base and terminations (preferably wago) material inside the box shall be supplied by the contractor.  |
|      | G   | The connectors shall be banana pin type connectors as approved by the engineer in charge.   |
|      | H   | The fixing arrangements shall also be done by the contractor with his own material.   |
| 4.27 |     | <b><u>Specifications and Requirements for charging of the secondary cells:</u></b>  |
|      | A   | All the secondary cells shall be charged as per the charging instructions of the OEM of the batteries.  |
|      | B   | The contractor shall supply the Acid/ Solution for the batteries at its own.  |
|      | C   | The batteries shall be charged and discharged minimum three times before the installation.  |
| 4.28 |     | <b><u>Specifications and Requirements for the Installation of AFTC equipments:</u></b>  |
|      | A   | <b><u>INDOOR EQUIPMENTS:</u></b>  |
|      | I   | All the indoor parts of AFTC equipments shall be installed as per the OEM's instructions.   |
|      | II  | The Racks shall be installed in the concerned room as approved by the engineer in charge.   |
|      | III | All the indoor equipments shall be properly fixed as per the installation manual which shall be verified by the engineer in charge.   |
|      | IV  | The wiring shall be done in a standard manner of wiring and   |

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|  |      | cabling as approved in the installation manual. All the connecting wires, cables, shielded wires shall be supplied by the contractor.   |
|  | V    | The connections between the field cables (quad cables) and the indoor equipments shall be done through the SPDs. These SPDs shall be supplied alongwith the AFTC equipments.  |
|  | VI   | The power supply shall be extended by the contractor to the indoor equipments as per the site instructions inside the slotted casing/coverings. The power wire shall be supplied by the Railways. However the D-type fuses of proper capacity with base shall be supplied by the contractor.  |
|  | VII  | All the contracts of the Vital Relays shall be repeated on the IDF by the contractor.   |
|  | VIII | All the indoor cables and the power wires shall be properly dressed on the ladder which shall be supplied by the contractor.  |
|  | IX   | Pre-commissioning checklist shall be jointly signed by the Railway's and OEM's representative.  |
|  | B    | <b><u>OUTDOOR EQUIPMENTS:</u></b>   |
|  | I    | The marking for the foundations shall be jointly decided as per the site requirements.  |
|  | II   | The foundation shall be prepared with the contractor's own material as per the drawings as mentioned in the clause 4.12 of chapter-IV.  |
|  | III  | The quad cables shall be taken inside TUs after properly testing.   |
|  | IV   | The TUs shall be fixed and cables shall be terminated as per the installation manual of the OEM.  |
|  | V    | Required holes shall be done for the S-bond and the site connections.   |
|  | VI   | The site connections shall be taken out of the TUs in a secured manner and the connections shall be terminated with the lugs of proper size at both the ends i.e. rails and TUs.  |
|  | VII  | The site connections shall be secured as per the standard practice and instructions of engineer in charge to make it safe from theft and damages. For this the site connections should be extended to the farther rail by laying the connections through proper track crossing and with protection of DWC pipe. DWC pipe for this shall be supplied by the contractor. All efforts shall be made that the site connections are bare minimum visible to outsiders to prevent |
|  | VIII | The S-bond shall be properly tied with the rails and sleepers with help of non metallic bonding clips as approved by the engineer in charge.  |
|  | IX   | Proper tuning shall be done as per the installation manuals and reading shall be jointly noted with Railway's representatives.  |

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|      | X    | All the details shall be painted about the track circuit no., frequency and type of TU.   |
|      | XI   | The joint checklist as per RDSO instructions shall be filled and submitted.   |
|      | XII  | The TUs shall be sealed properly to prevent the entry of insects from all the possible holes and slots.   |
|      | XIII | Pre-commissioning checklist shall be jointly signed by the Railway's and OEM's representative.  |
| 4.29 |      | <b><u>Specifications and Requirements for the Installation of DAC equipments:</u></b>   |
|      | A    | <b><u>INDOOR EQUIPMENTS:</u></b>  |
|      | I    | All the indoor parts of DAC equipments shall be installed as per the OEM's instructions.  |
|      | II   | The Racks shall be installed in the concerned room as approved by the engineer in charge. If the supplied system is not approved with the cabinet then the system shall be installed in the standard Relay racks of the Railways. These relay racks shall be supplied by the Railways but shall be installed by the contractor. |
|      | III  | All the indoor equipments shall be properly fixed as per the installation manual which shall be verified by the engineer in charge.   |
|      | IV   | The wiring shall be done in a standard manner of wiring and cabling as approved in the installation manual. All the connecting wires, cables, shielded wires shall be supplied by the contractor.   |
|      | V    | The connections between the field cables (quad cables) and the indoor equipments shall be done through the SPDs. These SPDs shall be supplied alongwith the DAC equipments.   |
|      | VI   | The power supply shall be extended by the contractor to the indoor equipments as per the site instructions inside the slotted casing/coverings. The power wire shall be supplied by the Railways.<br><br>However the D-type fuses of proper capacity with base shall be supplied by the contractor.                             |
|      | VII  | All the contracts of the Vital Relays shall be repeated on the IDF by the contractor.   |
|      | VIII | All the indoor cables and the power wires shall be properly dressed on the ladder which shall be supplied by the contractor.  |
|      | IX   | Pre-commissioning checklist shall be jointly signed by the Railway's and OEM's representative.  |



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|      | B    | <b><u>OUTDOOR EQUIPMENTS:</u></b>  |
|      | I    | The marking for the foundations shall be jointly decided as per the site requirements.   |
|      | II   | The foundation shall be prepared with the contractor's own material as per the drawings as mentioned in the clause 4.12 of chapter-IV.                                       |
|      | III  | The quad cables shall be taken inside DPs after properly testing.  |
|      | IV   | The DPs shall be fixed and cables shall be terminated as per the installation manual of the OEM.   |
|      | V    | Required holes shall be done for the site connections. The site connections shall be laid as mentioned in the foundation drawings.   |
|      | VI   | The site connections shall be taken out of the DPs in a secured manner i.e. the connections shall be buried in the ground at a depth of minimum 0.8-1.0 meters in DWC pipes. |
|      | VII  | The DWC pipes shall be filled with sand to prevent the entry of rodents inside the pipe.   |
|      | VIII | Proper tuning shall be done as per the installation manuals and reading shall be jointly noted with Railway's representatives.   |
|      | IX   | All the details shall be painted about the track circuit no., DP no. etc.  |
|      | X    | The joint checklist as per RDSO instructions shall be filled and submitted.  |
|      | XI   | The DPs shall be sealed properly to prevent the entry of insects from all the possible holes and slots.  |
|      | XII  | Pre-commissioning checklist shall be jointly signed by the Railway's and OEM's representative.   |
| 4.30 |      | <b><u>Supply and Provisioning of VINYL FLOORING:</u></b>   |
|      | I    | The vinyl flooring shall be supplied with minimum 1.5mm thickness.   |
|      | II   | The colour of the flooring and the sample shall be got approved from the engineer in charge at site.   |
|      | III  | Before the laying of flooring the floor shall be neatly cleaned.   |
|      | IV   | The flooring shall be pasted with proper adhesive material. This material shall also be supplied by the contractor.  |
| 4.31 |      | <b><u>SPECIFICATIONS AND REQUIREMENTS FOR INSTALLATION OF ELECTRICALLY</u></b>   |

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|  |     | <b><u>OPERATED LIFTING BARRIOR:</u></b>   |
|  | I   | First of all joint marking shall be done by Railway and Contractor's supervisor for the installation of the gate.   |
|  | II  | The foundations for the gate machine and Boom Resting Post shall be made as per the drawing issued to the supervisor by the Railways.   |
|  | III | The gate machine and the boom resting post shall be erected as per the standard arrangements.   |
|  | IV  | The wiring of gate machine and the cable terminations for the circuits issued by the Railways in the location box shall be done by the contractor as per the standard practice of the cable termination as mentioned in this tender.                                      |
|  | V   | The contractor shall also dig the trench across the Road Crossing for the cable extension to the solenoid coil. The cable shall be laid in GI/RCC pipe which shall be laid in the trench. Separate provision of trenching and pipe/cable laying is a part of this tender. |
|  | VI  | All the Relays fixing and jumpering in the Relay room/Hut shall be done by the contractor as a part of installation of the L.C. gate.   |
|  | VII | All the Road signals shall be erected and, fixed with hooters and signal lighting units with wiring, as a part of installation of the LC gate. The foundations for the Road Signal are covered in the schedule separately.  |
|  | VII | The gate shall be finally adjusted, tested and commissioned as per the requirements of the Railway.   |

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| <b>4.32</b> |   | <b><u>SPECIFICATIONS AND REQUIREMENTS FOR FOUNDATION OF SLIDING BOOM ASSEMBLY:</u></b>  |
|             | A | Before starting the digging work for foundation the location of the foundation shall be jointly verified and signed by the representatives of Railways and Contractor.  |
|             | B | While finalizing the location of foundation it must be taken care that the schedule of dimensions is strictly adhered to.   |
|             | C | It must be taken care that the foundation of Sliding Boom shall not be in any case on the banking of the terrain. If the foundation of the bank is unavoidable (only in exceptional circumstances) due to site conditions necessary support should be provided as approved by the Engineer in charge. |
|             | D | Total no of 10 foundations shall be provided per LC gate.   |
|             | E | The size of the foundation should be 2 ft X 2ft in Length and   |

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|      |    | breadth the depth will depend upon the site condition and as per the condition of the soil. The depth of the foundation shall vary from site to site and will be decided by the Engineer in charge. If the foundation is to be made on the leveled area, then the standard drawing shall be followed. If due to site requirements the foundation is to be made on the bank area then the depth of the foundation shall be suitable increased. The extra amount of concreting required for this shall be paid from the item of providing cement concreting. |
|      | F  | The foundations for the boom's resting pedestals and the foundation for the E type lock post shall be made by the contractor by the concreting material as per the drawings issued by the Railways. The foundations shall be made in such a manner that the foundation is well minimum 0.5 meter in the earth keeping in mind that the upper level of the boom is fixed as per the Road conditions.  |
|      | G  | The cement should be of grade 53 of reputed brand such as ACC, Birla, JK ,Ambuja , JP, Binani ,Sanghi the date of purchase should not be older than 1 month.   |
|      | H  | Cement Concrete work for miscellaneous items in the ration 1:3: 6 includes excavation, ramming, with 12 mm steel rods at each corner duly formed in a type of a cage.  |
|      | I  | Item includes curing and plastering with 1 : 4 cement - sand mixture ( Aggregate not exceeding 3 : 8 cm ).   |
|      | J  | Aggregate, cement, sand and holding down bolts, nuts shall be supplied by the contractor.  |
|      | K  | Due to local condition in very special circumstances if the size of the foundation for all the above items required to be increased/decreased, the extra payment /deduction for variation of the CC work shall be calculated on volumetric basis and paid to the contractor from the schedule of cement concreting.  |
|      | L  | Brick masonry in ratio 1:6cement and mortar including plastering with cement 1:4 cement and sand mixture both sides 20mm thick each II nd class bricks, including excavation curing, grouting ,bolting etc. Wherever required bricks and cement shall be supplied by the contractor.   |
| 4.33 |    | <b><u>SPECIFICATIONS AND REQUIREMENTS FOR INSTALLATION OF SLIDING BOOM ASSEMBLY:</u></b>   |
|      | I  | The sliding boom assembly shall be supplied by the Railways. The contractor has to transport the assembly to the site by its own as a part of installation.  |
|      | II | The contractor shall also dig the trench across the Road Crossing for the cable extension to the solenoid coil. The cable shall be laid in GI/RCC pipe which shall be laid in the trench. Separate provision of trenching and pipe/cable laying is a part of this tender. If the separate provision has not been made then this  |

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|      |     | activity shall be done under the installation item.  |
|      | III | All the Relays fixing and jumpering in the Relay room/Hut shall be done by the contractor as a part of installation of the L.C. gate. If the separate provision has not been made then this activity shall be done under the installation item.  |
|      | IV  | The contractor shall install the sliding boom assembly alongwith the lock post as per the instructions of the supervisor at the site.  |
|      | V   | All the wiring and relay fixing arrangement shall be done by the contractor by its own material.   |
|      | VI  | Installation testing and commissioning shall include shifting wiring & reinstallation of emergency lever lock &/OR KLCR, Fixing of hylum sheet etc as per the site incharge.   |
| 4.34 |     | <b><u>NOTE:</u></b>  |
|      | A   | All the works shall be executed as per Principal's (OEM's) installation and commissioning manual. This includes supply of materials and accessories whichever have not been specifically mentioned in schedule. The cost of which is to be included in the labour charges of the concerned item of the schedule. The pre-commissioning checklist shall be signed by the representatives of the Railways, contractor and OEM.   |
|      | B   | Except the amount printed in rates, sub-total & total amount of schedule of work, if at any place in tender documents any mistakes due to printing will be found in description of items, specifications, drawing, etc. & terms & conditions in tender document, the Railway has full power to rectify the same which will be binding for Contractor to agree the same after rectification. In this regard, the decision of Railway will be final and no any argument will be accepted from Contractor side. |
|      | C   | If any item missing from the tender but required for smooth working of the system, the tenderer shall specify the same and quote the rate and quantity in the tender schedule.   |
|      |     | <p style="text-align: center;"><b>For Senior Divisional Signal &amp; Telecom Engineer,</b><br/> <b>Central Railway, Mumbai-400001.</b></p> <p><b>For and on behalf of the President of India</b></p>   |

# **CHAPTER-V**

# **ANNEXURES AND**

# **PERFORMAS**

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|                         | <b>FOR EXTRA CLARIFICATION REFER GCC 2022</b>   |

**ANNEXURE-I****INSTRUCTIONS FOR SUBMITTING THE TENDERS AS JOINT VENTURE FIRMS**

On Non-judicial stamp of Rs. 100/-

**MEMORANDUM OF UNDERSTANDING****FOR JOINT VENTURE AGREEMENT**

1. This memorandum of understanding executed this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_ between \_\_\_\_\_ (Name of Co.) \_\_\_\_\_ a company registered under the Companies Act 1956 having its registered office at \_\_\_\_\_ represented through its Director / Authorized Representative \_\_\_\_\_ (hereinafter referred to as \_\_\_\_\_ which expression shall unless repugnant to the context thereof includes its successors) of the **FIRST PART.**

AND / OR

M/s. \_\_\_\_\_ a partnership firm constituted under the Indian Partnership ACT 1932, having its registered office at \_\_\_\_\_, represented through its partner Shri \_\_\_\_\_ / Authorized Representative Shri \_\_\_\_\_ (hereinafter referred to as \_\_\_\_\_ which expression shall unless repugnant to the context thereof includes its successors) of the **FIRST PART.**

AND / OR

M/s. \_\_\_\_\_ a proprietary concern having its registered office at \_\_\_\_\_ represented through its sole proprietor Shri \_\_\_\_\_ (hereinafter referred to as \_\_\_\_\_ which expression shall unless repugnant to the context thereof includes its successors) of the **FIRST PART.**

Whereas, the party of the First part i.e. M/s.\_\_\_\_\_ details to be supplied of the expertise in their field.

