

**DETAILED TENDER TECHNICAL SPECIFICATION & EXPLANATORY NOTES**

**Cement concrete for foundation & plinth in other than hard soil & rock. (Foundation should be M-15 type as per IS-456, i.e. ratio 1:2:4).**

Complete foundation material shall be supplied and used at site for new foundation work. The price shall also include the cost of cement, sand and ballast.

The price shall cover casting of OHE/AT structure & anchor foundations with grouting & muffing for all types of foundations used in 25 KV AC OHE design other than hard and rocky soil.

The price shall cover excavation and nominal reinforced concrete work for foundation including supply of steel for nominal reinforcement and all other materials including bending, binding, laying of the reinforcement, shoring wherever necessary for casting concrete including frame work where necessary, grouting & finishing the top of the foundation blocks. The price shall also include dismantling of all connected temporary arrangements, required back filling and removal of spoil. The price shall also cover concreting work required for repairing or raising of muff height of existing OHE structure.

The work of foundation of new OHE structures/anchor shall be carried out without PB/TB.

For reaching at each site along with material, Contractor has to make his own arrangement and all the charges will be borne by the Contractor.

The Contractor will carry out the foundation work at site as per RDSO's drawings and during execution of work if any dispute involved such as variation in quantity in respect of size mentioned in relevant RDSO drawing, approval of Sr.DEE/TRD/BSL is required before initiating the work. No additional work should be done without taking prior approval of competent authority in this regard.

Loading, unloading and transportation of foundation material and watering arrangements will be done by the Contractor.

After casting of every foundation curing for a period of minimum 7 days shall be done by the Contractor.

For casting of foundations, no material will be supplied by Railway. The cement used for foundation shall be ISI marked of reputed manufacturer.

For casting of foundation in black cotton soil, 6 mm dia. MS rounds 10 Nos. with suitable binders of 6 mm dia. 3 Nos. will be supplied and erected at the bottom of the foundation, wherever applicable, by the Contractor at his own cost.

Concrete for foundations shall be nominal mix of grade M-15 as per IS 456 or latest version and for grouting, muffing, embedding of structures in foundations, normal mix concrete of M-20 grade as per IS 456 or latest. Proportion of mix will be as given in IS-456.

The graded coarse aggregate 20 mm nominal size shall be used for foundation. A coarse aggregate for grouting muffs and embedding shall be of 20 mm graded nominal size. Fine aggregate shall be graded from 10 mm downwards. The maximum size of aggregate for under reamed pile foundation shall be 20 mm graded nominal size.

The depth of the excavation shall be measured at site from the formation level to the maximum excavated point.

The volume of casting of new foundation with grouting and muffing shall be calculated as per various volume chart of RDSO's.

All anchor blocks and foundation of structures shall be provided with concrete muffs. The top of the muffs shall be above the level of ground of the track formation and of adequate height of not less than 15 cms to afford reasonable protection

during rainy season. Muff may be installed at the same time as per RDSO's Drawing No. – ETI/C/0007/68 MOD-E or latest when the structures are grouted.

Marking for casting of new foundations at site will be given by the concerned SSE/TRD of the section as per site feasibility & RDSO's guide lines.

All the new foundations of various OHE structures at site shall be cast by the Contractor from the ground/rail level.

The Contractor as per RDSO volume charts & anchor sketches shall carry out design and excavation of new foundations at site.

The prices shall be same for any shape or size of concrete blocks. In calculating the individual volume of concrete, fraction of a cubic meter beyond the third decimal shall be rounded off to the next nearest third decimal.

The prices shall apply for concreting of all foundations for mast, gantries, portals anchor blocks for guy rods, and fencing uprights.

For purposes of computation of volume of concrete, the volume of steel work embedded in the foundation block and muff shall be ignored.

For purposes of computation of volume of concrete, the volume of concrete shall include the volume of sand and bitumen in sand cored foundation. However, for the purpose of computation, of quantity of cement utilized in sand core foundations, the volume of the sand bitumen used in core hole should be deducted from the total volume of the foundation.

