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Specification for the work	The following TRD Portion of works:
	(i) ASN Divn:- Regirdering, jacketing & protection work along with other anciliary works of Bridge No. 2 (span 2x 24.689m) in between SCN-TOP section under AEN/BRL/ASN
	(ii) ASN Divn:- Regirdering and strengthening of embankment with other anciliary works of Bridge No. 9 and 9A on UP & DN DSP line between KAN-ASN section under AEN/BRL /ASN
	(iii) Regirdering and strengthening of embankment with other anciliary works of Bridge No. 4 (ROR) on UP DSP line between KAN-ASN section under AEN/BRL/ASN
:	(iv) ASN Divn:-Regirdering of br. No. 2 DK along with other ancillary works in between KPK-DMA in ASN-KAN Section
	(v) ASN Divn: Replacement and renovation of PSC girder for Bridge No. 20 & protection work along with other ancil. Works at UDL under AEN/1/UDL in the jurisdiction of DEN/4 ASN
	(vi) Asansol Division: Provision of new FOB at MNAE station on replacement basis in the sec. of Sr.DEN/III/ASN
	(vii) Asansol Division: Provision of new FOB at GLI station on replacement basis in the sec. of Sr.DEN/III/ASN
	(viii) New ROH Shed at Marshelling Yard Andal

GENERAL

- (i) Quantities mentioned in the scope of work are based on approximate assessment of site. However actual quantities may vary depending upon site condition.
- (ii) Railway will not supply any other materials and contractor has to arrange his own tools & tackles for carrying out the work.
- (iii) "Permit to work" for carrying out the work under power block will be granted by **Nodal TRD Supervisor**. Programme for power block with details will be submitted one week in advance. Railway does not guarantee availability of power block on pre- appointed day and time.
- (iv) All contractor staff must be adequately insured against accidents / injuries / fatalities at worksite.
- (v) Safety of materials against theft after erection till charging will be contractor's responsibility. This will also include materials issued by Railway for erection.
- (vi) Railway reserves the right to under take any of the items covered under this schedule departmentally in case of urgency/accident, etc. contractor will not have any claim on such works.
- (vii) Wherever an item of work covers supply of materials and / or erection, such item will include supply & erection of all S.S / galvanized Bolts, Nuts, Lock Nuts, Washers, Pins, Split Pins. etc. of approved size of RDSO/CORE approved make wherever required as per RDSO's standard drawing, whether specifically mentioned or not, to complete the item of work.
- (viii) Immediately after issue of LOA, the contractor shall prepare and submit the Design & Drawing along with the assessment of the materials required for execution of the work within 15 days from the issue of LOA, which will be verified & approved by the Railways.
- (ix) The contractor must place orders for all materials to be supplied under the scope of this tender within 15 days from getting approval from Railways and shall produce documentary evidence for the same.
- (x) Transportation of the purchaser supply materials from the nominated stores of the purchaser to the working site will be the responsibility of the contractor, whether specifically mentioned or

- (xi) not. Railway will not give any transportation expense for transportation of these materials to the working spot.
- (xii) Erection of any item or equipment whether supplied by the purchaser or contractor will include testing, commissioning and bringing the item or equipment into operation to the entire satisfaction of the purchaser.
- (xiii) In case any discrepancies between this chapter and other parts of the Tenders documents, the provision of this chapter will prevail.
- (xiv) At the time of erection of portal boom, portal boom sag should not be negative, otherwise if it is found then 10% of the bill value for the respective item should be recovered from the bill.
- (xv) Before starting the project work, all tools & tackles should be tested. The test should not be before one year and the test report should be submitted to the concerned Nodal Supervisor. If it is not conducted before starting the project work, then 10% of the bill value for the corresponding erection work will be deducted.

SAFETY PRECAUTIONS TO BE FOLLOWED FOR EXECUTION OF THE WORK :

The following safety measures must also be followed during execution of the work at site in addition to the other safety measures specified in the tender document :-

- (i) As the work is to be carried out in electrified running lines, Contractor has to take all safety precautions for ensuring safety of both men & material not only of the Contractor but also of the Railways and Railway will not be responsible for any accident or injury to contractor's labour during execution of the work. Any damage/loss to Railway property due to negligent working of contractor will be recovered from the payment due to him.
- (ii) Contractor must ensure that only trained & competent staff are being deputed for working on the high voltage lines, switchgears and equipments under supervision of licensed supervisor and they must wear identity card issued by the contractor while working on line.
- (iii) Contractor shall give necessary training to their Supervisors and staff and ensure that they know about the safety norms to be followed for working in Railway premises and in the vicinity of Railway track in electrified territories.
- (iv) Contractor shall ensure that no staff is working on line / track side unless proper '**Permit To Work**' is issued for those lines by Competent Railway Supervisors to the Contractor's Site In-Charge.
- (v) The work should normally be done when good day light is there. However, if the work is required to be done in absence of adequate natural light, contractor must make adequate lighting arrangement at work site.
- (vi) While loading/unloading/stacking of released or new material along the track, edges of platform, the contractor must ensure that the material is not infringing the schedule of dimensions and keep them safely away. This work should be done under the supervision of a qualified Supervisor of the contractor. Such work should be done with prior information to the Railways and in the presence of Railway representative.
- (vii) At the end of each spell of work and on completion of the work, the contractor shall, as a part of his contractual obligation, leave the tracks and their approaches, stores, yard, etc. cleared of rubbish and obstructions of all kinds according to the instructions of the purchaser's representatives. It should also be ensured that the T&P items and other materials required for carrying out the work on one line do not infringe the other line.

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- (viii) Railway reserve the right to stop the work in the absence of proper safety gear and no claim shall be entertained in this regard. Decision of the Engineer-in-charge will be final and binding upon the contractor. The cost of all safety gear is deemed to have been included in the rates quoted and nothing extra is payable under this contract.

PROGRAMME FOR EXECUTION :

- (i) The list of location to be replaced in this section will be handed over to successful bidder. He may make his own arrangement for verifying the requirements of each and every site.
- (ii) After carrying out the survey the contractor will submit detailed program for execution. The contractor will locate proper site to set up his depot for supply of materials subject to approval of the purchaser Engineer.

MATERIAL PROCUREMENT & INSPECTION OF SUPPLY ITEMS.

- (i) The materials to be supplied by the contractor will be strictly as per the specification mentioned for the respective item or as per the latest governing RDSO/CORE specification for the item.
- (ii) All OHE/PSI items will be procured from CORE/RDSO approved Regular Sources (Part-I) only for the respective item. Materials purchased from CORE/RDSO approved Developmental Sources (Part-II) of such items will be accepted where there is no Regular Source (Part-I) for the respective item. The contractor will produce documentary evidence for the same. List of CORE/RDSO approved supplier will be given to successful Tenderer.
- (iii) Materials to be supplied under the scope of this tender has to be deposited at the nominated store / site of **Nodal TRD Supervisor**, who afterwards will issue the materials to the tenderer for execution of the work at site.
- (iv) Supply items may be inspected / tested by RITES / authorized representative of Sr. DEE/TRD/ASN at manufacturer's premises / site as decided by the consignee. The contractor will intimate in advance for readiness of materials for inspection.
- (v) All works will be carried out as per specification and Contractor will offer for stage wise inspection of items carried out. Any work rejected by inspecting official must be rectified / replaced as per instruction of the site in charge and the decision of the site in charge will be final in this regard.

EXPLANATORY NOTES ON SCHEDULE OF PRICE : (Detailed scope of work)

The quantities indicated for each item in following notes are indicative as minimum required. Any part not included in list but considered necessary for successful erection of the equipment shall also be covered in price. The list indicates requirement for standard arrangements, any modification required to suit particular condition will be included.

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Item description: Supply & Erection of Galvanised Rolled/fabricated Traction Mast/Gantry Mast

The price shall cover supply & erection of Galvanised Rolled / Fabricated Traction Mast / Gantry Mast as per site requirement & RDSO's Specification No. ETI/OHE/13 (4/84) with A & C Slip No. 1 to 3, or latest, if any. The minimum weight of galvanized zinc coating on Rolled/ Fabricated Traction Mast/ Gantry Mast must be 1000 G ms./Sq.mtrs as per Clause No. 4 of RDSO's Specification No. ETI/OHE/13 (4/84), A & C Slip No.1 to 3 of latest if any. The price shall cover cost of alignment and setting before grouting of individual traction mast/Gantry Mast. The price will also include painting of OHE mast Location Number on the back side of all OHE masts/structures (i.e. on opposite side of OHE mast Location Number Plate) by enamel Yellow paint over enamel traffic Blue base paint. The letters & numbers shall be of "GILISANS" Style with 125 mm height. The purchaser will arrange Rail crane free of cost for erection of Gantry masts only. **Procurement & inspection of supply items will be as per the "Material procurement & Inspection Clause" mentioned above**

Item Description: Supply of Galvanised TTC/Portal structure.