Whereas, the party of the Second part M/s.\_\_\_\_\_ details to be supplied of the expertise in their field.

Whereas, the party of the third part M/s.\_\_\_\_\_ details to be supplied of the expertise in their field.

AND whereas parties to this MOU have agreed to co-operate with each other to associate jointly and to form a Joint Venture Firm to participate in the CR Tender of Indian Railways.

Now, therefore, in consideration of the promises and mutual promises and of the undertaking contained herein, it is hereby agreed between the parties of the MOU as follows:

1. **The purpose of MOU**-M/s. \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_ agree to Co-operate with each other for the purpose of joint participation in the CR Tender and in the event, the contract is awarded, to jointly execute the contract. The broad interfaces and scope of work of each party is set forth below:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. The name of the Joint Venture firm shall be \_\_\_\_\_

3. The parties, hereto, represent that:

- a) They are in possession of all approvals and valid authorization for the purpose of execution of this MOU.
- b) They have not entered into any agreement / MOU of equal or similar nature with any third party for the CR Tender.

That each of the parties of JV, agrees and undertake to place at the disposal of the JV, benefits of its individual experience, technical knowledge and skill and shall in all respects bear its share of the responsibility, including the provision of information advice and other assistance required in connection with the works. The share and the participation of the partners in the JV shall broadly be follows:

M/s. \_\_\_\_\_ %

M/s. \_\_\_\_\_ %

M/s. \_\_\_\_\_ %

“That M/s. \_\_\_\_\_ shall be the lead member of J.V. firm who shall have a majority (at least 51%) share of interest in the JV firm. The other members shall have a share of not less than 20% each (in case of JV firm with up to three member) / The other members shall have a share of not less than 10% each (in case of JV firm with more than three members). In case of JV firm with foreign member(s), the lead member has to be an Indian firm with a minimum share of 51% (strike out which is not applicable)

And all right, interest, liabilities, obligations, work experience and risks (net profits or net losses) arising out of the contract shall be shared or borne by the Parties in proportionate to these shares. Each of the parties shall

bound by guarantees, sureties required for the work as well as its proportionate share in working capital and other financial requirements.

4. The parties to this MOU undertake:

- a) That after submission of the tender, the MOU shall not be modified / altered/terminated during the validity of the tender including extension and maintenance period except when modification becomes inevitable due to succession laws etc., but in no case the minimum eligibility criteria would be vitiated.
- b) That after the contract is awarded the constitution of the J.V. Firm shall not be altered during the currency of contract except when modification becomes inevitable due to Succession Law etc., “but in no case the minimum eligibility criteria would be vitiated”.
- c) That with respect of the CR Tender neither party, nor any subsidiary company of either Party, not any joint venture company or any other entity, in which the party / parties, is or are in any way interest, shall complete together with or through any third party, nor shall be parties advise, consult for, engage in or otherwise assist in any way person or entity or any affiliate thereof in respect of any orders or contracts related to this tender.
- d) That none of the members of joint ventures is black listed and / or debarred by the Railways or and other ministry or department of Govt. of India / State Govt. from participation in contract / under in the past either in individual capacity or the JV Firm or partnership firm in which they were / are members / partners.

5. Joint & Several Liability.

In respect of the CR Tender, all commercial terms shall comply each part on back-to basis specifications of the CR Tender or any other mutually agreed terms with the Owner Customer. The Parties hereto shall, if awarded the contract for the project for which the Joint Venture is formed, be jointly and severally liable to the Indian Railways for execution of the project in accordance with the contract. The Parties hereto also undertake to be liable jointly and severally for the loss, damages caused to the Indian Railways in course of execution or due to non-execution of the contract or part thereof arising out of the contract.

6. Shri\_\_\_\_\_ be authorized partner / person on behalf of the Joint Venture to deal with tender, to sign the agreement or enter into contract in respect of the said tender, to receive payment, to witness joint measurement of work done, to sign measurement books, and similar such action in respect of CR tender / Contract. All notices /correspondence with respect to the contracts would be sent only to this authorized partner / person of the J.V. firm.

7. Notwithstanding anything herein, in respect of the CR Tender, with regard to the internal relationship, the inter se liabilities between the parties shall be in proportion to their respective scope of work and shall be subject to the provisions of this MOU.

8. Responsibility.

Each Party shall assume and accept full responsibility for its Scope of Work and the obligations imposed in the Contract and in this MOU as if it was, with regard to this Scope of Work, an independent partner contracting individually

with the Customer. In the event of any defect and damage or any claim arising from the Customer under the Contract or any third party in relation to or as a consequence of any failure to meet the performance specification the Party, within whose Scope of Work the claim arises, shall be entirely responsible for the claim and shall indemnify and hold harmless the other Party from any liability, demand, claim burden cost, expense attorney's fees and costs arising from thereof.

9. Assignability

No party to the Joint Venture has right to assign or transfer the interest, right or liability in the contract without the written consent of the other party and that of the Railway.

10. Use of Machinery, Instruments, Labour Force etc.

The Parties here to undertake that whatever the machinery, instruments, Labour force (including unskilled, skilled, inspectors, Engineers etc.) they possess at the time of entering into joint Venture Agreement or which subsequently shall come in their possession and if such machinery, instruments, labour force is required for the speedy and efficient execution of the work, the Party / Parties having the control over the said machinery, instrument, labour force etc. without having any regard to their share of profit and loss agreed to between the Parties in Joint Venture Agreement shall hand over the same at the disposal of the other party who is actually executing the work for the purpose of execution of the contract without any hindrances and obstacle.

11. Duration of MOU

It shall be valid during entire currency of contract including the period of extension, if any and also till the maintenance period is over or till all the contractual liabilities including warranty /guarantee obligations are discharge completely.

12. Applicable Law.

The MOU and any arrangement /agreements regarding the performance shall be construed and interpreted in accordance with and governed by the Laws of India and shall be subject to the exclusive jurisdiction of the courts at the place where MOU is executed / signed between the parties.

13. Settlement of Disputes.

In the event of disputes arising from the MOU, the Parties to the MOU undertakes to Endeavour to settle the said disputes amongst them amicably. However, if the parties fail to resolve the disputes amongst them amicably, the said disputes arising out of or in connection with the present MOU shall be resolved through Arbitration as per the provisions enshrined under the Arbitration and Conciliation Act, 1996 or /and statutory modifications made thereafter.

14. All communications or notices provided for herein shall be in the English language and be delivered, mailed, or tele-faxed to the Parties addresses as indicated below:-

M/s. \_\_\_\_\_

M/s. \_\_\_\_\_

All correspondence and notices to the Joint Venture firm shall be addressed to the Lead Member i.e. M/s. \_\_\_\_\_/Shri \_\_\_\_\_ at the address stated herein below:-

M/s. \_\_\_\_\_

Such communication or notices shall be deemed to have been duly given when so delivered or, if mailed, when received at destination.

15. Each Part shall have full and sole responsibility to bear the expense of and effect the payment of any taxes, duties, special insurance, fees or assessments of any nature whatsoever (including personal income taxes levied or imposed or any of its employees or personnel or any of its sub-contractor's employees or personnel) including penalties and interest, if any, levied in connection with the execution of this MOU.

In witness whereof, the Parties have caused this MOU to be executed by their respective authorized representative on the date and year mentioned herein above.

Signature:-

Signature:-

Signature:-

Shri \_\_\_\_\_ of Shri \_\_\_\_\_

of Shri \_\_\_\_\_

of

M/s. \_\_\_\_\_

M/s. \_\_\_\_\_

M/s. \_\_\_\_\_

Witnesses:

1) Name:

Address:-

2) Name:

Address:-

**For Senior Divisional Signal & Telecom Engineer,  
Central Railway, Mumbai-400001**

**For and on behalf of the President of India.**

**CENTRAL RAILWAY****AGREEMENT FOR WORKS****CONTRACT AGREEMENT NO.****DATED** \_\_\_\_\_

ARTICLES OF AGREEMENT made this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_ between President of India acting through the Railway Administration hereafter called the "Railway" of the one part and \_\_\_\_\_ herein after called the "Contractor" of other part. WHEREAS the Contractor has agreed with the Railway for performance of the works \_\_\_\_\_ set forth in the Bill(s) of Quantities hereto annexed upon the Standard General Conditions of Contract, updated with correction slips issued up to date of inviting tender or as otherwise specified in the tender documents and the Specifications of \_\_\_\_\_ updated with correction slips issued up to date of inviting tender or as otherwise specified in the tender documents and the applicable Standard Schedule of Rates (SSOR) of \_\_\_\_\_ updated with correction slips issued up to date of inviting tender or as otherwise specified in the tender documents and the Special Conditions and Special Specifications, if any and in conformity with the drawings here-into annexed AND WHEREAS the performance of the said works is an act in which the public are interested.

NOW THIS INDENTURE WITNESSETH that in consideration to the payments to be made by the Railways, the Contractors will duly perform the said works in the said Bill(s) of Quantities set forth and shall execute the same with great promptness, care and accuracy in a workman like manner to the satisfaction of the Railway and will complete the same in accordance with the said specifications and said drawings and said conditions of contract on or before the \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_ and will maintain the said works for a period of \_\_\_\_\_ Calendar months from the certified date of their completion and will observe, fulfill and keep all the conditions therein mentioned (which shall be deemed and taken to be part of this contract, as if the same have been fully

set forth herein), AND the Railway, both hereby agree that if the Contractor shall duly perform the said works in the manner aforesaid and observe and keep the said terms and conditions, the Railway will pay or cause to be paid to the Contractor for the said works on the final completion thereof the amount due in respect thereof at the rates specified in the Bill(s) of Quantities hereto annexed.

Contractor \_\_\_\_\_ (Signature) Railway: Designation \_\_\_\_\_

Address \_\_\_\_\_ (For President of India)

Date \_\_\_\_\_ Date \_\_\_\_\_

Signature of Witnesses (to Signature of Contractor) with address:

Witnesses:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



**ANNEXURE III****PROFORMA FOR PREVIOUS EXPERIENCE OF CONTRACT/CREDENTIALS**

| Sr. No. | Name of similar work carried out in the past or being executed at present | Place & with which authority | Tender Cost | Time taken for completion of work |                   |
|---------|---|------------------------------|-------------|-----------------------------------|-------------------|
|         |   |                              |             | As stipulated in the Contract     | Actual Time taken |
| 1       | 2   | 3                            | 4           | 5                                 | 6                 |
|         |   |                              |             |                                   |                   |
|         |   |                              |             |                                   |                   |
|         |   |                              |             |                                   |                   |

Signature \_\_\_\_\_

Please fill in the questionnaire below:-

Give details of your previous experience in the manufacture and how long you have been manufacturing the stores as listed in this tender.

Give particulars of the present production capacity of the factory where the stores would be manufactured. (Please give details of license and the capacity for which you are licensed by Government).

Give the names of your Bankers and their reference.

Give details of the registration number, if you are registered for supply to Indian Railways (or any other Railway), DGS & D and NSIC, and the class of stores for which you are registered.

NOTE: This form shall be filled precisely and with full details.

**PROFORMA FOR STATEMENT OF DEVIATIONS**

- (1) The following are the particulars of deviations from the requirements of the instructions to Tenderers, General and Special Conditions of contract- (Chapter-II)

| Clause | Deviation | Remarks<br>(including justification) |
|--------|-----------|--------------------------------------|
|        |           |                                      |
|        |           |                                      |
|        |           |                                      |

- (2) The following are the particulars of deviations from the requirements of the tender specification. (Chapter-III & IV)

| Clause | Deviation | Remarks<br>(Including justification) |
|--------|-----------|--------------------------------------|
|        |           |                                      |
|        |           |                                      |
|        |           |                                      |

Signature and seal of the  
Manufacturer/Tenderer.

Note: Where there is no deviation, the statement should be returned duly signed with an endorsement indicating "No Deviations".

**TENDER NO.** \_\_\_\_\_**Requisition-cum-receipt for the material**

Requisition-cum-receipt for the material

Sr. No. \_\_\_\_\_

Date: \_\_\_\_\_

Please arrange to supply the bearer \_\_\_\_\_  
\_\_\_\_\_**Description of materials required**

| <b>Qty</b> | <b>Nos.</b> | <b>in words</b> | <b>In figures</b> |
|------------|-------------|-----------------|-------------------|
|            |             |                 |                   |

at (place of supply) \_\_\_\_\_

Station \_\_\_\_\_

for sub-section between Km. \_\_\_\_ to Km. \_\_\_\_ against Contract No. \_\_\_\_\_  
\_\_\_\_\_\_\_\_\_\_  
Signature of the Contractor/Contractors\_\_\_\_\_  
(Specimen signature)

(B) Received the above material Qty. \_\_\_\_ (fig) \_\_\_\_\_ as mentioned above.

On \_\_\_\_\_ received in good condition and I/We undertake the responsibility for replacement / payment of/ for the same as shall be deemed fit by the Railway in terms of Special Conditions

Station:  
Contractor(s)\_\_\_\_\_  
Signature of the

Date:

**ANNEXURE VI**

**INDEMNITY BOND**

Indemnity Bond for safe custody of Railway material to be supplied to  
M/s. \_\_\_\_\_ under Tender no.

\_\_\_\_\_ We, M/s. \_\_\_\_\_  
(hereinafter called the Contractor) do hereby undertake that we shall hold in our  
custody for and on behalf of the President of India acting in the premises through  
the General Manager, Central Railway or for him all Railway materials which have  
been handed over to us against the contract for Tender no.  
\_\_\_\_\_ dt. \_\_\_\_\_ for the work  
of \_\_\_\_\_ ” by the  
Railway for the purpose of execution of the said contract until such time the  
materials are duly installed and/or erected or otherwise handed over to the Railway.

We shall be entirely responsible for the safe custody and protection of the said  
materials against all risk till they are duly delivered as installed and/or erected  
equipment to the Railway or as directed otherwise and shall indemnify the Railway  
against any loss, damage or deterioration whatsoever in respect of the said  
materials. The said materials shall at all-time be opened to Inspection by any Officer  
authorized by the General Manager, Central Railway or his nominee.