For purposes of computation of volume of concrete the volume of each muff for all masts shall be taken as 0.02 Cu.M except for masts with balance weights and for each column of portal, each head span mast, 2 or 3 track cantilever masts, and special fabricated masts for which the volume of muff shall be taken as 0.08 Cu. M irrespective of the size and shape of muff, on a flat basis.

The prices shall also include the cost of concrete cable trenches and trench covers at the switching stations as well as embedment of drain pipes, where required.

The prices shall also cover the cost of diversion of masonry / earth drain wherever necessary for casting of foundations.

Testing of samples will be done as per IS-456 from any reputed laboratory or Govt. Polytechnic & Govt. Engineering College located in the respective section. The sample transportation and testing charges will be borne by Contractor. Contractor will submit authentic certificate of sample testing to the concerned SSE/TRD.

Note for measurement of foundation items:

(i) The depth of the excavation shall be measured from the formation level to the maximum excavated point.

(ii) The payable volume of the foundations under these items shall be designed one as shown in the drawings for which the hole has been blasted, irrespective of the actual configuration assumed by the latter due to the blasting.

(iii) One sample i.e. 3 test cubes (15 cm cube each) shall be taken for testing at 28 days, for every 25 Cub Mtr or part thereof, concreting work. If the total volume is less than 25 Cub Mtr, at least one sample shall be taken for testing as per IS:456. Test strength of sample must be as below:

| Grade Designation | Minimum Compressive strength at 28 days |
|-------------------|---|
| M-15              | 15 N/mm <sup>2</sup>                    |
| M-20              | 20 N/mm <sup>2</sup>                    |

**Cement concrete for foundation & plinth in hard soil & rock.(Foundation should be M-15 type as per IS-456, i.e. ratio 1:2:4).**

The price shall cover excavation, supply and handling of all materials and accessories, temporary arrangements for excavation in hard soil, concrete / masonry drains/ walls and rock requiring use of chisel and hammer or requiring blasting, Shoring where necessary, casting concrete as per IS: 456 (Latest) and relevant RDSO drawing for foundation including frame work where necessary, tamping the concrete, grouting of masts with concrete as per relevant RDSO drawing and finishing the top of concrete foundation or anchor blocks. The price also includes dismantling of all connected temporary arrangements, back filling with earth and compacting the same to the required height and width as per drawing to ensure safety of foundation, confining the exposed height of foundation block to within 10 cm. and removal of soil to safe place. The price shall also include the cost of cement, sand and ballast.

The price shall also cover the cost of diversion of masonry/ earth drain wherever necessary for casting of foundation. Price shall also cover excavation of cutting etc. to make room for foundation, if required.

The Purchaser's Engineer shall certify where use of chisel and hammer or blasting is necessary. The Contractor shall arrange for supply of explosives and all tools and plants for blasting operations at his own cost. If half or more of the depth or width of excavation is in hard soil/ concrete/ masonry drains/ walls or in rock, the entire foundation shall be paid under this item as the case may be. The price shall include the cost of cement. The blasting would be permitted in exceptional cases. To the extent possible rocky bed to be removed by pneumatic chisels only.

Testing of samples will be done as per IS-456 from any Govt. Polytechnic & Govt. Engineering College or reputed laboratory located in the respective section. The sample transportation and testing charges will be borne by Contractor. Contractor will submit authentic certificate of sample testing.

Note for measurement of foundation items:

- (i) The payable volume of the foundations under these items shall be designed one as shown in the drawings for which the hole has been blasted, irrespective of the actual configuration assumed by the latter due to the blasting.
- (ii) The depth of the excavation shall be measured from the formation level to the maximum excavated point.
- (iii) One sample i.e. 3 test cubes (15 cm cube each) shall be taken for testing at 28 days, for every 25 Cub Mtr or part thereof, concreting work. If the total volume is less than 25 Cub Mtr, at least one sample shall be taken for testing as per IS:456. Test strength of sample must be as below:

| Grade Designation | Minimum Compressive strength at 28 days |
|-------------------|---|
| M-15              | 15 N/mm <sup>2</sup>                    |
| M-20              | 20 N/mm <sup>2</sup>                    |

**Preparation of design & drawing for overhead equipment.**

**LOP:** After site survey, contractor will submit two sets of the proposed layout plan, for approval and after approval of proposed layout plan; the work is to be started.