The price shall cover supply of TTC / portal assembly complete with upright, boom, end pieces, cover angles, knee bracing including all SPS and fasteners whatever required or TTC mast complete with 5.5 mtr/ 8 mtr boom, Upright, knee plates including all SPS and fasteners whatever required as per RDSO's standard drawings and Specification No. ETI/OHE/13 (4/84), A & C Slip No. 1 to 3 or latest, if any. The type of portal assembly and clear span will be as per site requirement. The minimum weight of galvanized zinc coating on TTC/Portal Structure must be 1000 gms./Sq. mtrs as per Clause No. 4 of RDSO's Specification No. ETI/OHE/13 (4/84), A & C Slip No. 1 to 3 or latest if any. Procurement & inspection of supply items will be as per the "Material procurement & Inspection Clause" mentioned above.

Item Description: Erection under P.B. of Galvanised TTC/Portal structure.

The price shall cover erection under power block of TTC / portal assembly complete with upright, boom, end pieces, cover angles, knee bracing including all SPS and fasteners whatever required or TTC mast complete with 5.5 mtr/ 8 mtr boom, Upright, knee plates including all SPS and fasteners whatever required as per RDSO's standard drawings. Railway will arrange for power & traffic block. The contractor should take all safety steps so that there is no untoward incident at site. The price shall cover cost of alignment and setting before grouting of individual TTC / portal structure. **The price shall also include painting of OHE mast Location Number on the back side of all TTC/Portal structures (i.e. on opposite side of OHE mast Location Number Plate) by Enamel Yellow paint over Enamel Traffic Blue base paint. The letters & numbers shall be of "GILISANS" Style with 125 mm height. The purchaser will arrange Rail crane free of cost for erection of portal, portal boom, TTC & TTC boom only.**

Item Description: Cutting and removal of released Mast / TTC under Power Block including transportation to store.

The price under this item shall cover cutting and removal of all types of OHE mast/TTCs with all accessories at various locations in the section under power block. Railway will arrange for power & traffic block. The contractor should take all safety steps so that there is no untoward incident at site. The price shall include dismantling and removal of TTC booms, cutting and removal of all types of OHE masts/TTC uprights and booms into short pieces, if required, at site for the convince of transportation. **The purchaser will arrange Rail crane free of cost for removal of TTC booms only. The price will also cover shifting of the OHE mast location number plate from the released TTC/mast to the newly erected portal/TTC/mast before cutting of the released TTC/mast.** The price shall cover transportation of the all above cut masts/TTCs from the site to the nominated store of the purchaser. The price shall also include all lead/left, loading/unloading and transportation of the above cut masts/TTCs with all accessories from the individual site to the nominated store of the purchaser. The price will also include proper stacking of cuts masts/TTC uprights, booms, etc. separately inside the nominated store of the purchaser. Necessary tools and tackles required for cutting & removal including loading/unloading & transportation of the cut mast/TTC assemblies up to the nominated store including gas cutting arrangement, if required, have to be arranged by the successful tenderer and Railway will not supply any tool, tackles & vehicles for the same.

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Item Description: Cutting & removal of portal by crane under power block including transportation to store

The price under this item will cover cutting and removal of all types of OHE Portals with all accessories at various locations in the section under power block. The price will include dismantling and removal of portal booms, cutting and removal of all types of portal uprights and booms into short pieces, if required, at site for the convince of transportation. Railway will arrange for power & traffic block. The contractor should take all safety steps so that there is no untoward incident at site. **The purchaser will arrange Rail crane free of cost for removal of Portal booms only.** The price will cover transportation of the all above cut portal assembly from the site to the nominated store of the purchaser. The price will also include all lead/left, loading/unloading and transportation of the above cut portal with all accessories from the individual site to the nominated store of the purchaser. The price will also include proper stacking of portal uprights, booms, etc. separately inside the nominated store of the purchaser. Necessary tools and tackles required for cutting & removal including loading/unloading & transportation of the portal assemblies up to the nominated store including gas cutting arrangement, if required, have to be arranged by the successful tenderer and Railway will not supply any tool, tackles & vehicles for the same

Item Description: Supply of Small parts steel other than mast including Drop arm, Dwarf mast, gantry mast, super mast etc.

The price shall cover cost of supply of fabricated steel structures including SPS and all types of fasteners, multiple cantilever cross arms, BFB or RSJ type drop arms, Dwarf Mast, Gantry masts, super mast, adopters for bracket assemblies, backing angles and all other small parts steel works as per site requirement. The minimum weight of galvanized zinc coating on small parts steel must be 1000 gms / Sq mtrs as per Clause No. 4 of RDSO's Specification No. ETI/OHE/13 (4/84), A & C Slip No. 1 to 3 or latest if any. The price will also include supply of galvanized bolts, nuts, lock nuts and washer, etc. wherever required as per RDSO's standard drawings. Procurement & inspection of supply items will be as per the "Material procurement & Inspection Clause" mentioned above.

Item Description: Erection under Power Block of Small parts steel other than mast including Drop arm, Dwarf mast, gantry mast, super mast etc.

The price shall cover cost of erection under power block, alignment and setting wherever required of fabricated steel structures including SPS and all types of fasteners, multiple cantilever cross arms, BFB or RSJ type drop arms, Dwarf Masts, Gantry masts, super masts, adopters for bracket assemblies, backing angles and all other small parts steel works. The price shall also include erection of galvanized bolts, nuts, lock nuts and washers, etc. wherever required as per RDSO's standard drawings. The contractor shall have to erect all items irrespective of whether they are supplied by the purchaser or contractor. Railway will arrange for power & traffic block. The contractor should take all safety steps, so that there is no untoward incident at site.

Item Description: Supply of Cantilever assembly without insulator.

The price shall cover Fabrication & supply of cantilever assembly including all features as per site requirement. All the items should conform to RDSO's latest drawing. The minimum weight of galvanized zinc coating on cantilever tubes must be 610 gms/sq mtrs as per Clause No.4 of RDSO's specification No. ETI/OHE/11 (5/89) & ETI/OHE/13 (4/84) with A&C slip No. 1 to 4 or latest if any. The cost of supply shall exclude cost of stay and bracket insulators which shall be supplied by the Railways. The price will also include cost of supply and fabrication of 7 mm dropper wire for RA dropper. The price shall also include supply of all pins/split pins of approved size wherever required as per RDSO's approved drawing. Procurement & inspection of supply items will be as per the "Material procurement & Inspection Clause" mentioned above. The price shall include supply and fabrication of the following components as per site requirement.

Identification Part No.	Description	Quantity
3020-1	Mast fitting for hook insulator (Forged) with bolts, nuts, lock nuts and washers of 16 mm dia.	1 set
2400	Galvanized Steel Tubular stay tube complete with stay sleeve (Forged) (ID : 2403-2), Stay Adjuster (Forged) (ID : 2402 / 2402-1), S.S studs with Lock Nuts and S.S Bolts, Nuts & Lock Nuts for assembling with stay insulator.	1 set

2110/2130/ 2380	Catenary suspension bracket assembly or hook bracket complete with GI U Bolts, nuts & spring washers.	1 set.
1160/ 2120 / 2140	Suspension Clamp complete with S.S. U bolts, nuts, spring washers/lock nuts and locking plates.	1 set
2040 / 2080	Galvanized Steel Bracket tube assembly complete with tube cap, sleeve, S.S. U bolts, nuts & lock nuts for assembling with bracket insulator.	1 set
3070-1 / 3070-2	Mast bracket fittings assembly including bolts, nuts, lock nuts and washers of dia 16 mm for attachment to structures or to the small part steel work.	1 set
2151-2 & 2152-2/ 2161-2 & 2162-2	Register arm hook assembly (Forged) complete with bolts, nuts and lock nuts.	1 set
2420 or 2430	Galvanized Steel Register Arm tube assembly or raised register arm assembly complete with Register Arm Eye Piece (25 mm) (Forged) (ID : 2422-2), tube cap or sleeve (Forged) (ID : 2403-2), adjuster & S.S studs with Lock Nuts.	
2274-1 / 2277 or 2461-1 or 2471-1	Register arm dropper assembly complete with 7 mm dropper wire, dropper clips with GI bolts, nuts, pins, etc.	1 set
2390 / 2520	BFB Steady Arm assembly or bent steady arm assembly complete with Steady Arm Hook (BFB) (Forged) (ID : 2391-1) and Steady Arm Swivel (Forged) (ID : 2542).	1 set
2361-2	25 mm drop bracket assembly (Forged) (ID : 2361-2) complete with S.S. studs & lock nuts.	1 set
1220 / 1370-1	Contact wire swivel clip with swivel clip pin or raised register arm clamp with bolts, nuts, lock nuts & pins.	1 set
2550-1/2	Anti wind clamp complete with SS Nuts, bolts, etc.	1 set

Item Description: Erection of Cantilever assembly with insulator under Power Block.

The price under this item shall cover erection of fabricated cantilever assembly including all features as per site requirement under power block as per RDSO's latest drawing. Railway will arrange for power & traffic block. The contractor should take all safety steps, so that there is no untoward incident at site. The price will also include erection of 7 mm RA dropper. The cost of erection will also include erection of stay and bracket insulators which will be supplied by the Railways. The price shall include erection of all the components of fabricated cantilever assembly as specified in Item No.-8 above as per site requirement. The price will include shifting of all types of OHE load on new cantilever assemblies. The price will include cost of final adjustment of cantilever assembly including adjustment of catenary and contact wire height, stagger, adjustment of span droppers, if required, etc. as per site requirement. **The purchaser will provide tower wagon free of cost for adjustment of cantilever assemblies.** The price will include painting of various OHE parameters e.g. rail level setting distance, contact height, stagger, etc. on new OHE mast/structures by Black Enamel Paint over Yellow base.