Should any loss, damage or deterioration of materials occur or surplus materials  
disposed off and a refund becomes due, the Railway shall be entitled to recover from  
us the full cost and compensation determined in terms of the contract for such loss  
or damage, if any, along with the amount to be refunded without prejudice to any  
other remedies available to him by deduction from any sum due or any sum which  
at any time thereafter becomes due to us under the said or any other contract.  
In the event of any loss or damage as aforesaid the assessment of such loss or  
damage and the assessment of the compensation therefore would be made by the  
President of India acting through the General Manager, Central Railway or his  
authorized nominee shall be final and bind upon us.

Signed at \_\_\_\_\_ on this day of \_\_\_\_\_

Signature of Witness: \_\_\_\_\_

for & on behalf of M/s. \_\_\_\_\_

**Name of Witness in BLOCK LETTERS :** \_\_\_\_\_

**ADDRESS:** \_\_\_\_\_

**PROFORMA FOR BANK GUARANTEE BOND**

The President of India,

Acting Through the

**Senior Divisional Finance Manager,**

**CSTM ,Mumbai-400 001.**

**Central Railway.**

1. In consideration of the President of India (hereinafter called “the Government”) having agreed to accept from.....(hereinafter called “the said contractor/s”), under the terms and conditions of an Agreement/Acceptance letter dated .....made between.....and

.....(hereinafter called “the said Agreement”) the Performances Guarantee for the due fulfillment by the Contractor/s of the terms and conditions in the said Agreement on production of Bank Guarantee for

Rs.....(Rupees.....

.....only) we,.....(indicate the name of Bank thereafter referred to as “the Bank”) at the request of .....contractor/s do hereby undertake to pay the government an amount not exceeding Rs.....against any loss or damage caused to or suffered by or would be caused to or suffered by the Government by reason of any breach by the said Contractor(s) of any of the terms or conditions contained in the said Agreement.

2. We,..... (indicate the name of Bank) do hereby undertake to pay the amounts due and payable under this guarantee without any demur, merely on demand from the Government stating that the amount claimed is by way of loss or damage caused to or suffered by the Government by reason of breach by the said contractor/s of any of the terms or conditions contained in the said agreement or by reason of the contractor/s failure to perform the Agreement , any such demand made on the bank shall be conclusive as regards the amount due and payable to

the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs.....

3. We undertake to pay to the Government any money so demanded notwithstanding any dispute or dispute raised by the contractor/s/supplier(s) in any suit or proceeding pending before any Court or Tribunal relating thereto liability under this present being absolute and unequivocal. The payment so made by us under this bond shall be a valid discharge of our liability for payment there under and the contractor(s)/supplier(s) shall have no claim against us for making such payments.

4. We..... (indicate the name of the bank) further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Agreement, including Maintenance/Warrantee Period, and that it shall continue to be enforceable till the dues of the Government under or by virtue of the said agreement have been fully paid and its claims satisfied or discharge or till \_\_\_\_\_ office/Department. Ministry of Railway certifies that the terms and conditions of the Agreement have been fully and property carried out by the said Contractor(s) and accordingly discharged this guarantee, unless a demand or claim under this guarantee is made on us in writing on or before the .....we shall discharge from all liability under this guarantee thereafter.

5. We,..... (indicate the name of the bank ) further agree with the Government that the Government shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of terms and conditions of the said agreement or to extend time of performance by the said contractor(s) from time to time or to postpone from any time or from time to time any of the powers exercisable by the Government against the said contract and to forebear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such variation, extension being granted to the contractor/s for any forbearance act or commission on the part of the Government or indulgence by the Government to the said contractor/s or such any matter or thing whatsoever which under the law relating to sureties would , but for this provision, have effect of so relieving us.



6.This Guarantee will not be discharge due to the change in the constitution of the bank or the Contractor(s)/Suppliers(s)

7. We,..... (Indicate the name of Bank).....undertake not to revoke this guarantee during its currency except with the previous consent of the Government in writing.

Date this.....day of .....2013.

For .....

(Indicate the name of Bank)

Signature of Tenderer

**For Senior Divisional Signal &TelecomEngineer,**

**Central Railway, Mumbai-400001**

**For and on behalf of the President of India.**

**Certificate of no relative being an employee of Central railway**

I/We the under signed hereby solemnly declare and certify that I/ We do not have any of our relative/relatives employed in the Central railway (Signal and Telecom department) except the names mentioned herein under:

1.....

2.....

3.....

and so on .....

Note:- Names ,Designation , Name of office, Headquarter of the tenderer's relative in Central railway (Signal and Telecom Department) to be mentioned by the tenderer/ tenderers in 1,2, 3 and so on above.

Signature of Tenderer / Tenderers

***Format for authorization letter from OEM(s)***

(The authorization letter, printed on the original stationery of the OEM, is to be submitted by the Bidder along with the Bid as a requirement of Eligibility Criteria)

Ref. No: .....

Date : \_\_\_\_\_

To,

**Senior Divisional Signal &TelecomEngineer,**

**Central Railway, Mumbai-400001**

**For and on behalf of the President of India.**

**Dear Sir,**

Sub:- Tender Enquiry for (Name of Work)\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

-----

With reference to the Tender Enquiry for (Name of work)

---

\_\_\_\_\_ this is to certify that we (**name of manufacturer & address**) authorize (**name & address of participating bidder**) to include equipments manufactured by us in their bid. We undertake the responsibility to render all kind of repair & maintenance

support to the bidder as mentioned in the Tender Document in case a contract is awarded to M/s.(**name of the bidder**) based on their Bid and subsequent confirmations, if any, submitted by them to you.

We request you to kindly consider the bid submitted by (**name of the bidder**) for execution of the aforesaid work including supply and installation of equipment manufactured by us.

\_\_\_\_\_  
(Signature)

Seal of  
the  
Company

Name of the Person : \_\_\_\_\_

Authorized Signatory

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

**Annexure – X (LIST of DRAWINGS)**

| <b>Sr. No</b> | <b>ITEM</b>   | <b>Drawing No.</b>           |
|---------------|---|------------------------------|
| 1             | Relay Rack  | R-ST-10891                   |
| 2             | Cable Rout marker   | R-ST-11440                   |
| 3             | Apparatus Case – Half (Post Box)  | R-ST-11176/C                 |
| 4             | Apparatus Case – Full   | R-ST-11175/C                 |
| 5             | Slotted angle arrangements  | CSTE-WR-1097                 |
| 6             | RCC Channel DUCT -With cover (Trunking)   | R-ST-11916, R-ST-11639       |
| 7             | GI TROUGHING for bridges  | CSTE-WR-3004                 |
| 8             | Foundation for Digital Axle Counter(Siemens)  | R-ST-12065                   |
| 9             | Foundation for Digital Axle Counter(ELDYNE)   | R-ST-12066                   |
| 10            | Main Signal foundation AND Shunt Signal Foundation  | R-ST-11173                   |
| 11            | Foundation for Battery Box  | Dy CSTE/C/BCT/SG(BB) 1157/1  |
| 12            | ‘A’ Marker  | R-ST-11444                   |
| 13            | ‘C’ Marker  | R-ST- 11445                  |
| 14            | Arrow for shunt Sig   | R-ST-11803                   |
| 15            | Signal Number plate   | R-ST-11393                   |
| 16            | Shunt Signal number plate   | R-ST-11804                   |
| 17            | ‘AG’ Marker   | S23460                       |
| 18            | ‘P’ Marker  | S23456                       |
| 19            | ‘G’ Marker  | SA23477                      |
| 20            | GOODS WARNING BOARD   | RDSO SA 2380 (adv) or latest |
| 21            | Cable Trenching, Laying, Termination, Fixing of pipes/troughings on bridges, Cable Meggaring etc. | CSTE-WR-3611 (1-11)          |
| 22            | Normal Earth  | CSTE-WR-6091                 |

**OEM's Site Installation Certificate**

**(For EI,SSDAC/MSDAC,UFSBI/AFTC/BPAC,IPS ,Dataloggeronly )**

**To,  
Sr.DSTE,  
Mumbai CST,  
Central Railway**

This is to certify that verification of system installation (details given below) has been completed by undersigned (OEM representative) and all necessary arrangements like earthing, surge protection, power supply, power & communication cables, and equipment wiring meet the required standards of engineering for trouble free working of installed system.

1. System being commissioned:

2. Station / Section:

3. Division:

4. Date of commissioning:

.....

**Name of RDSO approved Original Equipment Manufacturer:**

.....

**Name of OEM representative with Designation:**

.....

**Signature of OEM representative with Date:**

**LIST OF TOOLS (ONE SET)**

| <b>SR.NO.</b> | <b>DESCRIPTIONS</b>                       | <b>QTY.</b> | <b>MAKE</b>          |
|---------------|---|-------------|----------------------|
| 1             | Crimping Tools (Varic crimp ) 0.25-4 sqmm | 1           | Wago part No 206-204 |
| 2             | Insulated flat plier 125 mm               | 1           | Taparia / Jhalani    |
| 3             | Insulated side cutter plier 1.50mm        | 1           | Taparia / Jhalani    |
| 4             | Combination plier 200 mm (insulated)      | 1           | Taparia / Jhalani    |
| 5             | Wire stripper (0.02-10 sqmm)              | 1           | Wago part No 206-124 |
| 6             | Insulated nose plier 160 mm               | 2           | Taparia / Jhalani    |
| 7             | Monkey plier 10"                          | 1           | Taparia / Jhalani    |
| 8             | Screw driver 1.5 sqmm                     | 1           | Wago part No 210-619 |
| 9             | Screw driver 2.5/4 sqmm                   | 1           | Wago part No 210-620 |
| 10            | Insulated screw driver 150 x 5 mm         | 1           | Taparia / Jhalani    |
| 11            | Insulated screw driver 150 x 6 mm         | 1           | Taparia / Jhalani    |
| 12            | Insulated screw driver 150 x 8 mm         | 1           | Taparia / Jhalani    |
| 13            | Insulated screw driver 250 x 8 mm         | 1           | Taparia / Jhalani    |
| 14            | Insulated screw driver 250 x 10 mm        | 1           | Taparia / Jhalani    |
| 15            | Hammer with handle 500gm.                 | 1           | Taparia / Jhalani    |
| 16            | Cable knife 4"                            | 1           | Superior Quality     |
| 17            | Flat chisel 175 x 20 mm                   | 1           | Superior Quality     |
| 18            | Flat chisel 100 x 10 mm                   | 1           | Superior Quality     |
| 19            | Brass brush                               | 1           | Superior Quality     |
| 20            | Test probe (Red)                          | 1           | Wago part No 210-136 |
| 21            | Steel measuring tape                      | 1           | Superior Quality     |



|               |   |             |  |
|---------------|---|-------------|--|
| 22            | Adjustable screw wrench 6" (155mm)  | 1           | Taparia / Jhalani                              |
| 23            | Adjustable screw wrench 8" (205mm)  | 1           | Taparia / Jhalani                              |
| 24            | Adjustable screw wrench 10" (255mm)   | 1           | Taparia / Jhalani                              |
| 25            | Soldering Iron 220 V, 50/65W  | 1           | Soldron Make                                   |
| 26            | Element for above   | 2           | Soldron Make                                   |
| 27            | Solder wire 60/40, 18 SWG , 500 gms   | 08<br>Rolls | Ghilco/Khosla                                  |
| 28            | Tin Cutter  | 1           | Ceco/ Good Quality                             |
| 29            | Box Spanner 5mm to 10mm   | 1 each      | Max/Tepco/Good Quality                         |
| 30            | Continuity buzzer   | 2           | Max/Tepco/Good Quality                         |
| 31            | Analog multimeter   | 1           | RISHABH OR MECO                                |
| 32            | Digital multimeter 4½ Digits 20000 Counts<br>9 Functions; 32 Ranges   | 2           | FLUKE OR Rishabh make                          |
| 33            | Megger standard make 100 V & 500 V One each   | 2           | RISHABH/ MECO/ MEGGAR/MOTWANI OR Superior make |
| <b>NOTE:-</b> |   |             |  |
| 1             | All tools shall be of the best manufacturer. The Rly. Reserves the right to reject the entire/part tools found to be of inferior quality. |             |  |
| 2             | The tools as listed above shall be supplied in a Tool Box of G.I. Sheet with Navtal lock.   |             |  |

**Note: Proof of authorization from Original manufacturer shall be submitted along with offer letter of Safe Earthing Electrode System stating that it is as per IS: 3043-1987.**

**1. Technical SPECIFICATION OF SAFE EARTHING ELECTRODE SYSTEM:**

- 1.1 It should be as per the IS: 3043-1987 requirement or latest.
- 1.2 It should be **pipe in pipe technology** i.e. there should be two pipes one inside the other. Both the pipes should be Hot Dip Galvanized (80 – 100 Microns) M.S. Pipes ORB-Class mild steel pipes of dia. 50 mm & 100 mm respectively.
- 1.3 Safe earthing electrode should not be in direct contact with the soil.
- 1.4 Galvanization of the pipes should be adequate.
- 1.5 The safe earth electrode should be non-corrosive/Crystalline Conductive Mixture (CCM) – having anti corrosive and conductive property.
- 1.6 The backfill compound should be insoluble in water and it should be a mixture of mineral and chemicals which can retain moisture, enhances conductivity, reduces soil resistivity and adheres to any surface it touches, helping in faster dissipation of fault current.
- 1.7 The earthing electrode should be of three meter in length.