After completion of work, the verified and corrected LOP drawings shall be supplied in four sets, one of which shall be transparencies of linen or film reproduction or any other durable material approved by the purchaser and also on the compact disc in "Autocad" supported approved version.

**Cross Section Drawings:** The price shall cover site survey, design and preparation of complete cross section drawings of each location as per RDSO/CORE standards (i.e. including existing unmodified portion). The contractor shall submit two sets of blue print for approval, in-so-far as yards between outer most points and crossings are concerned, cross section drawings for each structure showing guy rods, if any, indicating the cross section of the formation, height and nature of the bank, whether new or old, nature of soil, type of foundation block, structure proposed, reverse deflection of the structure and all necessary particulars for erection of the foundation and the structures. In the preparation of drawings, care shall be taken to show all obstructions such as signal wires, point rods and their correct location in reference to track/tracks as well as underground obstructions like pipes, cables, etc. after collecting such information from the site.

**Notes –**

- (i) In open line sections, cross-sections drawings shall be submitted in the proforma, separately for each Railway line.
- (ii) For special foundation, drawings with all necessary details shall be submitted to the Purchaser.
- (iii) In case of side bearing foundation with extra depth, formation details as such location and necessary details for anchor foundation will be submitted.

**Structure Erection Drawings:** The contractor shall then submit structure erection drawings for each location incorporating all the details included in the cross section drawing for the structure and as erected at site and the details of the bracket assembly, mast extensions, isolator mounting frame and anchorage of overhead equipment, feeder return conductors proposed for each structure together with all particulars necessary for the correct erection of overhead equipment at the structure. For structures with isolators, the details of electrical connections shall also be incorporated. In open line section the contractor shall submit structure erection particulars in the 'SED' proforma separately for each main line track in addition to particular details as indicated in the proforma for cross-section drawings.

**As Erected Drawings:** After completion of works, the verified and corrected drawings i.e. Lay out plan & SEDs, shall be supplied in four sets, one of which shall be plastic paper printing (75mic NJ EMF U to standard 90/95G), approved by the purchaser and also on the pen drive.

**NOTES FOR MEASUREMENTS:**

For the purpose of payment against these items, the length of track shall be measured as under:

- 1 General – By the difference in the chainages of the length under consideration, as incorporated in the layout plans.
- 2 Turnouts: The track taking off shall be deemed as starting from the toe of the switch of the turnout.
- 3 Crossovers: The length of track shall be taken as the difference in the chainages of the toes of switches of the two turnouts constituting the cross-over.
- 4 Diamond crossing with or without slips: The two tracks crossing each other shall be measured independently as per Note 1 above as though there were no crossing. No extra shall be provided for slip points.
- 5 Dead ends and tops of loops: The lengths for payment under this item shall be up to the chainage of anchor mast of the terminating OHE.
- 6 Feeders and return feeders from grid sub-station to feeding station.
- 7 Payment against item is restricted to the extent of new and/or modification works only. The existing wired tracks shown in layout shall not be counted for the purpose of payment.

8 Before taking up the work Contractor shall submit four prints of each approved drawings.

This item will also be applicable independently in case of feeders/return feeders/conductors from grid sub-station to overhead equipment feeding stations or in a case of feeders/conductors running on independent structures (not supporting OHE) along or across tracks.

In such a case the length of line to be considered for purpose of payment shall be measured by the distance between center of gantries of the grid sub-station and feeding stations, in case of feeder/return feeders/conductors line from grid sub-station, or by the distance between the center line of the two structures to which the feeders/return feeders/conductors are anchored in case of feeders running along the track if such feeder/return feeders/conductors are running completely on independent structures or by the distance between the center of the two structures supporting the OHE on either side of the first and last independent structure in case of feeders/return feeders/conductors running along the track supporting OHE.

#### **Supply & Erection of Sectioning diagram.**

Price shall cover preparation, supply & fixing of sectioning diagram on Foam sheet board with vinyl printing and framing of various sizes for various locations such as TRD depot, Station, CTPC office etc. as directed by concerned ADEE / SSE /TRD. The price shall also include erection of board with required fixing arrangement as approved by purchaser at nominated place.