Item Description: Dismantling of old Cantilever assembly & load shifting at new Cantilever assembly under Power Block including transportation to store.

The price under this item shall cover dismantling of old cantilever assembly with all accessories including stay & bracket insulators from all types of existing OHE structures at various locations under power block. Railway will arrange for power & traffic block. The contractor should take all safety steps so that there is no untoward incident at site. The price will include shifting of all types of OHE load on new cantilever assemblies. The price will include cost of final adjustment of cantilever assembly including adjustment of catenary & contact wire heights, stagger, adjustments of span droppers, if required, etc. as per site requirement. If cutting of catenary stands inside catenary suspension clamp are being noticed during dismantling of cantilever assembly at any location, the same should be informed to the Railway representative present at site immediately for necessary splicing by Railways. The price shall include all lead/lift loading/unloading and transportation of the released cantilever assemblies with all accessories including Stay & Bracket insulators from the individual site to the nominated store of the purchaser. The price will also include dismantling of all parts of the cantilever assembly and proper stacking of each components of the cantilever assembly separately inside the nominated store of the purchaser. Necessary

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tools tackles and vehicle required for dismantling and loading/unloading and transportation of dismantled cantilever assemblies have to be arranged by the successful tenderer and Railway will not supply any tools, tackles or vehicles, etc.

Item Description: **Foundation other than hard/rocky soil**

The price shall cover excavation, supply, handling of materials including Cement and accessories, temporary arrangement for excavation in all type of soil and concrete/ masonry drains / walls requiring use of chisel and hammer where necessary. The price will also cover casting of concrete, compaction and curing including frame work where necessary, tampering of concrete, grouting of masts and steel structures and finishing the top of the concrete foundation with required slope/muff as per RDSO's latest drawing. The price will also include dismantling of all connected temporary arrangement back filling with earth and compacting the same to the required height & width as per drawing to ensure safety of foundation and removal of soil. The price will also include restoring of Platform surface to its original position for foundation on platforms where required. The price will also cover cost of modification / diversion of drains wherever necessary. The price will cover concrete foundation in all types of soil with 1:2:4 proportion and Grouting the mast with 1:1½ :3 concrete. The cement of the above work will be Portland Cement conforming to IS-269 (latest version) or Portland Pozzolana Cement (fly ash based) as per IS-1489 Pt.-I (latest version). The ballast should be of 40 mm for casting and 20 mm for grouting. Contractor has to make his own arrangements of tools and tackles for the above casting. Concrete for foundations will be nominal mix of grade M-15 (Ratio – 1:2:4) obtained by proportions given vide table - 9 of IS: 456-1978. For grouting, mulling, embedding of structures in foundation and for cable trenches of switching stations, normal mix concrete of grade M-20 (Ratio - 1:1½ :3) obtained by mixing materials in proportions as indicated in table - 9 of IS: 456-1978 shall be used. Column batching may be adopted vide clause 9.2.2 of IS: 456-1978. The price shall also include the cost of Portland Cement or Portland Pozzolana Cement of reputed company make like ACC, Ultra Tech, Konark, Lafarge, etc.

The Guidelines for casting of OHE mast foundations is enclosed herewith in Annexure-I.

Item Description: **Supply of Porcelain Stay arm insulator (1050mm CD).**

The price shall cover supply of Porcelain Stay Arm Insulator (1050 mm CD) as per RDSO's Specification No. TI/SPC/OHE/INS/0070 (04/2007) with A&C Slip Nos. 1 & 2 or latest if any. Porcelain Stay Arm Insulator (1050 mm CD) shall be procured from RDSO approved sources only and the contractor should submit documentary evidence for the same. Procurement & inspection of supply items will be as per the "Material procurement & Inspection Clause" mentioned above.

Item Description: **Supply of Porcelain bracket insulator (1050mm CD)**

The price shall cover supply of Porcelain Bracket Insulator (1050 mm CD) as per RDSO's Specification No. TI/SPC/OHE/INS/0070 (04/2007) with A&C Slip Nos. 1 & 2 or latest if any. Porcelain Bracket Insulator (1050 mm CD) shall be procured from RDSO approved sources only and the contractor should submit documentary evidence for the same. Procurement & inspection of supply items will be as per the "Material procurement & Inspection Clause" mentioned above.

Item Description: **Supply of Porcelain 9 Tone insulator (1050mm CD).**

The price shall cover supply of Porcelain 9-Tonne Insulator (1050 mm CD) as per RDSO's Specification No. TI/SPC/OHE/INS/0070 (04/2007) with A&C Slip Nos. 1 & 2 or latest if any. Porcelain 9-Tonne Insulator (1050 mm CD) shall be procured from RDSO approved sources only and the contractor should submit documentary evidence for the same. Procurement & inspection of supply items will be as per the "Material procurement & Inspection Clause" mentioned above.

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Item Description: Supply & erection under power block of 3:1, 3 Pulley type Regulating equipment with counter weight assembly.

The price will cover supply & erection under power block of 3 pulley (modified) type regulating equipment 3:1 ratio as per RDSO's Specification No. TI/SPC/OHE/ATD/0060 (8/06) with A&C Slip No. 1 & 2 or latest, if any, (Ref. RDSO's Drg. No. TI/DRG/OHE/ATD/RDSO/00001/99/2, TI/DRG/OHE/ATD/RDSO/00002/99/2, TI/DRG/OHE/ATD/RDSO/00005/02/1 & TI/OHE/P/5341, Rev.-"A" with latest amendments) complete with SS Wire Rope conforming to RDSO's Specification No. TI/SPC/OHE/WR/1060 with A&C Slip No. 1 & 2 or latest, if any, including forged clevis & eye assembly (RI No. 5322-1), 9 tonne adjuster, Double strap assembly, Counter weight assembly (665 kg.) and guide tube assembly, galvanised fasteners whatever required as per site condition and RDSO's approved drawing. This will exclude cost of supply of 9-Tonne insulator but will include erection of the same. The price will also include painting of counter weight with two coats of anti corrosive Red oxide paint finished by two coats of Aluminium paint before final commissioning. The price will also include painting of "Y"-values at 5⁰ C, 35⁰ C & 55⁰ C as per the Tension Temperature chart on the new ATD mast. Supply and erection of all materials for proper functioning of a modified groove 3 pulley type 3:1 ratio Regulating Equipment whether specifically mentioned or not will form scope of work. Procurement & inspection of supply items will be as per the "Material procurement & Inspection Clause" mentioned above

Item Description: Dismantling of old Regulating Equipment & load shifting on new RE under power block including transportation to store

The price under this item will cover dismantling under power block of old regulating equipment with all accessories including 9-Tonne insulator, termination assembly, guy rod, etc. from the existing OHE structure at various locations in the section. The price under this item will cover shifting OHE anchor load on new ATD locations on all types of new mast under power block. The price will include extension of existing OHE anchor by providing large span wire of appropriate length / 20 mm dia. distance rod, wherever required at per site condition. Railway will arrange for power & traffic block. The contractor should take all safety steps so that there is no untoward incident at site. The price will also include adjustment of X & Y values as per tension-temperature chart at the new ATD location. The price will also include all lead/lift, loading/unloading and transportation of the released regulating equipments with all accessories including 9-Tonne insulators, termination assembly, guy rods, etc. from the site to the nominated store of the purchaser. The price will also include proper stacking of each components of the regulating equipment separately inside the nominated store of the purchaser. Necessary tools tackles and vehicles required for shifting of OHE load on new RE and dismantling of old RE including loading/unloading & transportation of same up to the nominated store have to be arranged by the successful tenderer and Railway will not supply any tools tackles or vehicle for the same

Item Description: Supply of Terminating assembly without 9-ton insulator for Single conductor & Erection under power block of Terminating Assembly with 9-Ton insulator for Single conductor.

The price shall cover supply of all materials necessary for the termination of Single overhead equipment conductors on a traction mast or structure including appropriate mast anchor fitting, clevis assembly, fasteners, adjuster, ending clamps for catenary and contact wires, anchor double strap assembly, equalizing/compensating plate (if required) and the termination wire/20 mm dia distance rod, if any, whatsoever required as per RDSO's latest drawing and erection of the same with the 9-Tonne insulator. The minimum weight of galvanized zinc coating on Malleable Iron casting must be 1000 gms./Sq.mtrs as per Clause No. 4 of RDSO's Specification No. ETI/OHE/13 (4/84), A & C Slip No. 1 to 3. The cost of supply will exclude cost of 9 tonne insulator. The price shall cover erection under power block of all materials including the 9 tonne insulator assembly. Railway will arrange for power & traffic block. The contractor should take all safety steps so that there is no untoward incident at site. The price will also cover taking of OHE load to the new double conductor termination location by providing large span wire of appropriate length / 20 mm distance rod as per site condition. Procurement & inspection of supply items will be as per the "Material procurement & Inspection Clause" mentioned above.