**Note: Proof of authorization from original manufacturer shall be submitted along with offer letter of Safe Earthing Electrode System stating that it is as per IS: 3043-1987.**

**2. Installation, testing commissioning of safe earthing electrode system:**

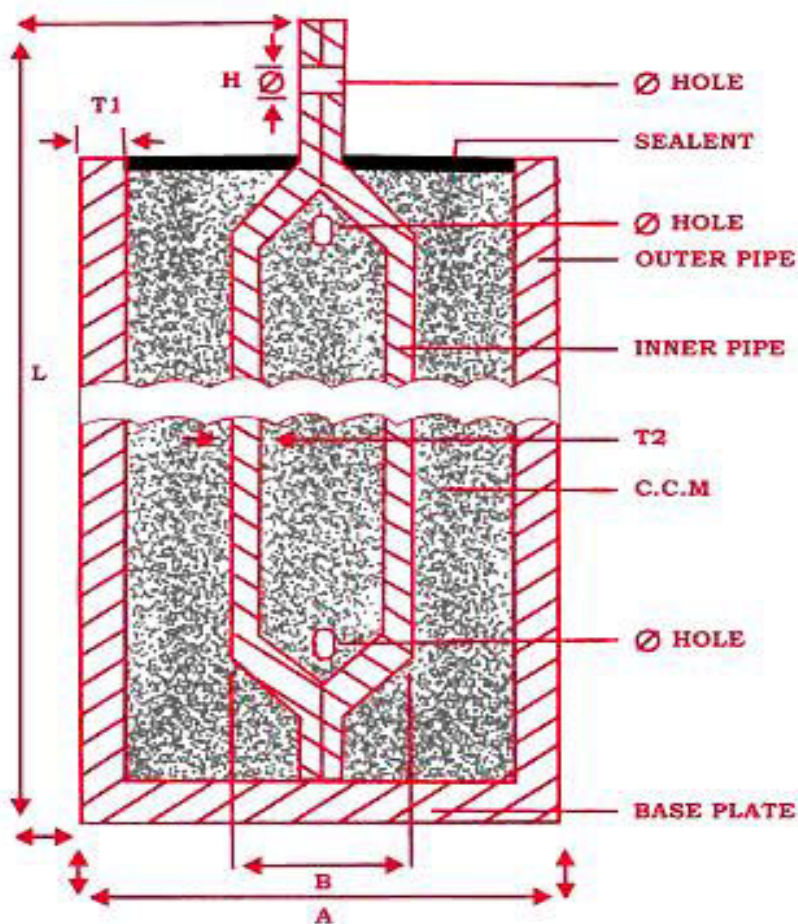
- 2.1 The size of the earth pit should be of 1 feet dia. and 10.5 feet deep.
- 2.2 The excavated soil is suitable as a backfill but should be sieved to remove any large stones and placed around the electrode, taking care that it is very well compacted.
- 2.3 The backfill compound used for filling the earth pit should be properly mixed with the dug out soil and filled around the earthing electrode.
- 2.4 The terminal of the electrode should be approximately 6” to 8” above the surface of the soil.
- 2.5 The terminal of the electrode should be enclosed in a brick cement chamber of suitable size as per site requirement.
- 2.6 The back filling of pit shall be done by tamping and consolidating the excavated soil. All the soil that is excavated shall be put back to the pit and care shall be taken in consolidation to ensure that the back filling does not

suffer any sinkage in monsoon. The left out earth if any within station limit has to be thrown out from Railway premises by the contractor at his own cost.

- 2.7 The earthing electrode should be connected to earthing bus bar in the equipment room through PVC insulated copper wire of size 16 mm multi strand wire with proper lugs and bolts at both the ends.
- 2.8 **Procedure for proper installation:** Make a bore of 8" to 10" india manually upto the electrode length and than put a little quantity of backfill compound (a layer of minimum 3" to 4") inside the pit and drop the electrode exactly in the center of the pit. Now mix the soil that has been dug out with the backfilling compound. Now pour the above mixture in small quantity into the pit followed by water and remove the trapped air inside the pit by poking a rod in the mixture repeatedly. Repeat the above exercise till the pit is completely filled up. Poor sufficient water so that mixture is in paste form. Allow the pit to absorb the water and became compact. Test the earth pit and connect it to the equipment. Avoid excess watering. Do not hammer the earth electrode. During testing and commissioning of the installation the contractor's engineers will be available at site for testing and commissioning and also for doing any wiring alterations which will be required during testing and commissioning.

### **3. TECHNICAL REQUIREMENTS (With Fig.)**

- 3.1 **Design:** Pipe in Pipe Technology
- 3.2 **Materials:** Hot Dip Galvanized (80 – 100 Microns) M.S. Pipes
- 3.3 **Inside filling material:** Crystalline Conductive Mixture (CCM) – having anti corrosive and conductive property.
- 3.4 **Back Fill Compound:** Excellent moisture retaining capacity reduces the soil resistivity, helps in faster dissipation of fault current.
- 3.5 **Specification: - 50 mm dia x 3 meter long** - suitably approved by any of the specified testing Institutes. Short Withstand and Peak Withstand current test: 20 kA rms for 1.0 second and 50 kA peak, no abnormality during test, no visible external damage to the electrode after the test, no visible damage to the earthing electrode on physical inspection.



| Length | Outer | Inner | H  |     |     |      |        |                         |
|--------|-------|-------|----|-----|-----|------|--------|-------------------------|
| Mm     | Dia   | Dia   | Ø  | T1  | T2  | PIPE | GALV   | Compound                |
|        | Mm    | mm    | mm | SWG | SWG |      | μ      | C.C.M.                  |
| 3000   | 49    | 25    | 14 | 18  | 14  | G.I. | 80-100 | Filled in annular space |

*(All the above given dimensions may vary  $\pm 1$  MM)*

**LIST OF SCAFFOLDING MATERIAL REQUIRED FOR 1 RELAY  
RACK(Annexure II as per NIT).**

| SN | DESCRIPTION  | SIZE                | UNIT | QTY |
|----|--|---------------------|------|-----|
| 1  | Relay racks with all fixtures spacers  |                     | Nos. | 1   |
| 2  | IDF pillars with fixtures  |                     | Nos. | 1   |
| 3  | Top frame angle for 1 relay rack   | 65x65x1105mm/1656mm | Nos. | 1   |
| 4  | Bottom frame angle for 1 relay rack  | 65x65x1105mm/1656mm | Nos. | 1   |
| 5  | IDF Bottom angle for 6 pillars   | 65x65x1105mm/1656mm | Nos. | 2   |
| 6  | IDF Top angle for 6 pillars  | 65x65x1105mm/1656mm | Nos. | 2   |
| 7  | Vertical support angle for RH  |                     | Nos. | 1   |
| 8  | Vertical support angle for LH  |                     | Nos. | 1   |
| 9  | Triangle base assembly with 'J' bolts, nut, flat and spring washers.   |                     | Nos. | 2   |
| 10 | Insulators with fixing studs, spring and flat washer (one stud each for one insulator). Stud size-   | 12x25mm & 12x20mm   | Nos. | 8   |
| 11 | Cable support assembly i.e. 'L' Bracket with 4 nos. of bolts with nut, spring and plain washer for each L bracket.   | 8x25mm & 6x50mm     | Nos. | 4   |
| 12 | 16 way fuse holder (1.6A/0.6A) mounting strips with studs, spring and plain washer.  |                     | Nos. | 3   |
| 13 | 8-way fuse holder (6A) mounting strips with stud, spring and plain washer.   |                     | Nos. | 1   |
| 14 | Bracket for mounting 16way/8 way fuse stripes with nuts, bolts and washers, (i.e. top bracket). All angle and stripes shall be 6mm & 5mm thick respectively. |                     | Nos. | 2   |
| 15 | Brackets for mounting 16-way stripes (i.e. bottom)   |                     | Nos. | 2   |
| 16 | Cable supporting stripes   | 5x20x210mm          | Nos. | 10  |
| 17 | Cable supporting stripes   | 5x20x150mm          | Nos. | 4   |
| 18 | String rod with PVC insulation (sleeve) fixing bracket and stud with spring and plain washer.  |                     | Nos. | 10  |
| 19 | 11mm bus bar with 16 sqmm Lugs with PVC cover and fixing arrangement (Bracket for fixing   |                     | Nos. | 1   |

|    |   |              |       |    |
|----|---|--------------|-------|----|
|    | cover) nut & bolts.   |              |       |    |
| 20 | Square bar for fixing 8 nos. of mini group base plate.  |              | Nos.  | 16 |
| 21 | PVC sleeve for insulating wire run supports on IDF pillars and at other places.   | 16mm         | Mtrs. | 15 |
|    | Angle of various sizes for frame wall support and cable run support (interspacing between racks) (All angles of 6mm thick). |              |       |    |
| 22 | a) Angle  | 65x65x2000mm | Nos.  | 1  |
|    | b) Angle  | 40x40x2000mm | Nos.  | 1  |
|    | c) Angle  | 40x40x1350mm | Nos.  | 1  |
|    | d) Angle  | 40x40x1000mm | Nos.  | 2  |
|    | e) Angle  | 65x65x1000mm | Nos.  | 1  |
| 23 | Angle pieces for wall support angles with 'J' bolts, nuts, springs and plain washer having 13mm holes and 8mm holes.        |              |       |    |
|    | a) Angle pieces with 23mm holes at both 65mm side.  | 65x65x65     | Nos.  | 1  |
|    | b) Angle pieces with one hole 13mm and other 9mm on 40mm side.  | 40x40x35     | Nos.  | 2  |
| 24 | Cable support 'U' Bracket.  | 540x100mm    | Nos.  | 3  |
| 25 | 'C' bracket for cable run support (5mm thick) 20mm width MS flat to be used.  | 200x200 mm   | Nos.  | 6  |
| 26 | 'C' bracket for cable run support (5mm thick) 20mm width MS flat to be used.  | 200x150x20mm | Nos.  | 6  |
| 27 | Signal resistance mounting assembly complete fixtures and fasteners.  |              | Nos.  | 1  |
| 28 | Guide rails with fixuters and fasteners for-  |              |       |    |
|    | a) Point group RRI  |              | Nos.  | 1  |
|    | b) Point chain group  |              | Nos.  | 1  |
|    | c) Route group  |              | Nos.  | 1  |
|    | d) Main signal group  |              | Nos.  | 1  |
|    | e) Shunt signal group   |              | Nos.  | 1  |
| 29 | MS flat strip for mounting AG timers  |              | Set   | 1  |
| 30 | Resistance and condenser mounting assembly Quantity and size as per requirement.  |              | Lot   | 1  |
| 31 | Anodized nuts and bolts with plain and spring washer  |              |       |    |

|       |   |           |       |     |
|-------|---|-----------|-------|-----|
|       | a)'J' bolts for fixing square bars.   |           | Nos.  | 10  |
|       | b)Stud for fixing relay base plate  | 4x20 mm   | Nos.  | 100 |
|       | c)Bolts with nuts   | 6x20 mm   | Nos.  | 15  |
|       | d)Bolts with nuts   | 6x25 mm   | Nos.  | 100 |
|       | e)Bolts with nuts   | 6x40 mm   | Nos.  | 10  |
|       | f)Bolts with nuts   | 6x50 mm   | Nos.  | 10  |
|       | g)Bolts with nuts   | 6x75 mm   | Nos.  | 5   |
|       | h)Bolts with nuts   | 8x25 mm   | Nos.  | 5   |
|       | i)Bolts with nuts   | 12x25mm   | Mtrs. | 5   |
| 32    | Rack joining pieces.  |           |       | 1   |
| 33    | Ladder for cable run support and power wiring with ladder joining pieces and bolts with nuts and washers.   |           |       |     |
|       | a)400x1500mm  | 40x40x6mm | Nos.  | 1   |
|       | b)200x1500mm  | 25x25x5mm | Nos.  | 1   |
|       | c)150x1500mm  | 25x25x3mm | Nos.  | 2   |
| 34    | Blue colour PVC sleeve.   | 2.5mm     | Mtr.  | 1   |
| 35    | Relay rack designation board, L shape complete with fixing clamps.  |           | Nos.  |     |
| Not e | MS angle and strap should be OF MALHOTRA or TISCO or SIMILAR  |           |       |     |
| Not e | Above list is indicative and suitable for Siemens type relay based installations, any other material required other than listed above or variation in quantity (more/less) shall be supplied as per site requirement free of cost. If firms desires to supply other than Siemens make groups then base plates/ Increase in relay racks should be supplied free of cost. |           |       |     |



**ANNEXURE -XV****LIST OF SCAFFOLDING MATERIAL REQUIRED FOR ONE CABLE TERMINATION RACK.**

| SN | DESCRIPTION   | SIZE                         | UNIT | QTY |
|----|---|------------------------------|------|-----|
| 1  | Cable termination complete with all fixtures, fasteners and spares.   |                              | Nos. | 1   |
| 2  | Top frame angle for relay rack (2 way) 6mmthick   | 65x65x1104mm                 | Nos. | 1   |
| 3  | Bottom frame angle for relay rack (2 way) 6mmthick  | 65x65x1104mm                 | Nos. | 1   |
| 4  | Vertical support angle RH   | 6mm thickx65x65              | Nos. | 1   |
| 5  | Vertical support angle LH   | 6mm thickx65x65              | Nos. | 1   |
| 6  | Triangle base assembly with 'J' bolts nuts, springs and plain washer  |                              | Nos. | 2   |
| 7  | Insulators with two stud each with flat and spring washer.  | 12mm x 20mm & 12mm x 25mm    | Nos. | 4   |
| 8  | L Bracket re cable support assembly complete with fixtures and fasteners.   |                              | Nos. | 1   |
| 9  | Cable support stripes (U) i.e. 'U' Bracket.   |                              | Nos. | 1   |
| 10 | 8-way 6A fuse mounting stripes  |                              | Nos. | 1   |
| 11 | Cable supporting strips with fasteners  | 5mmx20mmx150mm               | Nos. | 3   |
| 12 | String rods with fixing bracket and fasteners complete with PVC insulation  |                              | Nos. | 20  |
| 13 | Square bars for fixing 8-way terminal block, 4nos.on each bar compete with studs for fixing 8-way terminal blocks nuts, bolts flat and spring washers for fixing square bars. |                              | Nos. | 20  |
| 14 | Angles for wall support, complete with angle piece 'J' bolts, bolts with nuts, plain and spring washer with   | 40mmx40mmx1000mm (6mm thick) | Nos. | 1   |
| 15 | Ladder for outdoor cable support made of 40mm x 40mm x 6mm angle  | 500mm x 2000mm               | Nos. | 1   |

|   |  |                              |      |   |
|---|--|------------------------------|------|---|
| 16  | Ladder for indoor cable run support made of 40mm x 40mm x 6mm angle        | 400mm x 1500mm               | Nos. | 1 |
| 17  | 8-way tag block complete with its fixing assembly, fixtures and fasteners. |                              | Nos. | 8 |
| 18  | Forming sheets with white colour   | 3x 1200x 2400mm              | Nos. | 1 |
| 19  | Angle for wall support   | 40mmx40mmx2000mm (6mm thick) | Nos. | 2 |
| 20  | Any other material required for erection of CT Rack                        |                              | Nos. |   |
| Above list is indicative, any other material required other than listed above or variation in quantity (more/ less) shall be supplied by the contractor as per site requirement free of cost. |  |                              |      |   |