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Item Description: Supply of Terminating assembly without 9-ton insulator for Double conductor & Erection under power block of Terminating Assembly with 9-Ton insulator for Double conductor.

The price shall cover supply of all materials necessary for the termination of Double overhead equipment conductors on a traction mast or structure including appropriate mast anchor fitting, clevis assembly, fasteners, adjuster, ending clamps for catenary and contact wires, anchor double strap assembly, equalizing/compensating plate (if required) and the termination wire/20 mm dia distance rod, if any, whatsoever required as per RDSO's latest drawing and erection of the same with the 9-Tonne insulator. The minimum weight of galvanized zinc coating on Malleable Iron casting must be 1000 gms./Sq.mtrs as per Clause No. 4 of RDSO's Specification No. ETI/OHE/13 (4/84), A & C Slip No. 1 to 3. The cost of supply will exclude cost of 9 tonne insulator. The price shall cover erection under power block of all materials including the 9 tonne insulator assembly. Railway will arrange for power & traffic block. The contractor should take all safety steps so that there is no untoward incident at site. The price will also cover taking of OHE load to the new double conductor termination location by providing large span wire of appropriate length / 20 mm distance rod as per site condition. Procurement & inspection of supply items will be as per the "Material procurement & Inspection Clause" mentioned above.

Item Description: Supply & Erection of Guy rod assembly for dwarf mast

The price shall cover supply and erection of galvanised Guy Rod assembly for dwarf mast complete with Mast Guy rod fitting, Anchor double strap assembly, Guy rod of various lengths with all parts required for adjustment and attachment with dwarf mast including, dwarf mast attachment, guy rod stirrup, anchor bolts, galvanized fasteners whatever required as per site condition as per RDSO's approved drawing. All parts of Guy Rod assembly should conform to RDSO's Drawing No. ETI/OHE/G/01402 (Mod.-B) or its latest version. Procurement & inspection of supply items will be as per the "Material procurement & Inspection Clause" mentioned above

Item Description: Supply of Galvanised Steel Flexible wire Bond for Traction with Lug duly crimped (each 3.5 M long).

The price shall cover supply of Galvanised Steel Flexible Wire Bond for Traction with Lug duly crimped(each 3.5 M long).The price shall cover supply of each 3.5 Mtrs long Galvanized Stranded Steel Traction Bonds (Flexible Wire Bonds) conforming to RDSO's specification No. I/SPC/OHE/GALSTB /0040 (09/04) with A&C Slip No. 1&2 or its latest version, if any, complete with 18 mm galvanized forged (compression type) Lugs conforming to RDSO's Drawing No. TI/DRG/OHE/GTHLUG/RDSO/00001/04/0 duly crimped on both ends. End lugs shall be crimped with Dowell's hand operated hydraulic tools SYE-150 / HCT-150 with dies model No. JER-12 at about crimping pressure of 450 Kg/cm². Minimum three crimps on barrel portion of lugs shall be made to get proper joint. Galvanized Stranded Steel Traction Bonds shall be procured from RDSO approved sources only and the contractor should submit documentary evidence for the same. Procurement & inspection of supply items will be as per the "Material procurement & Inspection Clause" mentioned above.

Item Description: Erection of Galvanised Steel Flexible Wire Bond for Traction with Lug duly crimped (each 3.5 M long).

The price shall cover erection of per meter length of galvanized steel standard wire traction bond connecting a traction mast or structure to the nearest non-track circuited rail or earth electrode, etc. including supply of galvanized fasteners at both ends complete with washers, lock nuts/spring washers, etc. whatever required as per RDSO's standard drawing. The bonds on platform area should be flushed at least 06 inches under the platform surface and the platform surface should be restored to its original position after erection of the bonds. The price shall include supply & fixing of suitable M.S. Clamps, approved by the purchased Engineer, for clamping of the bonds on the vertical portion of the platform with at least 03 (three) Nos. of clamps for high level platforms and at least 02 (two) Nos. clamps for medium & low level platforms, to avoid any infringement with the moving dimensions. The price will also include shaping and drilling of the hold on rail required for erection bond and it also includes erection of all materials including bond and heat shrinkable PVC tube for bond under track circuited rail. The price will also include removal and transportation of the damaged / released structure bond, if any, from the site to the nominated store of the purchaser

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Item Description: **Supply of large Jumper wire(105 sq.mm)**

The price shall cover supply of 105 sq. mm Annealed Copper Stranded Jumper Wire (Large) as per RDSO's Specification No. ETI/OHE/3 (2/94) with A&C Slip No.-1 or latest. 105 sq. mm Annealed Copper Stranded Jumper Wire shall be procured from CORE approved sources only and the contractor should submit documentary evidence for the same. Procurement & inspection of supply items will be as per the "Material procurement & Inspection Clause" mentioned above

Item Description: **Supply of 50 sq.mm copper jumper**

The price shall cover supply of 50 sq. mm standard copper small Jumper Wire as per RDSO's Specification No. TI/SPC/OHE/JMP/0941. 50 sq. mm Standard Jumper Wire shall be procured from CORE approved sources only and the contractor should submit documentary evidence for the same. Procurement & inspection of supply items will be as per the "Material procurement & Inspection Clause" mentioned above

Item Description: **Supply of 25 kv Single pole isolator with Earthing Heel (1600 A).**

The price shall cover the supply of 25kV Single Pole Isolator complete with mounting base, operating rod, operating rod guides, operating mechanism and all accessories required for its smooth and trouble free operation. The price shall include cost of supply of solid core Post Insulators, Operating Rod insulators, etc. 25kV Single Pole Isolators (1600Amps capacity) shall conform to RDSO specification No. ETI/OHE/16(1/94) (Rev.-2) and RDSO's Letter No. TI/PSI/ISOL/POLICY/99 dtd. 03.06.1999 or latest if any. The price shall also cover supply of Bolted type Terminal Connectors of appropriate type with S.S. fasteners at both terminal pads of the isolator and Aluminium-Copper bi-metallic strips where their use is approved for connecting up of the isolator with OHE wires with Large Jumper wires. The price shall also cover supply of an enameled number plate and a GI Pad lock for each Isolator. The price shall also cover supply of an interlocking mechanism on the isolators to permit working of two or more isolators or an isolator and an interrupters/circuit breaker in a desired sequence. Procurement & inspection of supply items will be as per the "Material procurement & Inspection Clause" mentioned above.

Item Description: **Erection of 25 kv Single pole isolator with Earthing Heel under P.B. (1600A).**

The price shall cover erection under power block of 25 KV, 1600 Amp. capacity Single pole Isolator Assembly complete with mounting base, operating rods, supports for operating rods, operating rod guides and supports for operating rod insulators and post insulators required for the operation of the isolator. The price shall also cover erection of Isolator Jumpers, Bolted type terminal connectors of appropriate type at both terminal pads of the isolator, Aluminium-Copper bi-metallic strips where their use is approved, pad locks, galvanised fasteners and the number plates of approved design for each isolator. The price will also cover the cost of loading / unloading and transportation of the Isolator Assembly from the centralized store at Asansol to the individual site for erection of the same. Railway will arrange for power & traffic block. The contractor should take all safety steps, so that there is no untoward incident at site. The price shall also cover erection of an interlocking mechanism on the isolators to permit working of two or more isolators or an isolator and an interrupters/circuit breaker in a desired sequence.

Item Description: **Supply & Erection under P.B of Section Insulator Assembly**

The price will cover supply of all components required for standard section insulator assembly complete with core insulator & runners (for conventional OHE) including all terminal fittings for conductors and erection of the same under power block. Railway will arrange for power & traffic block. The contractor should take all safety steps, so that there is no untoward incident at site. The section insulators assembly should generally conform to RDSO Drg. No. ETI/OHE/P/6100. (Mod.- A) or its latest version. The price shall exclude the cost of 9-tonne insulator. The price shall also cover erection under power block and adjustment of all components of section insulator assembly including 9-tonne insulator. Railway will arrange for power & traffic block. The contractor should take all safety steps so that there is no untoward incident at site. The purchaser will provide tower wagon free of cost for erection and final adjustment of Section Insulator Assemblies. Materials should be inspected / tested as per the inspection clause mentioned above. The contractor will intimate in advance for readiness of materials for inspection. The items include.

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1120 : Catenary ending clamp : 02 nos.
1192 : Catenary dropper clip assembly : as required.
6170 : Parallel clamps for double contact wire. : 12 nos.
6100 : Section Insulator assembly with all fasteners etc. : 01 set.
Complete with core insulator & runners
6180 : Section Insulator droppers assembly : 03 sets

Item Description: Preparation of Design & Drawing for OHE

The price will cover on flat rate basis for survey, preparation of Cross Section Drawing (CSD), preparation of OHE Lay Out Plan (LOP) and Structure Erection Drawing (SED) of the over head equipment in detail. The price will include supply of verified & corrected as erected drawing in six sets, two of which will be of transparent reproducible tracing film (RTF) approved by the purchaser. The price shall also include supply of two digital copy of all the above drawings in “AUTOCAD” format in the form of DVD.

Item Description: Supply of Retro-reflective Structure Number plate as per RDSO's specification

The price shall cover supply of Retro-Reflective Structure Number Plate as per RDSO's specification No. ETI/OHE/33A (12/97), Rev.-8 (11/2012) or latest. Retro-Reflective Structure Number Plates shall be procured from CORE/RDSO approved sources only and the contractor should submit documentary evidence for the same. Procurement & inspection of supply items will be as per the “Material procurement & Inspection Clause” mentioned above.

Item Description: Erection of Retro-reflective Structure Number plate as per RDSO's specification.

The price shall cover erection of Retro-Reflective Structure Number Plates on various OHE structures / drop arms as per RDSO's approved drawings and instructions given by the purchaser. The contractor should take all safety steps, so that there is no untoward incident at site. The price shall also include erection of galvanized fixtures/adapters/clamps, galvanized fasteners with lead/fiber flat washers, spring washers, etc. required for erection of Structure Number Plates. OHE mast Location Numbers, where these Retro-Reflective Structure Number Plates are to be provided, will be supplied to the successful tenderer.

Item Description: Development & supply of Appendix-G to Station working Rules with drawing (5 copies in each set).

The price shall cover Development & supply of Appendix-G (5 Set Copies in each set) to station traction station working rules with drawing as per site condition & instruction of concerned incharges with preparation of write-up etc. as per TSWRD. Price is inclusive of any survey which is required to be carried out at site.

Item Description: Supply & erection of 25KV Copper feeder wire/cross feeder wire

The price shall cover supply & erection of 25KV Copper feeder wire/cross feeder wire as per RDSO's latest specification and as required made of a single all Copper bare, hard drawn conductor (spider). The price shall also include the cost of feeder suspension assembly including all accessories. The price shall not include the cost of termination of small parts steel works, complete with bolts, nuts etc. if any. The price shall also cover on a flat rate basis, the cost of supply of splices to the extent required

Item Description: Supply of Discharge/ Earthing Rod assembly for OHE complete with all accessories (Preferably Glass Fibre Type) as per RDSO's latest Specification.

The price shall cover supply of Discharge / Earthing Rod assembly complete with copper cable and rail clamps for 25 KV AC Traction as per RDSO's Specification No. ETI/OHE/51 (9/87), Rev-1 (10/92) or latest. Procurement & inspection of supply items will be as per the “Material procurement & Inspection Clause” mentioned above

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Item Description: Supply of Operating Rod (Pole) as per latest RDSO's latest Specification

The price shall cover supply of Operating Pole (Rod) assembly for 25 KV AC D.O. Fuse Switch as per RDSO's Specification No. ETI/PSI/14 (1/86), Rev-1 (4/87) or latest. Procurement & inspection of supply items will be as per the "Material procurement & Inspection Clause" mentioned above.

Item Description: Erection / Stringing and termination of copper contact wire including contact wire dropper clips and dropper wire etc.

The price shall cover Provision of temporary droppers at intervals of 9 mtrs and provision of Temporary anchor fittings and temporary terminations arrangements with 9 tonne insulators on either end of the tension length. The price shall also cover Manual stringing of new contact wire and suspending the contact wire in temporary droppers and anchoring of the new contact wire duly giving sufficient tension at either end. The price shall include Shifting of new contact wire in place of old contact wire duly replacing all dropper wires, contact wire dropper clips, and termination of contact wire. The contact wire and dropper wire will be supplied by the Railways. The work also include erection of catenary dropper clips, terminating arrangement, BFB steady arm etc. where ever required for which materials will be supplied by the railways. After completion of all erection work all kind of adjustments such as contact wire height, stagger and X & Y value(if required) also to be done by the contractor. All arrangements required for the execution of work including arranging tools and equipments will be at contractors responsibility. The materials including droppers supplied by railways should be returned to nearest OHE depot. The schedule includes loading/unloading of contact wire drum on tower wagon. No work train will be provided by the purchaser. All the wiring materials like conductor drums and steel structures for erection should be transported to the site by the contractor by his means for erection. LADDER TROLLEYS The Contractor to use "A" type light ladder trolleys (Aluminium) on tracks for carrying out installation of droppers and adjustments of traction overhead equipment and must have one ladder trolley/3Km. The Aluminium ladder trolleys shall not weigh more than 200 kg and should be capable of being removed from the track easily and quickly. In case the contractor desires to utilize ladder trolley and tower car for erection purpose, on request the same will be spared by Railways on loan basis for which hire charges will be deducted in the respective bills as follows. i) Tower car Each Rs. 15000/ per day (24 hours). ii) Ladder trolley Each Rs. 2500/ per day (24 hours). iii) Time of usage will be calculated from the time of taking the tower wagon from the tower wagon shed / sign ON and return back / sign OFF to the shed. iv) The minimum hire charge for the usage of tower wagon will be Rs. 4250/- per spell and for ladder trolley Rs 780/- irrespective of the extent of time of usage Conditions of contract. The procedure for replacement of contact wire has been shown at Annexure- II.

Item Description: Erection of Catenary wire. This activity is to be carried out under power block as per specification

The price shall cover erection of catenary wire by removing of existing catenary wire. The erection & removing of catenary wire will be carried out in the same power block in required tension length. Tenderer should arrange adequate man power and required tools & tackles so that erection & dismantling work should be carried out in same power block. The tenderer shall erect the catenary wire as per designed OHE. After erection of catenary wire, OHE profile to be maintained for smooth running of pantograph. Necessary power block will be arranged by Railway. (Catenary wire will be supplied by Railway). Minimum 03 no Tower Wagons shall be provided by Railways for stringing and erection of catenary wire. . Minimum of 2:30hrs (may change as per external factor) traffic and power block of the line in which stringing /erection activity to be done will be arranged by railway and contractor will complete the same of one TL (may change as per requirement of consignee).

Item Description: Supply of Dropper wire (5 mm dia)

The price shall cover supply of 5 mm dia Round Copper Dropper Wire (Small Dropper Wire) as per IS Specification No. IS : 282 : 1982. Small Dropper Wire shall be procured from RDSO approved sources only and the contractor should submit documentary evidence for the same. Procurement & inspection of supply items will be as per the "Material procurement & Inspection Clause" mentioned above

Item Description: Supply and erection of Single Earth Electrode with Earth Pit Box cover complete.

The price will cover supply and erection of earthing station with a single GI pipe/electrode of 50 mm dia of 3 mtrs length (Rly. Part No. 7021) embedded in to the ground with proper alternate layer of charcoal and salt to bring the earthing resistance below 08 Ohm as per SR. DEE/TRD/ASN's Drawing No.-TRD/ASN /11/20 and reference RDSO's Drawing No. ETI/OHE/P/7020 (Mod.-B) or its latest version. The price will cover supply of protective reinforced cement concrete box with removable reinforced cement concrete cover for each earthing stations as per SR. DEE/TRD/ASN's Drawing No.- TRD/ASN/11/20 and reference RDSO's Drawing No. ETI/OHE/P/7020 (Mod.-B) or its latest version. The price will include cost of ballast, sand, M.S. Rods of appropriate size for reinforcement and cement of reputed company make. The price will include erection of the earth pit boxes with cover as per the Sr. DEE/TRD/ASN's above drawing. The price will also include testing of Earth Resistance Value and painting of earth resistance values on the earth pit box by Black Enamel Paint over Enamel Yellow base Paint. Procurement & inspection of supply items will be as per the "Material procurement & Inspection Clause" mentioned above.

Item Description: Supply of MS Flat 40 x 6 mm for each bond complete

The price will cover supply of 04 mtrs long Transverse Bond made up of M.S (Mild teal) Flat Size : 40 x 6 mm conforming to IS Specification No. IS : 1731 required to provide a Traction Bond (Transverse Bond) connecting two adjacent non-track circuited rails. The price will also cover supply of 02 Nos. of Galvanized Fasteners (size - 16 x 50 x 38 mm) complete with washers, nuts, lock nuts/spring washers, etc. per bond for erection of the same. Procurement & inspection of supply items will be as per the "Material procurement & Inspection Clause" mentioned above.

Item Description: Erection of MS Flat 40 x 6 mm for each bond complete

The price shall cover fabrication of M.S. (Mild Steel) Flat of size : 40 x 6 mm by cutting, bending & twisting of the MS Flats to make Traction Bonds, i.e. Transverse Bonds conforming to relevant RDSO drawing and as per the site requirement. The price will cover drilling of 17.5 mm dia. holes at both ends of the Bonds. The price will include painting of Traction Bond with two coats with anti corrosive red oxide paint finished by two coats with Synthetic Enamel Paint to colour Grass Green shade-218 of IS : 5. The contractor should take all safety steps during drilling of holes on rails, so that there is no untoward incident at site.