**Technical Specification for schedule item no.-3****ISOLATION TRANSFORMER 10 KVA**

|                             |  |
|-----------------------------|--|
| INPUT Voltage (Primary)     | 230V (183V to 264V)  |
| Output Voltage (Secondary)  | 230V (183V to 264V)  |
| Output power                | 10 KVA   |
| No load current             | Less than 8% of full load at nominal voltage   |
| Regulation                  | $\pm 3\%$  |
| Common Mode Noise Rejection | More than 130dB  |
| DC Galvanic Isolation       | More than 1000M Ohm between any Winding or Winding to Case.  |
| Break Down Voltage          | 2.5KV AC for 2 Minutes between any winding or Winding to Case.   |
| Acceptable Line frequency   | 46 to 56 Hz  |
| Input /Output Termination   | Terminal Strips  |
| Construction                | Multiple shielding technologies in order to reduce coupling capacitance to avoid transfer of electrical noise from Input to Output.  |
| Marking                     | All markings/indications shall be placed in the vicinity of the components to which they refer and shall not be placed on removable parts.<br><br>Supply voltage has to be indicated nearby the same.                            |
| Instruction Manual          | The Manual shall be provided with every equipment. It should clearly illustrate installation, connection and operating procedures.   |
| Test and Requirements       | Conditions of Tests: Unless otherwise specified all tests shall be carried out at ambient atmospheric condition.<br><br>For inspection of material relevant clauses of this specification shall also apply.                      |
| Acceptance test             | a. Visual Inspection.<br>b. Performance test.  |
| Packing and labeling.       | Units shall be packed in suitable boxes/crates, strong enough, with additional packing to prevent damage or loss to the unit during transit. Loose space inside the box/crate shall be filled up with suitable packing material. |

**DETAILS OF DESIGN SET**

| Design set of following specifications or higher |                          |  |
|--|--------------------------|--|
| 1  | PROCESSOR & MOTHER BOARD | Intel I7 or AMD Ryzen 7 with latest generation and version or equivalent |
| 2  | HARD DISK DRIVE          | 512 SSD or better  |
| 3  | KEY BOARD CASE           | OEM original attachable Bluetooth keyboard case                          |
| 5  | MONITOR/DISPLAY          | 12" touch display with OEM PEN & PROTECTIVE CASE (WITH OUT KEYBOARD)     |
| 6  | MAIN MEMORY              | 16 GB RAM or higher  |
| 9  | PORTS                    | 2 x USB-C ports.   |
| 10   | SOFTWARE                 | Licensed WINDOWS 11, MS Office, Antivirus                                |
| 11   | Model                    | Microsoft Surface Pro or similar   |



**ANNEXURE -XVIII****DETAILS OF DATALOGGER (IRS.S.99/2001)**

|    |  |   |        |
|----|--|---|--------|
| A  | DATA LOGGER WITH CENTRAL MONITORING UNIT Intel Core i7 4770 BASED WITH MODEM/NETWORKING INTERFACE & FAULT ALARM SYSTEM SOFTWARE AND OTHER ACCESSORIES COMPLETE WITH POWER SUPPLY, SOFTWARE, PRINTER (DOT MATRIX), MONITOR, PRINTER RACK, COMPUTER TABLE, SPIKE PROTECTOR, UPS ETC., AS PER IRS 99/2001) WITH LATEST AMENDMENT. |   |        |
| B  | ACCESSORIES OF DATA LOGGER (ONE SET TO BE SUPPLIED WITH 1 SET OF DATA LOGGER   |   |        |
| 1  | PROCESSOR & MOTHER BOARD   | Intel Core i7 4770 , 3.4 Ghz, 8 MB Cache or higher. Intel Q67 or higher on OEM motherboard.   | 1 SET. |
| 2  | HARD DISK DRIVE  | 1TB   | 1 NO.  |
| 3  | DVD DRIVE  | 52X/24X/52X DVD-RW drive  | 1 NO.  |
| 4  | KEY BOARD & Mouse  | Wireless  | 1 NO.  |
| 5  | DVD WRITER   | OMEGA MAKE (EXTERNAL) or equivalent   | 1 NO.  |
| 6  | PRINTER  | HP Laser Jet 1022 or equivalent.  | 1 NO.  |
| 7  | MONITOR  | 21" LED colour monitor.   | 1 NO.  |
| 8  | MAIN MEMORY  | 8 GB DDR3 RAM or higher.  | 1 NO.  |
| 9  | SOUND CARD   | Standard along with 2 nos. loud speakers.   | 1 SET. |
| 10 | POWER SUPPLY UPS 500 VA (AOC MAKE) 1 NO.   | Spike protector with UPS 1KVA (with 2 hrs backup for 5 Amps load.) Emerson/Etech/Microteck/AOL  | 1 NO.  |
| 11 | VIDEO CARD   | 1 GB Graphic Processor  | 1 NO.  |
| 12 | CABINET  | Mini ATX power cabinet  | 1 NO.  |
| 13 | MODEM  | 56 KBPS INTERNAL  | 1 NO.  |
| 14 | PORTS  | 6 USB ports, 1 RS-232 serial port, Audio port for microphone and headphone in front. 10/100 MBPS ETHERNET, HDMI Port etc.                       | 1 NO.  |
| 15 | MULTICARD READER   | Standard in front panel   | 1 NO.  |
| 16 | SOFTWARE   | Licensed WINDOWS 10 (64BIT), MS Office 2010 or latest & antivirus preloaded with media & documentation and certificate of authenticity with CD. | 1 NO.  |
| 17 | WORK STATION   | a. Composite computer table of Godrej make no. T-102.   | 1 NO.  |
|    |  | b. Chair Godrej make PCH-7002.  | 1 NO.  |
| 18 | DVD-R  | CD STORAGE BOX STORING 20 DVD WITH COVER  | 2 NO.  |

The above Data logger and CMU mentioned above should be placed in President Rack of suitable rack to be supplied by the Contractor.

**LIST OF OPERATING TOOLS FOR WAGO(As per NIT annexure to be followed)**

| <b>SR.NO.</b> | <b>DESCRIPTIONS</b>   | <b>QTY.</b> | <b>MAKE</b>             |
|---------------|---|-------------|-------------------------|
| 1             | Crimping Tools (Varic crimp) 0.25-4 sqmm  | 1           | Wago part No 206-204    |
| 2             | Crimping Tool UPTO 25sqmm   | 1           | Taparia Or Similar      |
| 3             | Insulated flat plier 125 mm   | 1           | Taparia / Jhalani       |
| 4             | Insulated side cutter plier 1.50mm  | 1           | Taparia / Jhalani       |
| 5             | Combination plier 200 mm (insulated)  | 1           | Taparia / Jhalani       |
| 6             | Wire stripper (0.02-10 sqmm)  | 4           | Wago part No 206-124    |
| 7             | Insulated nose plier 4 to 12 inch   | 1 Each      | Taparia / Jhalani       |
| 8             | Hexa Black Frame Small with Blade 6 inch  | 2           | Superior Quality        |
| 9             | Screw driver 1.5 sqmm   | 1           | Wago part No 210-619    |
| 10            | Screw driver 2.5/4 sqmm   | 1           | Wago part No 210-620    |
| 11            | Insulated screw driver 150 x 5 mm   | 1           | Taparia / Jhalani       |
| 12            | Insulated screw driver 150 x 6 mm   | 1           | Taparia / Jhalani       |
| 13            | Insulated screw driver 150 x 8 mm   | 1           | Taparia / Jhalani       |
| 14            | Insulated screw driver 250 x 8 mm   | 1           | Taparia / Jhalani       |
| 15            | Insulated screw driver 250 x 10 mm  | 1           | Taparia / Jhalani       |
| 16            | Cable knife 4"  | 1           | Superior Quality        |
| 17            | Test probe (Red)  | 1           | Wago part No 210-136    |
| 18            | Cotton measuring tape 15 Mtr  | 2           | Superior Quality        |
| 19            | Adjustable screw wrench 6" (155mm)  | 1           | Taparia / Jhalani       |
| 20            | Adjustable screw wrench 8" (205mm)  | 1           | Taparia / Jhalani       |
| 21            | Adjustable screw wrench 10" (255mm)   | 1           | Taparia / Jhalani       |
| 22            | Soldering Iron 220 V, 25/35/50/65W  | 3           | Soldron Make Or Similar |
| 23            | Box Spanner 5mm to 10mm   | 1each       | Max/Tepco/Good Quality  |
| 24            | Continuity buzzer   | 10          | Max/Tepco/Good Quality  |
| <b>NOTE:-</b> |   |             |                         |
| 1             | All tools shall be of the best manufacturer. The Rly. Reserves the right to reject the entire/part tools found to be of inferior quality. |             |                         |

**DETAILS OF RESISTANCE, CONDENSER, LUGS ETC (To be read as annexure-V of NIT).**

| <b>SN</b> | <b>DESCRIPTION</b>  | <b>QTY.</b> |
|-----------|---|-------------|
| 1         | RESISTANCE WIREWOUND ADJUSTABLE -80 OHMS 50 W             | 10          |
| 2         | RESISTANCE WIREWOUND ADJUSTABLE -50 OHMS 25 W             | 20          |
| 3         | RESISTANCE WIREWOUND ADJUSTABLE 12.5 OHMS 25 W            | 10          |
| 4         | RESISTANCE WIREWOUND ADJUSTABLE -600 OHMS 10 W            | 2           |
| 5         | RESISTANCE 100 OHM 10 W                                   | 100         |
| 6         | RESISTANCE WIREWOUND ADJUSTABLE -300 OHMS 10 W            | 2           |
| 7         | RESISTANCE 1000 OHMS 1 W                                  | 100         |
| 8         | CONDENSOR 1000 MFD 150V DC                                | 20          |
| 9         | CONDENSOR 500 MFD 150V DC                                 | 15          |
| 10        | CONDENSOR 250 MFD 150V DC                                 | 15          |
| 11        | CONDENSOR 25 MFD 150V DC                                  | 25          |
| 12        | LED WITH HOLDER 5 MM ( RED 100, YELLOW 100 & GREEN 100)   | 100         |
| 13        | JUMBO LED 10 MM WITH HOLDER (RED, YELLOW & GREEN 10 NOS.) | 30          |
| 14        | VOLTMETER AC/DC,0-150V 65 MM ROUND,SEW MAKE               | 12          |
| 15        | DIODES IN 4007  | 400         |
| 16        | STEEL GRIP PVC TAPE ROLLS ( 20 MMX 10 M.T.)               | 60          |



**Tool Kit for Digital Axle Counter. (1 Set consist of)**

| TOOL KIT - 01 Main line with BBIK M12 GS02 |                 |  |     |     |
|--|-----------------|--|-----|-----|
| Calssified                                 |                 |  |     |     |
| Sr. No.                                    | Item code - ERP | Description  | Qty | UOM |
| 1  | 100328          | TOOL KIT - 01 Main line with BBIK M12 GS02   | 1   | No. |
| 2  | 100394          | Metal tool Box with 5 Compartments 525 x 220 x 210 mm (+/- 10 mm tolerance)              | 1   | No. |
| 3  | 100395          | Plumb line 2 mtrs with weights for mounting height measurement                           | 1   | No. |
| 4  | 100396          | Combination Spanner 13 mm  | 2   | No. |
| 5  | 102312          | Torque wrench 20....100Nm, reversible type torque wrench                                 | 1   | No. |
| 6  | 100398          | Metal Wire brush with metal mesh 4 Row & length 140 mm, Total brush length approx. 290mm | 1   | No. |
| 7  | 100399          | Measuring Tape 3 Meter   | 1   | No. |
| 8  | 100400          | 3/8" drive Hex Socket,Size:17mm CR-V   | 1   | No. |
| 9  | 100401          | 3/8" drive Hex Socket,Size:19mm CR-V   | 1   | No. |
| 10   | 100402          | Measuring probes (Red & Black, length: 100 cm each, with 2mm and 4mm banana socket)      | 1   | Set |
| 11   | 100403          | Screw Driver, Size : 3 x 100 mm Flat   | 1   | No. |
| 12   | 100404          | Screw Driver, Size : 4 x 100 mm Flat   | 1   | No. |
| 13   | 100405          | Screw Driver, Size : 3 x 100 mm Star   | 1   | No. |
| 14   | 100406          | Screw Driver, Size : 4 x 100 mm Star   | 1   | No. |
| 15   | 100407          | Wire Cutter (100 mm, SS)   | 1   | No. |
| 16   | 100408          | Hand Gloves, Black Nylon Seamless Knitted Glove With Purple Nitrile Coating On Palm      | 1   | Set |
| 17   | 100409          | WD40 Spray Small bottle  | 1   | No. |
| 18   | 101770          | Testing plate PB200-TS GS01  | 1   | No. |
| 19   | 100411          | Torch  | 1   | No. |
| 20   | 100412          | 1/4" DR. Spinner Handle Size: 12-1/4", Overall length: 310 mm CR-V                       | 1   | No. |
| 21   | 100413          | 1/4"DR. 6PT Metric Standard Socket   | 1   | No. |
| 22   | 100415          | Gedore 6256120 31 KR 20-36 Friction Type ratchet with ring 36 mm                         | 1   | No. |
|  |                 |  |     |     |

**DIAGNOSTIC PC- MSDAC**

|   |                          |  |       |
|---|--------------------------|--|-------|
| MSDAC MONITORING CONSOLE FOR MONITORING ALL THE DPS INSTALLED AT STATION /ARH / I BH etc. From reputed make OEM like HP, DELL , LENOVA etc., desktop or portable, with following specifications |                          |  |       |
| 1   | PROCESSOR & MOTHER BOARD | Intel I5 or AMD Ryzen 5 with latest generation and version or equivalent | 1 SET |
| 2   | HARD DISK DRIVE          | 512 SSD or better  | 1 NO. |
| 3   | KEY BOARD & MOUSE        | Wired (DESKTOP) /built-in (for portable)                                 | 1 NO. |
| 4   | PRINTER                  | HP LaserJet M208dw or equivalent/better                                  | 1 NO. |
| 5   | MONITOR                  | 21" color monitor (Desktop)/ minimum 13"inch (for Portable)              | 1 NO. |
| 6   | MAIN MEMORY              | 16 GB RAM or higher  | 1 NO. |
| 7   | SOUND CARD               | Built-in   | 1 SET |
| 8   | POWER SUPPLY UPS         | UPS 1 KVA with buit-in battery (for DESKTOP)                             | 1 NO. |
| 9   | VIDEO CARD               | Buit-in  | 1 NO. |
| 10  | PORTS                    | USB, HDMI,100/1000 Mbps Ethernet   | 1 NO. |
| 11  | SOFTWARE                 | Licensed WINDOWS 11, MS Office, Antivirus                                | 1 NO. |
| 12  | WORK STATION             | a. Composite computer table of Godrej make no T -102 or equivalent       | 1 NO. |
|   |                          | b. Chair Godrej make PCH-7002 or equivalent                              | 1 NO. |