Item Description: Slewing and put back of OHE (under power block)

The price under this item will cover per span length slewing of OHE wires under power block, either by lifting of the OHE wires to the required height or by lowering of the OHE wires to the ground as per the site requirement to facilitate Crane working, JCB working, etc. Balance weights on both ends of OHE tension length have to be lifted and locked prior under taking the slewing work. OHE wires have to be removed from the catenary suspension clamps and the swivel clips at all cantilever supports. The price will also cover putting back of OHE wires after completion of Crane working, JCB working, etc. to its original position. The purchaser will provide tower wagon free of cost for releasing and putting back of OHE wires at cantilever supports. Railway will arrange for power & traffic block. The contractor should take all safety steps, so that there is no untoward incident at site.

Item Description : Adjustment of OHE and Tower Wagon checking (under power block)

The price under this item will cover per span length adjustment and checking of the OHE wires under power block. The price will include checking of the tightness of cantilever fittings, dropper clips, jumper connections, if any. The price will include adjustment of height and stagger of contact wire, if required. The price will cover adjustment of X & Y values of ATDs as per Tension-Temperature Chart, if required. The price will also cover final checking of the OHE by tower wagon. The purchaser will provide tower wagon free of cost for final adjustment and tower wagon checking of OHE. Railway will arrange for power & traffic block. The contractor should take all safety steps, so that there is no untoward incident at site.

Item Description: Supply of Overhead equipment & Erection under P.B. of Over Head Equipment

The price shall cover erection of contact wire, catenary wire under power block and supply & erection under power block of all types of clamps, dropper clips, span dropper, etc. suitable for regulated OHE. This will cover supply of all components / parts including contact & catenary dropper clips, 5 mm dropper wire for span droppers, parallel clamps for jumpering and contact & catenary wire splices, where their use is approved, but excluding SPS with bolts & nuts, etc. and termination. The price shall also include provision of all span droppers including dropper clips, enameled number plates on traction masts/structures, painting of various OHE parameters e.g. Rail Level, setting distance, contact wire height, stagger, etc. on new masts/structures by Black Enamel Paint over Yellow base. The price shall exclude small parts steel works complete with bolts, nuts, lock nuts, etc. for attachment of enameled number plates to the OHE mast/structure. **The purchaser will provide tower wagon free of cost for erection of contact & catenary wires, dropper works & final adjustment of OHE wires, turnouts / crossovers and overlaps.** Railway will arrange for power & traffic block. The contractor should take all safety steps so that there is no untoward incident at site. Procurement & inspection of supply items will be as per the “Material procurement & Inspection Clause” mentioned above.

Item Description: Supply of 160 sq. mm copper Jumper

The price shall cover supply of 160 sq. mm Annealed Copper Stranded Large Jumper Wire as per RDSO’s Specification No. TI/SPC/OHE/JMP/0941 or its latest if any. The price however, shall also cover supply of parallel clamp (P.G clamp) and fasteners suitable for 160 sq. mm Annealed Copper Stranded Jumper Wire. Wire shall be procured from CORE / RDSO approved sources only and the contractor should submit documentary evidence for the same. Procurement & inspection of supply items will be as per the “Material procurement & Inspection Clause” mentioned above

Item Description: Supply of Contact Wire Ending Clamp

The price shall cover supply of Contact Wire Ending Clamp (ID No. : 1118 & 1119) as per RDSO’s Drawing No. ETI/OHE/P/1110-2, Rev.-D or latest, if any, complete with GI Snap Head Pin (size : 20/55) with GI Punched Washer (A-22) and Annealed Copper Split Pin (4 x 40 mm). Contact Wire Ending Clamps shall be procured from CORE approved sources only and the contractor should submit documentary evidence for the same. Procurement & inspection of supply items will be as per the “Material procurement & Inspection Clause” mentioned above

Item Description: Supply of Catenary wire Ending Clamp (65)

The price shall cover supply of Catenary Wire Ending Clamp (65) (ID No. : 1121, 1092 & 1094) as per RDSO’s Drawing No. ETI/OHE/P/1120, Rev.-B or latest, if any, complete with GI Snap Head Pin (size : 20/55) with GI Punched Washer (A-22) and Annealed Copper Split Pin (4 x 40 mm). Catenary Wire Ending Clamps shall be procured from CORE approved sources only and the contractor should submit documentary evidence for the same. Procurement & inspection of supply items will be as per the “Material procurement & Inspection Clause” mentioned above.

Item Description: Supply of Contact wire Splice

The price shall include supply of Contact Splice as per the RDSO Drawing No. ETI/OHE/P/ 1081-1 Rev-C or latest with required number of Stainless Steel Nut & Stud Bolt of required size as per the specification. and RDSO’s Specification No. ETI/OHE/P/1081-1 Mod-C or latest with all other accessory parts require for splicing of contact wire. Material should be procured from RDS/Core approved source only. Procurement & inspection of supply items will be as per the “Material procurement & Inspection Clause” mentioned above.

Item Description: Supply of Catenary wire Splice

The price shall include supply of Catenary Splices as per the RDSO Drawing No. ETI/OHE/P/ 1090 and RDSO’s Specification No. TI/SPC/OHE/FITTINGS/0130 with A & C Slip No. 1 with Railway Identification 1091, 1092, 1093 and 1094 or latest with all other accessory parts require for splicing of catenary wire. Procurement & inspection of supply items will be as per the “Material procurement & Inspection Clause” mentioned above.

Item Description: Supply of P.G. clamp (1031-3)

The price shall cover supply of Parallel Clamp (1031-3) as per latest RDSO specification including supply of SS bolts & nuts, lock nuts, spring washer etc. PG clamp complete with fasteners (1031-3) or latest and shall be procured from CORE/RDSO approved sources only and the contractor should submit documentary evidence for the same. Procurement & inspection of supply items will be as per the “Material procurement & Inspection Clause” mentioned above.

Item Description: Supply of PG clamp (1041-2)

The price shall cover supply of Parallel Clamp (1041-2) as per latest RDSO specification including supply of SS bolts & nuts, lock nuts, spring washer etc. PG clamp complete with fasteners (1041) or latest and shall be procured from CORE/RDSO approved sources only and the contractor should submit documentary evidence for the same. Procurement & inspection of supply items will be as per the “Material procurement & Inspection Clause” mentioned above.

Item Description: Supply of PG clamp (1051-3)

The price shall cover supply of Parallel Clamp (1051-3) as per latest RDSO specification including supply of SS bolts & nuts, lock nuts, spring washer etc. PG clamp complete with fasteners (1051) or latest and shall be procured from CORE/RDSO approved sources only and the contractor should submit documentary evidence for the same. Procurement & inspection of supply items will be as per the “Material procurement & Inspection Clause” mentioned above.

Item Description: Supply and erection of Public caution board in three language English, Hindi & regional language

The price under this item shall cover supply and erection of retro-reflective type Public Caution Board i.e. General Caution Notice for Public as required viz. Switching station name board, protected place, number plate, sectioning diagram, shock treatment chart, Sigma board as per CORE/RDSO approved drawing and instructions given by the purchaser. etc. and mounted on OHE structures/gantry/wall as per CORE/ RDSO approved drawing and instructions given by the purchaser at the entrance to Railway Station in their languages in Hindi, English & regional languages as per latest RDSO’s specification. Public caution boards are to be mounted on various OHE structure /gantries or any platform structure/wall as per the instruction given by the purchaser. The price shall include cost of supply of galvanized fasteners with lead/fiber washers and spring washer required for erection of the public caution boards on all types of OHE Structures /walls. The price shall also include cost of supply of galvanized fixtures adopters clamps as per RDSO’s approved drawing with latest version to fix up the public caution board on normal fabricated / Rolled mast or portal structure. Supply of the caution board including galvanized fixtures /adopters /clamps and Galvanized fasteners with lead/fiber washers and spring washers, etc. on normal fabricated/Rolled mast or portal structure/walls as per RDSOs standard drawing whether specifically mentioned or not will from the scope of the work. Procurement & inspection of supply items will be as per the “Material procurement & Inspection Clause” mentioned above

Item Description: Supply of Contact wire dropper clip

The price shall cover supply of contact wire dropper clip as per RDSO’s Specification No. TI/SPC/OHE/Fittings/0130 with A&C Slip No.-1. or its latest Drawing No. RE/33/P1181 with suitable locking wire ‘U’ pin. Contact wire dropper clip shall be procured from CORE approved sources only and the contractor should submit documentary evidence for the same. Procurement & inspection of supply items will be as per the “Material procurement & Inspection Clause” mentioned above.

Item Description: Supply of Catenary wire dropper clip.

The price shall cover supply of catenary wire dropper clip (Part No. 1192) including SS Nuts & bolts with lock nuts, spring washer and split pin etc. Catenary dropper clip shall be procured from CORE/RDSO approved sources only and the contractor should submit documentary evidence for the same. Procurement & inspection of supply items will be as per the “Material procurement & Inspection Clause” mentioned above

Item Description: Supply of Raised Register Arm Clamp as per RDSO Drg. No. ETI/OHE/P / 1370-1(Rev-J) or latest (RI No. 1371-3) complete with fasteners and packing saddles as per RDSO spec. No. TI/SPC/OHE/FITTINGS/0130 (10/13) Rev. 1 or latest.

The price shall include the supply of Raised Register Arm (RRA) clamp as per RDSO drawing No.ETI/OHE /P/13701(Rev-J) or latest RI No. 1371-3 with all fasteners and packingsaddles as per RDSO specifications TI/SPC/OHE/ FITTINGS /0130 (10/13) Rev. 1 or latest & ETI/OHE/13(4/84) WITH A & C-1 to 4 or Latest. The RRA must be well chamfered from all the sharp edges so as to avoid necking & parting of Contact wire. The supplied material must be approved by Sr.DEE/TRD/ASN or his authorized representative Procurement & inspection of supply items will be as per the “Material procurement & Inspection Clause” mentioned above.

Item Description: Supply of Packing Saddle for single Suspension Clamp RI No. 1174, As per RDSO Drawing No. RE/33/P/1174 or latest.

The price shall cover supply of Packing Saddle for Single Suspension Clamp R.I No.1174 as per RDSO Drg. No. RE/33/P/1174 or latest and RDSO specification No. TI/SPC/OHE/Fitting/0130(10/13), Rev-1 or latest.

Item Description: Supply of Single Suspension Clamp (1161) along with fasteners and Suspension ClampLock Plate (1163) as per RDDSO Specification /Drg. No. RE/33/P/1160 Rev-J and RE/33/P/1163 Rev-D

The price shall cover supply of Single Suspension Clamp (RI No.1161) along with all fasteners including Suspension Clamp Lock Plate (RI No. 1163) as per RDSO Specification No. RE/33/P/1160 Rev-J and Drg. No. RE/33/P/1163 Rev-D.

Guidelines for casting of OHE mast foundations.

1.0 Type of cement, Aggregates and water to be used in concrete work.

- 1.1 Portland Cement conforming to IS-269 (latest version) or Portland Pozzolana Cement (fly ash based) as per IS-1489 Pt.-I (latest version) is to be used.
- 1.2 The graded coarse aggregate 40 mm nominal size (Table-2 of IS:383 latest version) shall be used for foundation. A coarse aggregate for grouting muffs and embedding shall be of 20 mm graded nominal size as per table-2 of IS:383.

2.0 Minimum Cement content and water cement ratio.

- 2.1 The water cement ratio is an important factor for durability of concrete. Appropriate values for minimum cement content and the maximum free water cement ratio are given in Table-5 of IS:456 for different exposure condition. The same is reproduced below:

Table – 5

Sl. No.	Exposure	Plain Concrete		
		Min. cement content Kg/ m ²	Max. free water cement ratio	Min. Grade of concrete
1	Mild	220	0.60	-
2	Moderate	240	0.60	M-15
3	Severe	250	0.50	M-20
4	Very severe	260	0.45	M-20
5	Extreme	280	0.40	M-25

3.0 Concrete mixture proportioning:

- 3.1 The mix proportions shall be selected to ensure the work ability of the fresh concrete and when concrete is hardened, it shall have the required strength, durability and surface finish.

Concrete for foundations as well as for grouting, muffing embedding of structures in foundations and for cable trenches at switching stations shall be obtained by mixing cement, coarse aggregate, fine aggregate and water in accordance with proportions given in table-9 of IS:456 (latest version). The same is reproduced below.

Table – 9 : PROPORTIONS FOR NOMINAL MIX CONCRETE
(Clause 9.3.1)

Grade of concrete	Total quantity of dry aggregates by mass per 50 kg. of cement to be taken as the sum of the individual masses of the fine and coarse aggregates, kg, max	Proportion of the fine aggregate of coarse (by mass)	Quantity of water per 50 kg of cement (Max liters)
1	2	3	4
M-5	800	Generally 1:2 but subject to an upper limit of 1:1.5 and a lower limit of 1:2.5	60
M-7.5	625		45
M-10	480		34
M-15	330		32
M-20	250		30

Note: The proportions of the fine to coarse aggregates should be adjusted from upper limit to lower limit progressively as the grading of the fine aggregates becomes finer and the maximum size of coarse aggregate becomes larger. Graded coarse aggregate shall be used.

Example:

For the average grading of the fine aggregate (that is zone II of Table-4 of IS:383 the proportions shall be 1:1.5, and 1:2 and 1:2.5 for maximum size of aggregate 10 mm, 20 mm and 40 mm respectively.

Specification for coarse and fine aggregates from natural sources for concrete (second revision).

“Volume batching may be allowed only where weigh-batching is not practical and provided accurate bulk densities of materials to be actually used in concrete have earlier been established. Allowance for bulking shall be made in accordance with IS:2386 (Part-3) (latest version). The mass volume relationship should be checked as frequently as necessary. The frequency for the given job is being determined by Engineer-in-charge to ensure that the specified grading is maintained”.

4.0 Quality Assurance Measures:

- 4.1 The job of quality control and quality assurance would involve quality audit of both the inputs as well the outputs. Inputs are in the form of materials for concrete, workmanship in all stages of batching mixing, transportation, placing, compaction and curing in order to ensure proper performance, it is necessary to inspect each step in concreting.

5.0 Compaction and curing:

- 5.1 Concrete should be thoroughly compacted and fully worked around the reinforcement, around embedded fixture.

Curing is the process of preventing the loss of moisture from the concrete whilst maintaining a satisfactory temperature regime. Exposed surface of concrete shall be kept continuously wet condition by covering with a layer of sacking and kept continuously wet for at least 10 days from the date of placing concrete.

6.0 Supervision:

- 6.1 Supervision is of extreme importance to check the concrete. Hence, constant and strict supervision of all the items of the construction is necessary during the mixing of the concrete.

7.0 Acceptance criteria:

In acceptance criteria, compressive strength of concrete by random sampling procedure should be included in the contract documents. Samples from fresh concrete shall be made as per IS : 1199 and cubes shall be made, cured and tested at 28 days in accordance with IS : 516. The minimum frequency of sampling of concrete of each grade as mentioned in Para-15.2.2 of IS : 456 (2000) is furnished below:

Quality of concrete in the work, m ³	Number of samples
1 - 5	1
6 - 15	2
16 - 30	3
31 - 50	4
51 and above	4 Plus one additional sample for each additional 50 m ³ or part thereof.

Note : At least one sample shall be taken from each shift.

Test Results of samples:

The test results of sample shall be the average of the strength of three specimens. The individual variation should not be more than +15 percent of the average. If more, the test results of the sample are invalid.

The compressive strength specified in Table-2 shall be the criterion for acceptance or rejection of the concrete. The same is reproduced below.

Table – 2 : Grades of Concrete:

Group	Grade Designation	Specified characteristic Compressive Strength of 150 mm Cube at 28 days in N/mm ²
(1)	(2)	(3)
Ordinary	M 10	10
Concrete	M 15	15
	M 20	20

Note- 1: In the designation of concrete mix M refers to the mix and the number to the specified compressive strength of 150 mm size cube at 28 days, expressed in N/mm².

PROCEDURE FOR REPLACEMENT OF CONTACT WIRE IN TENSION LENGTH.

Physical measurement of tension length of contact wire to be replaced must be done in advance jointly with TRD supervisors since in many occasions it is found that the actual length varies from the lengths calculated from the drawings, which perhaps might not have been updated. This exercise will avoid embarrassment at site if the length is found short at the time of anchoring necessitating temporary anchoring.

At Depot

1. Selection of the correct drum with required length for replacement.
2. Inspection of the contact wire drum for any damages and Fitness to unroll the wire at site using trolley.
3. Inspection of contact wire for any damages.
4. Loading of the correct drum for transporting to site using Crane /chain pulley block/Manual .
5. Un-loading of the correct drum at site using crane.

At site:

1. Inspection of the drum number and length, inspection for any damages caused running loading / unloading and transit
2. Insertion of contact wire ending clamp at the free end of the contact wire.

Preparatory work on previous days :

1. Provision of temporary anchor arrangements on the anchor masts of either end of the tension length above the existing anchor point with necessary precaution to avoid slipping of the anchor.
2. Provision of temporary droppers at the catenary wire with 8 SWG GI wire near to the existing droppers duly twisting one end of the 8 SWG wire at the catenary and the other end bent to a hook and hanging off 15 to 20cm above the existing contact wire plane, to suspend the new contact wire. While stringing “Care should be taken to ensure that the temporary droppers should not infringe movement of pantographs.
3. Site survey to be conducted to decide the starting point of the stringing work and decide about the loading of contact wire drum in trolley/tower wagon fixed with proper support jacks and axle arrangements for easy rotations of the contact wire drum while pushing the trolley. Care should be taken to load the contact wire drum with free end of the contact wire come at the top of the drum in avoid tilting up off the drum and trolley during move.
4. Temporary anchor to be made in such a way that the cut in insulator of the existing contact wire and that on the new wire should come in the same vertical alignment with each other. For standard anchor arrangements with FTA & BWA temporary anchor with catenary wire or with distance rod can be made in advance and used at such locations. In special cases where, the cut in insulator is provided for clearance purpose, the length of the temporary anchor arrangement to be made in advance to be measured and the same may be fabricated in advance to suit the location. This will avoid confusion at site during work. This is possible only if the site survey is done thoroughly. 216
5. At some anchor locations, the electrical working clearance to nearby OHE may not be adequate (less than 2m) to carry out work smoothly. In such cases, power block / line block on adjacent line also to be obtained for safe working.
6. Every fitting / component proposed to be used for the works should be thoroughly checked by the OHE supervisors for quantity of the material, manufacturing defect if any , sources of supply etc., before it is used on OHE.
7. All the insulators are to be tested for 60% UTS before erection and failure prone insulators should not be used on OHE .