**ANNEXURE - XXIII**

**Specifications for Microprocessor based  
Earth resistance sensing unit For Quad Cable**

|  |   |  |
|--|---|--|
| Number of channels                       | : | 12 channels  |
| Input working voltage                    | : | 110V A.C. +/- 10%  |
| Frequency                                | : | 50 to 60 Hz  |
| Rated voltage of network to be monitored | : | 50V AC max.  |
| Stray DC voltage                         | : | 100 V DC   |
| Measuring supply                         | : | 50 V DC max.   |
| Measuring current                        | : | 0.2 mA max.  |
| Measuring device                         | : | 8 bit microcontroller with internal oscillator & phase locked loop. Also with programmable analog & digital block with programmable interconnect system. |
| Indicating device                        | : | Alpha numeric 16 x 2 LCD with backlight for 1channel at a time with Auto Changing Scanner.   |
| AC internal resistance                   | : | More than 400 K ohms   |
| Alarm setting value                      | : | Less than 20 mega ohm.   |
| PCB                                      | : | Glass epoxy Double side 1.6mm thick, tin masking. All connections to pcb should be through detachable plug in type connectors.                           |
| Alarm                                    | : | Audiovisual alarm.   |
| Housing                                  | : | M.S. typical size is 280 x 150 x 170 mm, +/- 10 mm.  |
| Connections                              | : | Male/female connectors suitable for 2.5 sq. mm wire.   |

**Details of Monitoring Console**

|    |                          |  |        |
|----|--------------------------|--|--------|
| 1  | PROCESSOR & MOTHER BOARD | Intel I5 or AMD Ryzen 5 with latest generation and version or equivalent | 1 SET. |
| 2  | HARD DISK DRIVE          | (512 GB SSD) or better.  | 1 NO.  |
| 3  | DVD DRIVE                | 52X/24X/52X DVD-RW drive   | 1 NO.  |
| 4  | KEY BOARD & Mouse        | wired keyboard and mouse.  | 1 NO.  |
| 5  | MONITOR                  | 21" LED colour monitor.  | 1 NO.  |
| 6  | MAIN MEMORY              | 16GB RAM(latest version) or higher.                                      | 1 NO.  |
| 7  | SOUND CARD               | Standard along with 2 nos. loud speakers.                                | 1 SET. |
| 8  | VIDEO CARD               | Built in video graphics card or Higher.                                  | 1 NO.  |
| 9  | CABINET                  | Mini ATX power cabinet   | 1 NO.  |
| 10 | MODEM                    | 56 KBPS INTERNAL.  | 1 NO.  |
| 11 | PORTS                    | USB, HDMI, RS232, 100/1000 Mbps ethernet, microphone                     | 1 NO.  |
| 12 | MULTICARD READER         | Standard in front panel  | 1 NO.  |
| 13 | SOFTWARE                 | Licensed WINDOWS 11, MS Office, Antivirus                                | 1 NO.  |

## **Specification for Fire Alaram System**

Effective from dd.mm.yyyy

RDSO/SPN/xxx/2016

Version-0

|   |  |                    |
|---|--|--------------------|
| <b>DOCUMENT DATA SHEET</b>  |  |                    |
| <b>RDSO/SPN/XXX/2016</b>  |  | <b>Version 0.0</b> |
| <b>Title of Document</b><br>DRAFT SPECIFICATION FOR AUTOMATIC FIRE DETECTION &ALARM SYSTEM for POWER EQUIPMENTS & RELAY ROOMOF PI/RR/SSI/EI INSTALLATIONS |  |                    |
| <b>Authors</b><br><br>See Document Control Sheet  |  |                    |
| <b>Approved by RDSO</b><br><b>Name: Sh. Deepak Bansal</b><br><b>Designation: Executive Director (Co-Ord)/Signal</b><br><b>RDSO, Lucknow</b>               |  |                    |
| <b>Abstract</b><br>DRAFT SPECIFICATION FOR AUTOMATIC FIRE DETECTION &ALARM SYSTEM for POWER EQUIPMENTS & RELAY ROOM OF PI/RR/SSI/EI INSTALLATIONS         |  |                    |

**ANNEXURE-XXVI**

**FORMAT FOR CERTIFICATE TO BE SUBMITTED / UPLOADED BY TENDERER  
ALONGWITH THE TENDER DOCUMENTS**

I.....(*Name and designation*)\*\*appointed as the attorney/authorized signatory of the tenderer (including its constituents),

M/s\_\_\_\_\_ (hereinafter called the tenderer) for the purpose of the Tender documents for the work of \_\_\_\_\_ as per the tender No.\_\_\_\_\_ of \_\_\_\_\_(*Railway*)\*\*, do hereby solemnly affirm and state on the behalf of the tenderer including its constituents as under:

1. I/we the tenderer (s) am/are signing this document after carefully reading the contents.
2. I/We the tenderer(s) also accept all the conditions of the tender and have signed all the pages in confirmation thereof.
3. I/we hereby declare that I/we have downloaded the tender documents from Indian Railway website [www.ireps.gov.in](http://www.ireps.gov.in) . I/we have verified the content of the document from the website and there is no addition, no deletion or no alteration to the content of the tender document. In case of any discrepancy noticed at any stage i.e. evaluation of tenders, execution of work or final payment of the contract, the master copy available with the railway Administration shall be final and binding upon me/us.
4. I/we declare and certify that I/we have not made any misleading or false representation in the forms, statements and attachments in proof of the qualification requirements.
5. **I/We also understand that my/our offer will be evaluated based on the documents/credentials submitted along with the offer and same shall be binding upon me/us.**
6. **I/We declare that the information and documents submitted along with the tender by me/us are correct and I/we are fully responsible for the correctness of the information and documents, submitted by us.**
7. I/we certify that I/we the tenderer(s) is/are not blacklisted or debarred by Railways or any other Ministry / Department of Govt. of India from participation in tender on the date of submission of bids, either in individual capacity or as a HUF/ member of the partnership firm/LLP/JV/Society/Trust.

8. I/we understand that if the contents of the certificate submitted by us are found to be forged/false or incorrect at any time during process for evaluation of tenders, it shall lead to forfeiture of the Bid Security besides banning of business for a period of uptoTwo year. Further, I/we (insert name of the tenderer) \*\*\_\_\_\_\_and all my/our constituents understand that my/our offer shall be summarily rejected.
9. I/we also understand that if the contents of the certificate submitted by us are found to be false/forged or incorrect at any time after the award of the contract, it will lead to termination of the contract, along with forfeiture of Bid Security/Security Deposit and Performance guarantee besides any other action provided in the contract including banning of business for a period of uptoTwo year.
10. I/We have read the clause regarding restriction on procurement from a bidder of a country which shares a land border with India and certify that I am/We are not from such a country or,if from such a country, have been registered with the competent Authority. I/We hereby certify that I/we fulfil all the requirements in this regard and am/are eligible to be considered (evidence of valid registration by the competent authority is enclosed)

SEAL AND SIGNATURE  
OF THE TENDERER

Place:

Dated:

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



**ANNEXURE-XXVII**

**(This certificate is to be given by attorney/authorized signatory/each member of Partnership firm/Joint venture (jv) / Hindu undivided Family HUF / Limited Liability Partnership (LLP) etc.)**

I / WE. . . . .(Name), attorney/authorized signatory of the (constituent firm/constituent partner) and member/partner of the .....(tendering firm) hereby solemnly affirm and state as under:

I / we certify that (constituent firm/constituent partner) is/are not blacklisted or debarred by Railways or any other Ministry / Department of Govt. of India from participation in tender on the date of submission of bids, either in individual capacity or as a HUF/ member of the partnership firm/LLP/JV/Society/Trust.

I / We have read the clause regarding restriction on procurement from a bidder of a country which shares a land border with India and certify that I am/we are not from such a country or, if from such a country, have been registered with the competent Authority. I/we hereby certify that I/we fulfill all the requirements in this regard and am/are eligible to be considered (evidence of valid registration by the competent authority is enclosed),

SEAL AND SIGNATURE  
OF THE CONSTITUENT FIRM/CONSTITUENT PARTNER

Place:

Dated:

**ANNEXURE-XXVIII**

**TENDERER'S CREDENTIALS (BID CAPACITY)**

**\_\_\_\_\_ RAILWAY**

For tenders having advertised value more than Rs 10 crore wherein eligibility criteria includes bid capacity also, the tenderer will be qualified only if its available bid capacity is equal to or more than the total bid value of the present tender. The available bid capacity shall be calculated as under:

Available Bid Capacity =  $[A \times N \times 2] - 0.33 \times N \times B$

Where,

A = Maximum value of construction works executed and payment received in any one of the previous three financial years or the current financial year (up to date of inviting tender), taking into account the completed as well as works in progress.

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

B = Existing commitments and balance amount of ongoing works with the tenderer as per the prescribed proforma of Railway for statement of all works in progress and also the works which are awarded to tenderer but yet not started upto the date of inviting of tender.

Note:

- (a) The Tenderer(s) shall furnish the details of -
- (i) Maximum value of construction works executed and payment received in any one of the previous three financial years or the current financial year (up to date of inviting tender) for calculating A, and
  - (ii) Existing commitments and balance amount of ongoing works with tenderer as per the prescribed proforma of Railway for statement of all works in progress and also the works which are awarded to tenderer but yet not started upto the date of inviting of tender for calculating B. In case of no works in hand, a 'NIL' statement should be furnished.

The submitted details for (i) and (ii) above should be duly verified by Chartered Accountant.

- (b) In case if a bidder is JV, the tenderer(s) must furnish the details of
- (i) Maximum value of construction works executed and payment received in any one of the previous three financial years or the current financial year (up to date of inviting tender) by each member of JV for calculating A, and
  - (ii) Existing commitments and balance amount of ongoing works with each member of JV either in individual capacity or as a member of other JV as per the prescribed proforma of Railway for statement of all works in progress and also the works which are awarded to each member of JV either in individual capacity or as a member of other JV but yet not started upto the date of inviting of tender for calculating B. In case of no works in hand, a 'NIL' statement should be furnished.

The submitted details for (i) and (ii) above should be duly verified by Chartered Accountant.

- (c) Value of a completed work/work in progress/work awarded but yet not started for a Member in an earlier JV shall be reckoned only to the extent of the concerned member's share in that JV for the purpose of satisfying his/her compliance to the above mentioned bid capacity in the tender under consideration.
- (d) The arithmetic sum of individual "bid capacity" of all the members shall be taken as JV's "bid capacity".
- (e) In case, the tenderer/s failed to submit the above statement along with offer, their/his offer shall be considered as incomplete and will be rejected **summarily**.
- (f) The available bid capacity of tenderer shall be assessed based on the details submitted by the tenderer. In case, the available bid capacity is lesser than estimated cost of work put to tender, his offer shall not be considered even if he has been found eligible in other eligibility criteria/tender requirement.

**ANNEXURE-XXIX**

**DOCUMENTS & DRAWINGS**

- 1) Logic Circuit - Approved - Tracing(1) & White Print (4 copy)**
- 2) Interface Circuit - Approved - Tracing(1) & White Print (4 copy)**
- 3) VDU layout & Panel diagram - Approved**
- 4) Route section plan - Approved**

**ANNEXURE-XXX**

**Bid Security:**

**(Bid Security)**

Bank Guarantee Bond from any scheduled commercial bank of India  
(On non-judicial stamp paper, which should be in the name of the Executing Bank).

**Name of the Bank: -----**

President of India,

Acting through .....,

..... Railway,

Beneficiary: ..... Railway

Date:.....

**Bank Guarantee Bond No.:**

**Date:-----**

In consideration of the President of India acting through----- (*Designation & address of Contract Signing Authority*), ..... Railway, ....., .... (hereinafter called "The Railway") having invited the bid for\_\_\_\_\_through Notice inviting tender (NIT) No..\_\_\_\_\_, We have been informed that . . . . [*Insert name of the Bidder*]..... (**hereinafter called "the Bidder"**) intends to submit its bid (hereinafter called "the Bid") .

WHEREAS, the Bidder is required to furnish Bid Security for the sum of *[Insert required Value of Bid Security]*, in the form of Bank Guarantee, according to conditions of Bid.

**AND**

WHEREAS, .....*[Insert Name of the Bank]*, with its Branch .....*[Insert Address]* having its Headquarters office at..... *[Insert Address]*, hereinafter called the **Bank**, acting through .....*[Insert Name and Designation of the authorised persons of the Bank]*, have, at the request of the Bidder, agreed to give guarantee for Bid Security as hereinafter contained, in favour of the Railway:

1. KNOW ALL MEN that by these present that I/We the undersigned *[Insert name(s) of authorized representatives of the Bank]*, being fully authorized to sign and incur obligations for and on behalf of the Bank, confirm that the Bank, hereby, unconditionally and irrevocably guarantee to pay to the Railway full amount in the sum of *[Insert required Value of Bid Security]* as above stated.
2. The Bank undertakes to immediately pay on presentation of demand by the Railway any amount up to and including aforementioned full amount without any demur, reservation or recourse. Any such demand made by the Railway on the Bank shall be final, conclusive and binding, absolute and unequivocal on the Bank notwithstanding any disputes raised/ pending before any Court, Tribunal, Arbitration or any Authority or any threatened litigation by the Bidder or Bank.
3. The Bank shall pay the amount as demanded immediately on presentation of the demand by Railway without any reference to the Bidder and without the Railway being required to show grounds or give reasons for its demand of the amount so demanded.
4. The guarantee hereinbefore shall not be affected by any change in the constitution of the Bank or in the constitution of the Bidder.
5. The Bank agrees that no change, addition, modifications to the terms of the Bid document or to any documents, which have been or may be made between the Railway and the Bidder, will in any way absolve the Bank from the liability under this guarantee; and the Bank, hereby, waives any requirement for notice of any such change, addition or modification made by Railway at any time.
6. This guarantee will remain valid and effective from.....*[insert date of issue]*till.....*[insert date, which should be minimum 90 days beyond the expiry of validity of Bid]*. Any demand in respect of this Guarantee should reach the Bank within the validity period of Bid Security.
7. The Bank Guarantee is unconditional and irrevocable.
8. The expressions Bank and Railway herein before used shall include their respective successors and assigns.
9. The Bank hereby undertakes not to revoke the guarantee during its currency, except with the previous consent in writing of the Railway. This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No.758.

10. The Bank hereby confirms that it is on the SFMS (Structured Financial Messaging System) and shall invariably send the advice of this Bank Guarantee to the following bank details –

|             |                                     |
|-------------|-------------------------------------|
| IFSC CODE   | SBIN000RAIL                         |
| IFSC TYPE   | BRANCH                              |
| BANK NAME   | STATE BANK OF INDIA                 |
| BRANCH NAME | RAIL                                |
| CITY NAME   | NAVI MUMBAI                         |
| ADDRESS     | SECTOR-11, CBD BELAPUR, NAVI MUMBAI |
| DISTRICT    | NAVI MUMBAI                         |
| STATE       | MAHARASHTRA                         |
| BG ENABLED  | YES                                 |

11. The Guarantee shall be valid in addition to and without prejudice to any other security Guarantee(s) of Bidder in favour of the Railway. The Bank, under this Guarantee, shall be deemed as Principal Debtor of the Railway.

Date .....

.....

Place.....

Bank's Seal and authorized signature(s)

*[Name in Block letters]* .....

*[Designation with Code No.]* .....

*[P/Attorney]* No.

Witness:

1 Signature, Name & Address & Seal

2 Signature, Name& address & Seal

Bank's Seal

*[P/Attorney]*No.

**Note:** All italicized text is for guidance on how to prepare this bank guarantee and shall be deleted from the final document.



**ANNEXURE-XXXI**

**NOVATION AGREEMENT**

Articles of agreement made on this day \_\_\_\_\_ in the year Two Thousand and Twenty-One between the President of India, acting through the \_\_\_\_\_ <Zonal Railway>. Administration having its office at \_\_\_\_\_ hereinafter called the 'Railway' of the first part and <\_\_\_\_ Name of the contractor\_\_\_\_>herein after called the 'Contractor' of the second part and Indian Railway Finance Corporation Limited hereinafter called the "IRFC" of the third part having its office at \_\_\_\_\_ with GSTIN \_\_\_\_\_ <GSTIN of billing unit (IRFC)>

First part, second part and third part collectively hereinafter called the 'Parties'.

Whereas the party hereto of the second part executed an agreement with the party hereto of the first part being agreement no. \_\_\_\_\_ dated \_\_\_\_\_ with contract cost of Rs.\_\_\_\_\_ for performance of \_\_\_\_\_ hereinafter called the "Principal Agreement"

Now it is hereby agreed by and between the parties that Indian Railway Finance Corporation shall be made an additional party to the Principal Agreement executed between Railway and Contractor with effect from date of this agreement.

It is agreed by and between the parties that Railway shall continue to be held responsible for all obligations, risk and liabilities, whatsoever, arising out of or in connection with the Principal Agreement and this Novation Agreement, whether during the progress of the work or after its completion.

It is further agreed and understood by and between the parties that IRFC shall be the owner of assets, if any, arising out of execution of works as defined in the Principal Agreement, except the land whose ownership shall continue with Railway. Accordingly, the invoices shall be issued by capturing GSTIN of contractor (*as the supplier*) and GSTIN of IRFC (*as the bill-to party*). Also, the contractor shall submit the invoice, issued in the name of IRFC, to Railway for processing payment by Railway to Contractor subject to applicable TDS under the Income Tax, GST or any other applicable laws.

It is further agreed by and between the parties that IRFC shall be responsible to comply with Income Tax and GST laws in relation to filing of returns.

It is further agreed and understood by and between the parties that, except for the amended obligations as mentioned above, the terms of the Principal Agreement for all kind of contractual / performance and legal obligations shall remain in full force and effect.

All the communication in relation to the Principal Agreement and said Novation Agreement, would only be between party hereto of first part and second part.

For and on behalf of the

President of India

Witness of the Signature

1. \_\_\_\_\_

2. \_\_\_\_\_

TENDER NO.CR-BB-SnT-EAST -2026-64

Address: \_\_\_\_\_

Contd...2

-:2:-

For and on behalf of the

Indian Railway Finance Corporation

Witness of the Signature

1. \_\_\_\_\_

2. \_\_\_\_\_

Address: \_\_\_\_\_

Signature of Contractor

<Name of Authorised signatory>

Witness of the Signature

1. \_\_\_\_\_

2. \_\_\_\_\_

Address: \_\_\_\_\_

**PROFORMA FOR TIME EXTENSION**

No. \_\_\_\_\_

Dated: \_\_\_\_\_

Sub: (i) \_\_\_\_\_ *(name of work)*.

(ii) Acceptance letter no. \_\_\_\_\_

(iii) Understanding/Agreement no. \_\_\_\_\_

Ref: \_\_\_\_\_ *(Quote specific application of Contractor for extension to the date received)* \_\_\_\_\_

Dear Sir,

1. The stipulated date for completion of the work mentioned above is \_\_\_\_\_. From the progress made so far and the present rate of progress, it is unlikely that the work will be completed by the above date (or 'However, the work was not completed on this date').

2. Expecting that you may be able to complete the work if some more time is given, the competent authority, although not bound to do so, hereby extends the time for completion from \_\_\_\_\_ to \_\_\_\_\_.

3. Please note that an amount equal to the liquidated damages for delay in the completion of the work after the expiry of \_\_\_\_\_ *(give here the stipulated date for completion with/without any liquidated damage fixed earlier)* will be recovered from you as mentioned in Clause 17B of the Standard General Conditions of Contract for the extended period, notwithstanding the grant of this extension. You may proceed with the work accordingly.

4. The above extension of the completion date will also be subject to the further condition that no increase in rates on any account will be payable to you.

5. Please intimate within a week of the receipt of this letter your acceptance of the extension of the conditions stated above.

6. Please note that in the event of your declining to accept the extension on the above said conditions or in the event of your failure after accepting or acting upto this extension to complete the work by \_\_\_\_\_ *(here mention the extended date)*, further action will be taken in terms of Clause 62 of the Standard General Conditions of Contract.

Yours faithfully

For and on behalf of the President of India

**ANNEXURE-XXXIII****Annual Contractual Turnover Data for the Previous 3/4 Years (Contractual Payment Only)**

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

NAME OF BIDDER/JV PARTNER:

| Annual Contractual Turnover Data for the Previous 3/4 Years<br>(Contractual Payment only) |                    |                  |   |
|---|--------------------|------------------|---|
| Year  | Amount<br>Currency | Exchange<br>Rate | Indian National<br>Rupees<br>Equivalent |
|   |                    |                  |   |
|   |                    |                  |   |
| Average Annual Contractual Turnover for last 3 years                                      |                    |                  |   |

1. The average annual contractual turnover shall be calculated as an average of “total contractual payments” in the previous three financial years. However, in case balance sheet of the previous year is yet to be prepared/ audited, the audited balance sheet of the fourth previous year shall be considered for calculating average annual contractual turnover.
2. The information supplied shall be substantiated by data in the audited balance sheets and profit and loss accounts for the relevant years in respect of the bidder or all members constituting the bidder.
3. Contents of this form should be certified by a Chartered Accountant duly supported by Audited Balance Sheet duly certified by the Chartered Accountant.

SEAL AND SIGNATURE OF THE BIDDER

Certified that all figures and facts submitted in this form have been furnished after full consideration of all observations/notes in Auditor’s reports. \_\_\_\_\_

(Signature of Chartered Accountant)

Name of CA: \_\_\_\_\_

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

(Seal)

**Portable operator console for on site programming.**

| <b>HP Spectre x360 convertible 13-ae503TU 2018 13.3- inch Laptop (8<sup>th</sup> Gen intel core i7- 8550U/16GB/512GB/Win10/Intel UHD Graphics620) Dark Ash Silver or latest.</b> |   |
|--|---|
| <b>S.N</b>   | <b>Description</b>  |
| 1.   | 1.8 GHZ Intel 8 <sup>th</sup> generation Core-i7-8550U Processor. |
| 2.   | 16GB DDR4 RAM   |
| 3.   | 512 GB Solid State hard drive                                     |
| 4.   | 13.3-inch screen, Intel UHD Graphics 620.                         |
| 5.   | Windows 10 Professional operating system                          |
| 6.   | 11.5 hours battery life or higher, 1.26kg Laptop                  |

**ANNEXURE-XXXV(To be followed as per NIT)****TOOL BAG COMPLETE WITH MEGGER, AC-DC CLAMP METER. (ONE SET)**

| <b>SR.NO.</b> | <b>DESCRIPTIONS</b>   | <b>QT Y.</b> | <b>MAKE</b>                                    |
|---------------|---|--------------|--|
| 1             | Tool bag  | 1            | FATMAX BACK PACK or similar- Stanley make      |
| 2             | Crimping Tools (Varic crimp ) 0.25-4 sqmm   | 1            | Wago part No 206-204                           |
| 3             | Insulated flat plier 125 mm   | 1            | Taparia / Jhalani                              |
| 4             | Insulated side cutter plier 1.50mm  | 1            | Taparia / Jhalani                              |
| 5             | Insulated screw driver 150 x 5 mm   | 1            | Taparia / Jhalani                              |
| 6             | Insulated screw driver 150 x 6 mm   | 1            | Taparia / Jhalani                              |
| 7             | Insulated screw driver 150 x 8 mm   | 1            | Taparia / Jhalani                              |
| 8             | Continuity buzzer   | 2            | Max/Tepco/Good Quality                         |
| 9             | Digital multimeter 4½ Digits 20000 Counts 9 Functions; 32 Ranges  | 2            | FLUKE OR Rishabh make                          |
| 10            | Megger standard make 100 V & 500 V One each   | 2            | RISHABH/ MECO/ MEGGAR/MOTWANI OR Superior make |
| 11            | Cotton measuring tape 15 Mtr  | 2            | Superior Quality                               |
| <b>NOTE:-</b> |   |              |  |
| 1             | All tools shall be of the best manufacturer. The Rly. Reserves the right to reject the entire/part tools found to be of inferior quality. |              |  |

**SPECIFICATION FOR TOOL BAG KIT**

ANNEXURE-A

Tool Bag for Technician Signal as per specification given below:-

1) Tool Kit bag for Technician Signal, Material Used: Matte Nylon with nylon finishing and inner PVC lining fabric will be used of the best quality for higher strength and durability. Size: Length: 15" approx., Width: 7.5" approx. Height: 15" approx. (2) High quality tensile canvas with strong and super fine stitching for higher performance and weight sustainability. (3) Rubber bolts at the bottom/bāse of the bag. (4) Upper top side flap will have cushion inner lining and padding and zip facility will be provided for security. (5) Single shoulder belt will be provided for extra support. (6) Handle belts will be provided of 1.5" width in canvas material with inner matte nylon cloth made in two colours (red colour will be used for greater visibility). (7) The front face of the bag will be having 4 pouches (2 on the upper side and 2 on the lower side and 2 pockets one on the upper side and one on the lower side each provided with covering flaps. (8) Back side has one big pouch for keeping bigger and wider electrical equipments. (9) Sideways on one side elastic pouch is provided for keeping water bottle. (10) On the opposite side two pouches are made one below and one above for keeping equipments which are longer in dimension. (11) Inner portion on one side has two big pouches and vertical slots are provided for keeping narrow and long instruments like smaller screw driver etc. (12) Inner portion on opposite side has one big zipper pouch of rectangular shape with 4 vertical slots (2 above and 2 below) with one broader pouch below. (13) For greater strength, the handle belts are stitched right upto the bottom on either side of the bag. (14) Stitching will be of the best quality thread material and minute double bit stitching will be given for increased strength and longer life.







**Insulated Tool kit for maintenance of Signaling gears.**

| Sr. No | Description of tool                         |
|--------|---|
| 1      | Insulated cable cutter                      |
| 2      | Insulated crimping tool                     |
| 3      | Insulated nose plier 5"                     |
| 4      | Insulated gloves                            |
| 5      | Insulated screw driver star head set        |
| 6      | Insulated adjustable spanner 12" and 15"    |
| 7      | Insulated fix spanner – 46x50, 32x36, 18x19 |
| 8      | Insulated screw driver 250x10mm, 150x5mm    |
| 9      | Insulated plier 12.5cm                      |
| 10     | Insulated nose plier 6"                     |
| 11     | Insulated cutting plier small               |
| 12     | Insulated stripper small                    |
| 13     | Insulated crow bar                          |
| 14     | Insulated chisel                            |
| 15     | Insulated box spanner set                   |
| 16     | Insulated heavy duty knife                  |
| 17     | Insulated pogar                             |
| 18     | Cotton measuring tape (15 meter)            |
| 19     | Insulated hacksaw frame big and small       |

**Insulated** tools should be certified for safe usage upto 1000v and Comply with IEC60900 Standard.

**ANNEXURE-C:-**

**EXECUTION WORK:-**

**Sub:** System Improvement regarding depth of signalling cables.

**Ref:** CVO(S&T)C.Rly.'s L.No.G.130/2020/09/00900/V5/V.Con.  
dated 04.06.2021.

CVO(S&T) vide letter mentioned above has stated that as per SEM1 Part I & Part II , the signalling cable should be buried at a depth of atleast .8 meter (minimum) for the cables which are parallel to track and 1 meter from rail flange for track crossing.

In view of above following should be added in the schedule of cable laying  
in all future cable laying.