COMMENCEMENT OF WORK:

1. Contact wire loading on trolley/tower wagon should be done only with proper power block and the block as required as per site.
2. After loading of the contact wire the wiring trolley/tower wagon should be brought to the adjacent location of the anchor and the new contact wire end from the drum to be taken over the “RT of in run OHE at this location and then the end is taken out through in between the running contact wire and catenary wire (in close alignment to the out of run contact wire), pulled and terminated at the temporary anchor. A ½” rope piece to be tied at the insulator and the rope to be hold by a person to prevent the insulator hitting

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anywhere, thereby preventing its breakage. After the termination of the contact wire the wiring trolley should be pushed to the next location allowing the drum to rotate and unroll the contact wire. Care should be taken while pushing the trolley that while the contact wire is unrolled the inertia will allow the drum to rotate speedily even if the trolley is not moving and thereby uncoiling more wire from the drum. This uncoiling of wire will result in twist and bend on the wire. This should be avoided by gradual and steady movement of the wiring trolley while pushing as well as by manual braking of drum for slow rotations. Two Ladder trolleys with sufficient men to be followed the wiring drum trolley, first trolley should support the uncoiled wire on the temporary 8 SWG droppers and the other trolley following will attend at each location where the new contact wire to be supported. After the contact wire is placed inside the hook about 15 to 20 cm above the contact wire plane the hook to be closed by twisting the end with the vertical wire portion thereby avoiding the contact wire coming out.

3. At the locations, the new contact wire is to be supported above the RTs with 4 folds of 16 SWG GI wire piece allowing free movement of the wire during the tensioning process. At few locations / alternate locations the new contact wire should be tied with the RT. In such case the new contact wire should be raised to the existing contact wire using the 1st temporary droppers on either side and also the contact wire to be supported by two folds of 16 SWG GI binding wire piece to the RT near the steady arm clamp. Care should be taken in securing the binding wire end to avoid panto entanglement. On no account should the old and new contact wires be supported/ tied on the same steady arm. On no account the old contact wire and new contact wire be supported on the steady arm Eye/Hook and drop bracket assembly.

4. On reaching the other end of the tension length tackle rope should be made readily available from the anchor point to take the load of new contact wire to reduce the sag on wire in between and to facilitate cutting of the new contact wire to the approximate length and there by releasing the drum and trolley.

5. The come along clamp should be provided sufficiently away on the new contact wire and using tackle rope the wire is to be pulled to the extent possible and then cut the wire to the approximate length required to anchor the wire. The balance wire can be re-rolled in the drum and the drum trolley can be released and cleared from the track. Using a tirfor of 3 T capacity the load on the 217 new contact wire should be taken and the load to be measured by using a dynamometer. Confirmation from the other end of the tension length to be obtained regarding proper tension on the wire and lift-up of the new contact wire in tension can be now anchored to the temporary anchor fitting.

6. The Ladder trolley is now moved towards the other end duly checking the stretch, turn out, cross over for any adjustments required jointly with TRD supervisors.

7. The loading appliances used can now be released.

8. Ensure that both cut in insulators are not rubbing or hitting each other.

CHANGING OVER OF DROPPERS AND JUMPERS FROM OLD WIRE TO NEW WIRE.

1. The groove on the new contact wire to be checked and from one end the droppers and swivel clips are changed over from the old wire to new wire and lifting the old wire inside the temporary droppers. After this the anchors on either side also to be shifted permanently keeping the old wire on temporary anchor.

2. While carrying out the change over from old wire to new wire, proper lapping between two wires to be ensured.

3. Where shifting of droppers involves crossovers and turn outs proper attention to be given by both TRD supervisors.

RELEASING OF OLD COCONTACT WIRE.

1. The old wire is released from one end to the other end along with all temporary droppers, binding wires and temporary anchor fittings.

2. The tension of the new contact wire to be checked and BWA adjusted if required.

3. New contact wire to be checked thoroughly for any kink or twist, adjustment of turnout or crossover.

PROCEDURE FOR REPLACEMENT OF “G” JUMPERS.

Old jumper wires to be replaced with new ones along with new PG clamps as decided by the purchaser. The length of the “G” jumper to be 4 metres at turn outs and 3.8 metres at UIOL. The jumper wire should be 105 sq.mm annealed stranded copper wire. While providing the jumper wire the making surface of the wires should be properly cleaned using 0-grade emery paper to have better contact.

The rate shall also cover stringing/erection of contact wire(107 sq.mm) for the full tension length required for replacement of existing contact wire (107 sq. mm) in conventional type OHE. The rate shall include transporting, loading, unloading etc., of conductor drums with the help of road crane. Price shall also cover supply of dropper clips, for catenary and contact wire, PG clamps for jumper with nuts and bolts and contact wire ending clamp at the termination, swivel clip along with pins etc. The rate shall also include termination of the wire at the tension length including stringing of tail end wire wherever tail termination exists. The rate shall also include termination of the wire temporarily before replacement and after replacement including clamping of the contact wire at supports and replacement of existing droppers with new dropper and consequent adjustment of the affected equipment like various jumpers, section insulator, cut-in-insulator at SI, IOL locations, turnouts, crossovers, and associated components, fitting etc, to make the unit of work as per standard. Any arrangement required for the execution of works will be at the contactors responsibility. If any components at the termination are damaged during dismantling/stringing of the contact wire, the same will be covered by contractor. The price shall cover fabrication, and erection of dropper assembly including erection of contact and catenary wire dropper clips with fasteners. The in-span droppers shall be made as per site encumbrance for each span and as per RDSO's design with consultation of Railways site supervisor. One span will be considered only after supply, fabrication and erection of 9 no. dropper assembly (including contact and catenary wire dropper clips with fasteners) or as per site encumbrance for each span irrespective dropper of actual no. of spans. Price shall cover supply contact wire dropper clips(107) with locking wire as per RDSO's Drg. No. RE/33/P/1181 Rev, G or latest & supply 65 sq. mm copper catenary dropper clip assembly consisting of catenary clip SS bolts, spring washer, Split pin, as per RDSO Drg. No. ETI/OHE/P/1192 Mod C or latest.

Price shall cover the activities under power & traffic blocks.

Minimum 3 no Tower Wagons shall be provided by Railways for stringing and erection of contact wire , with the approval of concerned AEE/DEE/SSE of the Section.

- (i) 107 sq. mm copper contact wire shall be supplied by Railway at nominated depot prescribed by nodal supervisor and price shall cover transportation of copper contact wire from the railways store depot including loading and unloading with contactor's own men and crane driver(necessary competency and experience certificate to be submitted to nodal supervisor), tools, tackles and machineries for stringing of contact as per railways proper procedure and specification.

The price shall cover erection of contact wire along with all components and dropper jumper section insulator and terminating wires. Minimum of 2:30hrs (may change as per external factor) traffic and power block of the line in which stringing /erection activity to be done will be arranged by railway and contractor will complete the same of one TL (may change as per requirement of consignee).

- (i) Contractor shall used such jigs, fixtures and machineries(of his own), which would avoid kinks and twists in overhead conductors while erection.
- (ii) Proper anti-theft arrangement is to be provided by a contactor so far the OHE is not charged with Traction supply. Any type of theft or loss shall have to be born by the contactor, till issue of PAC.
- (iii) The price shall include termination of conductors, provision of cut in insulators and section insulators etc.
- (iv) Price shall include erection of all jumpers including "G" jumpers required for turnouts, cross overs and overlaps for jumpering two OHEs.
- (vii) Erection cost also include all the adjustment of OHE, turnout, overlap, section insulator, Bracket etc. as per Railway standard. It also include adjustment of existing OHE, turnout, overlap, section insulator, bracket etc as per Railway standard if disturbed on account of new wiring.
- (viii) The price shall cover splicing of terminated overhead equipment(conventional type) for execution and consequent adjustment of the affected equipment. Price shall include the cost of erection of all materials such as contact wire splices for extension of OHE by splicing or

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equalizing plate and accessories for extension of OHE using single large span wire.

(ix) The price shall cover erection of all material necessary for the termination of single conductor of over head equipment of terminating wire on a traction mast or structure building appropriate mast anchor fitting and insulator, clevis assembly, adjuster, anchor double strap, ending clamp for contact wire or terminating wire and fittings including mast anchor fitting terminating wire. The price shall cover erection of all materials and components & terminating wire, if any.

(x) The price shall cover erection of section insulator assembly along with all components required for a standard section insulator assembly, complete with solid core porcelain insulator (sectioning & 9 ton insulator), including special droppers for supporting the equipment and all terminal fittings for conductors, for the section insulator assembly and the 9 ton insulator assembly on the catenary & dropper wires as required. The price shall also cover erection and adjustment of all components including porcelain section insulator assembly, 9 ton porcelain insulator on the catenary and droppers.