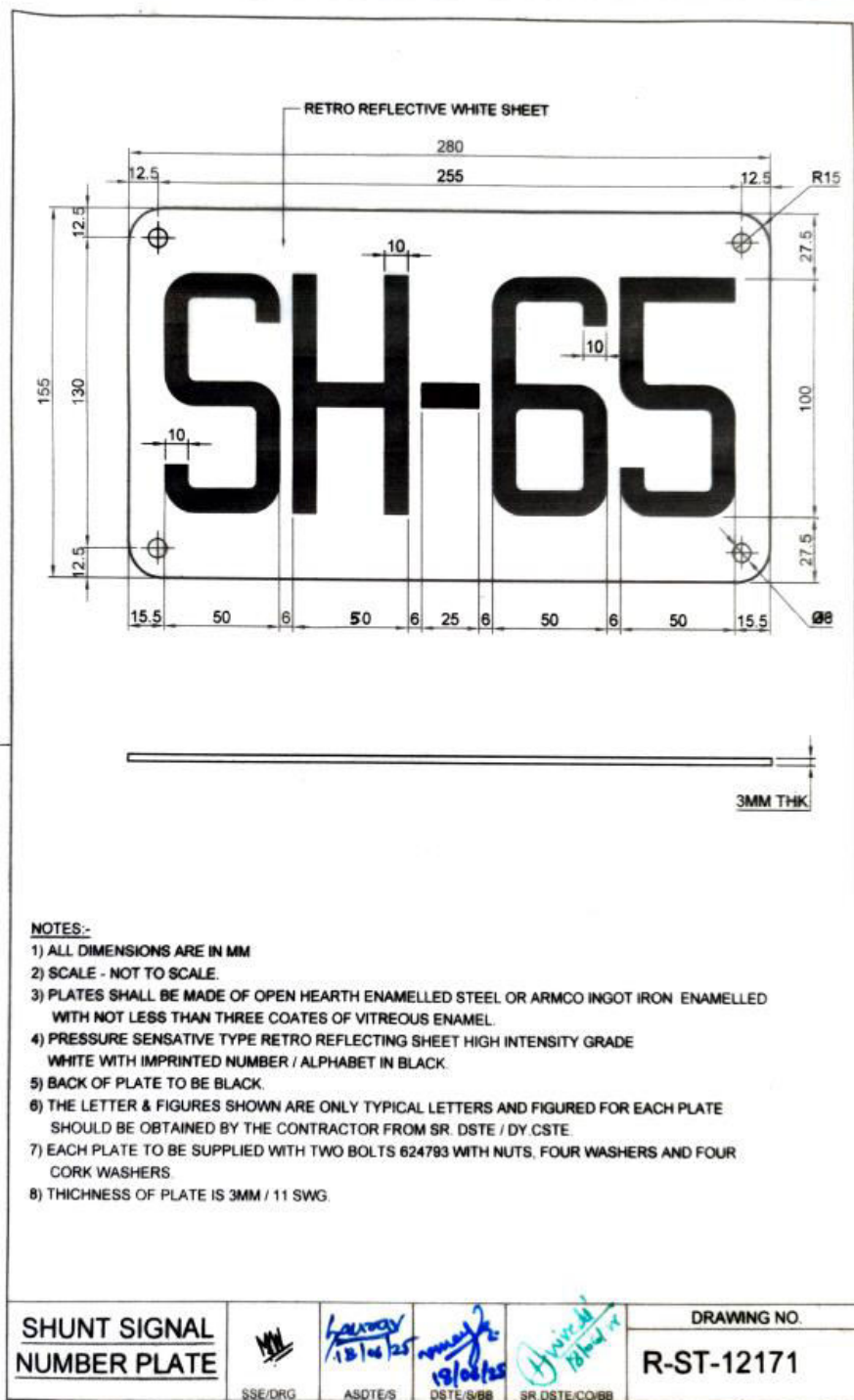
**“When large number of cables are to be laid in the trench, the depth and width of trench may be increased suitably to ensure that the top most cables get buried at a depth not less than that required as per SEM (i.e.0.8 metre from ground level for cables laid parallel to track and 1.0 metres below rail flange for cables laid across the track).”**

This is already included in SOR/Part B Item No.81 & 82. Please ensure the tender schedule are made as per SOR which already have the above para.

अमरेंद्र सिंह

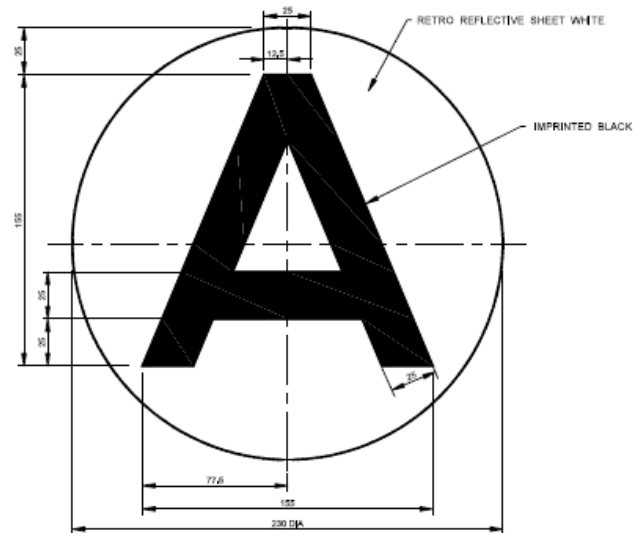
Date: 2021.06.08  
17:57:51 +05'30'

( **Amrendra Singh** )  
CSTE(Proj)CRly.



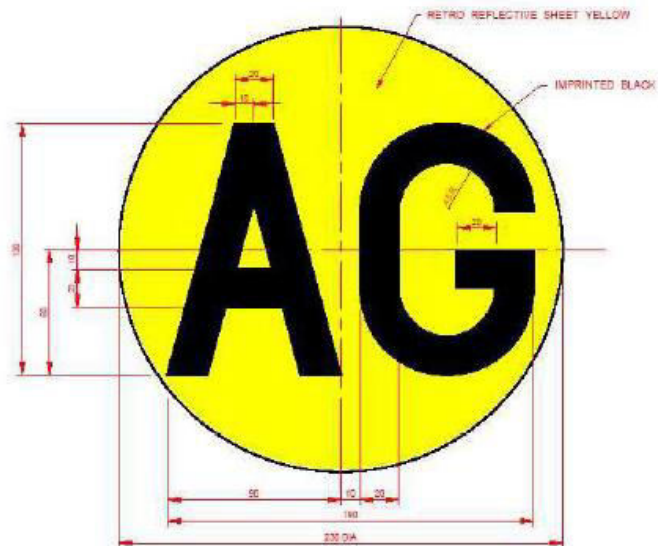


Drg.No. 19-D10 (Sheet 1 of 10)

**"A" MARKER RETRO REFLECTIVE SHEET****MATERIAL :-**

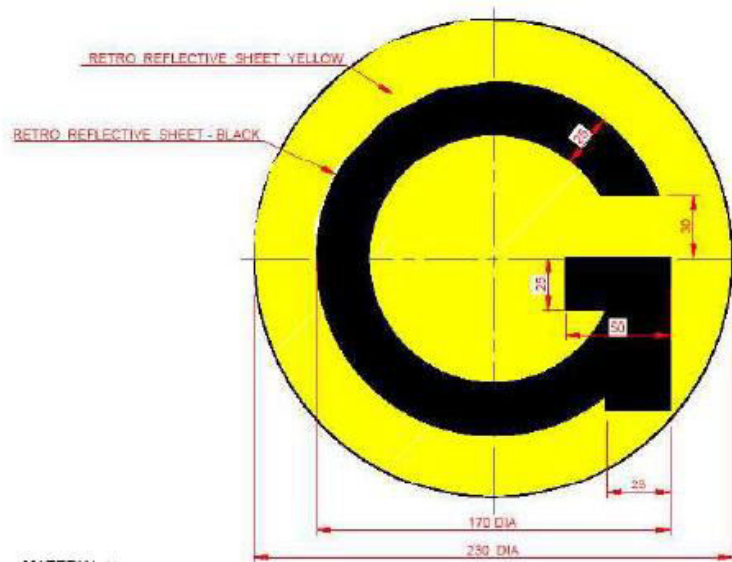
RETRO REFLECTIVE SHEET HIGH INTENSITY GRADE WHITE WITH  
 IMPRINTED 'A' IN BLACK  
 WITH FILM THICKNESS 0.3 mm  
 TOLERANCE AS PER APPLICABLE  
 NOTE :- ALL DIMENSIONS ARE IN mm

Drg.No. 19-D10 (Sheet 2 of 10)

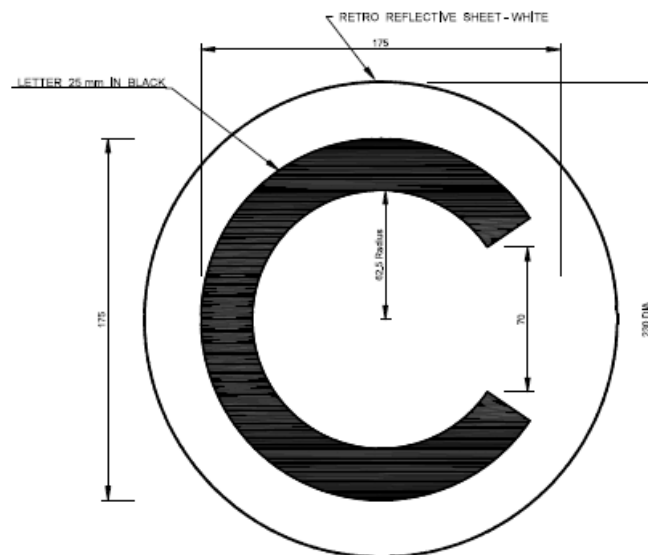
**"AG" MARKER RETRO REFLECTIVE SHEET****MATERIAL :-**

RETRO REFLECTIVE SHEET HIGH INTENSITY GRADE YELLOW WITH  
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 WITH FILM THICKNESS 0.3 mm  
 TOLERANCE AS PER APPLICABLE  
 NOTE :- ALL DIMENSIONS ARE IN mm

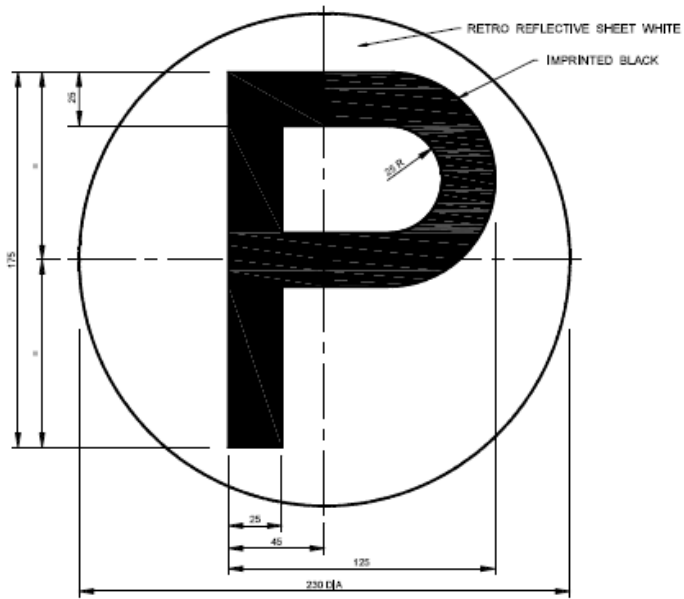
**PRINT IN COLOUR**

**"G" MARKER RETRO REFLECTIVE SHEET****MATERIAL :-**

RETRO REFLECTIVE SHEET HIGH INTENSITY GRADE YELLOW WITH  
 IMPRINTED 'G' IN BLACK  
 WITH FILM THICKNESS 0.3 mm  
 TOLERANCE AS PER APPLICABLE  
 NOTE :- ALL DIMENSIONS ARE IN mm

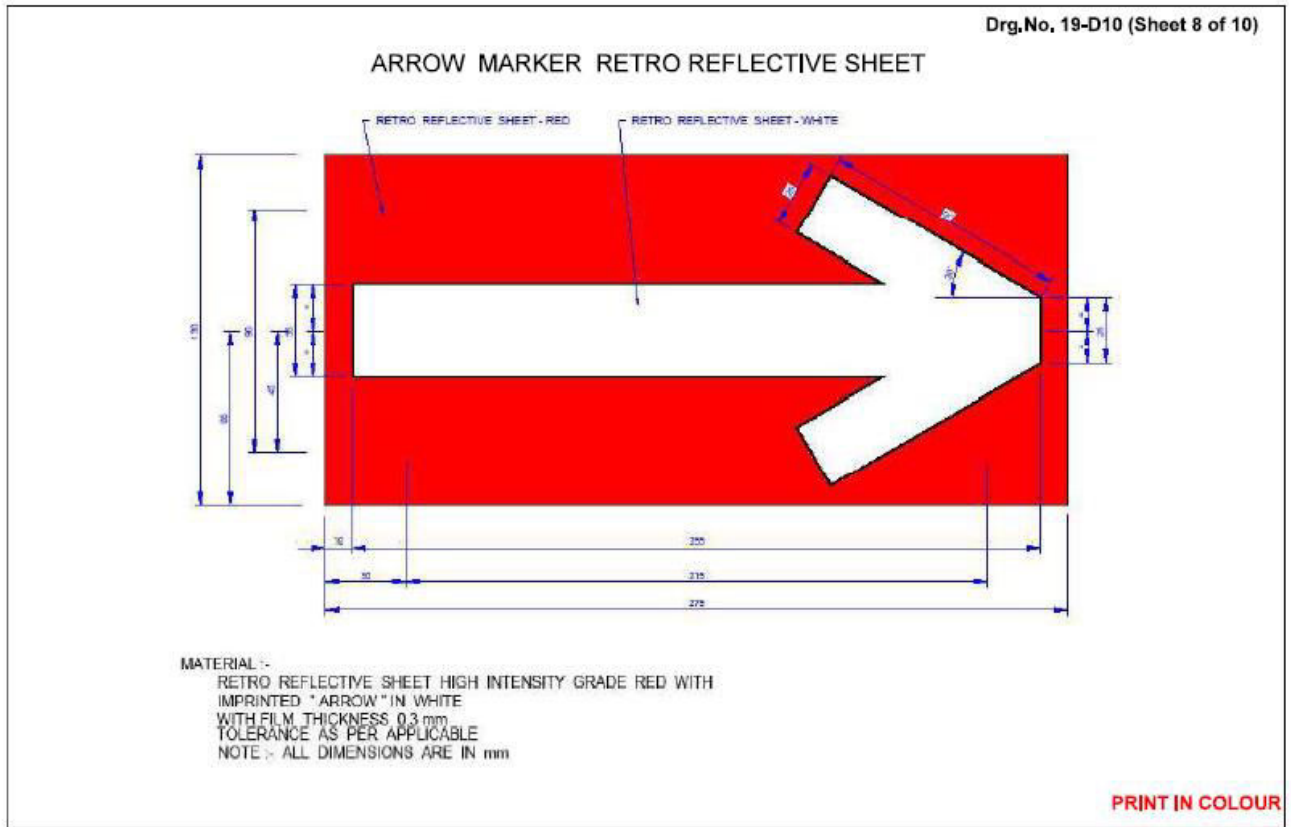
**PRINT IN COLOUR****"C" MARKER RETRO REFLECTIVE SHEET****MATERIAL :-**

RETRO REFLECTIVE SHEET HIGH INTENSITY GRADE WHITE WITH  
 IMPRINTED 'C' IN BLACK  
 WITH FILM THICKNESS 0.3 mm  
 TOLERANCE AS PER APPLICABLE  
 NOTE :- ALL DIMENSIONS ARE IN mm

**"P" MARKER RETRO REFLECTIVE SHEET****MATERIAL :-**

RETRO REFLECTIVE SHEET HIGH INTENSITY GRADE WHITE WITH  
 IMPRINTED 'P' IN BLACK  
 WITH FILM THICKNESS 0.3 mm  
 TOLERANCE AS PER APPLICABLE  
 NOTE -> ALL DIMENSIONS ARE IN mm





**VDU Table Specifications:****VDU Table Specifications:**

| Description | Requirement   |
|-------------|---|
| Table       | U shape, space for having 2 VDU and 2 Block counters.<br>Dimensions as per site requirements and field approved drawing,<br>18 mm thick Marine Ply covered with 1 mm sun mica sheet to be used. |
| Chair       | Godrej fabric Beat visitor Chair (4 Nos per table)  |

# End of tender document