Approval of SSE/Drg/BSL & concerned ADEE/SSE/TRD to Sectioning diagram must be obtained by tenderer before finalization/before provision.

Price shall cover all man, material, tools and tackles required for successful execution of work.

#### **Supply & Erection of galvanized steel for structures:**

The price shall cover cost of supply of various types of galvanized steel structures, individual traction masts, dwarf masts, portals uprights and booms, TTUs & TTBs, knee bracings and main masts and masts for LT supply transformer stations, etc., fabricated out of different sections of steel as per RDSO drawings and specifications. All the steel structures for carrying overhead equipment are to be fully galvanized after drilling and fabrication as per specification no ETI/OHE/13(4/84) with latest amendments. No painted structures are to be used. Price shall also cover supply of all types of hot dip galvanized nut bolts / washers required as per RDSO drawings.

The price shall cover cost of manual erection, alignment and setting before grouting of individual traction masts and main masts for LT supply transformer stations whether rolled or fabricated including those for head span. The price shall also include the cost of painting of the setting distance of masts/structures, contact height and rail level on masts/structures.

**Minimum average weight of zinc coating on all steel structures and small part steel shall be 1000 gm/sq m.**

#### **Manual/With Road Crane Erection of Portal and TTC boom.**

The price shall cover erection of Portal / TTC boom including SPS with the help of Road Crane or manually. The price shall also include the cost of painting of the setting distance of masts/structures, contact height and rail level on Portal structure.

**Supply & Erection of galvanized small parts steel (SPS):**

The price shall cover cost of supply of galvanized steel fabricated small parts steel work consists of DAs, super masts, suspension brackets for feeders, anchor fittings & stiffener angles, multiple cantilever cross arms, chairs, adopters and all types of backing angles etc as per relevant RDSO drawings and specifications. All the steel work is to be fully galvanized after drilling and fabrication as per RDSO Specification No. – ETI/OHE/13(4/84) with latest amendments.

The price shall also cover cost of manual erection of small parts steel work on individual traction masts and main masts as per site requirements.

**Minimum average weight of zinc coating on all steel structures and small part steel shall be 1000 gm/sq m.**

**Supply & erection of cantilever assembly for Conventional type OHE with 1050 mm long Creepage Distance bracket and stay porcelain insulators.**

The price shall cover on a flat rate basis for supply of bracket assembly for conventional type/ Tramway type OHE (whatever may be the case) as per RDSO drawing no. ETI/OHE/G-02106, SHEET-1,3, Mod-C or latest version, on a traction masts or support or on a drop arm and shall include those on high/low rail level platforms, in the vicinity of turnouts, over bridges, overlaps, and at locations with reduced encumbrance or terminating wire as per RDSO's latest drawings. The price shall include the cost of supply of all components and bolts, nuts, including galvanized steel tubes, inclined dropper wires etc. but excluding small parts steel work. **1050 mm** long creepage distance **porcelain Insulators** shall be supplied by Contractor.

The price shall cover fabrication of cantilever assembly as per SED and erection of all components including insulators, dropper wires, fasteners and small parts steel work, if any. The price shall also cover for supply & erection of additional fittings required for supporting an additional OHE on a single bracket assembly.

**Note:**

- 1) Price shall cover supply of all types of bolts, nuts, flat & spring washers which are required for erection of new cantilevers assemblies as per RDSO drawing no. ETI/C/0073 or latest and specification no. ETI/OHE/18 (4/84) or latest on OHE structures.
- 2) The fittings which are also available in forged type, for such fittings forged type fittings only shall be used.

**Supply of Hard drawn round copper for dropper wire, diameter 5 mm as per IS:282:1982.**

**Supply Contact wire Dropper clip (107) with locking wire as per RDSO Drawing no. RE/33/P/1181 Rev. G or latest.**

**Supply 65 Sq.mm copper catenary dropper clip assembly consisting of catenary clip SS bolt M-10X30X35mm (10/16), spring washer B-10, Split pin 2.5X20mm, as per RDSO Drg. No. ETI/OHE/P/1192 Mod. C or latest.**

**Fabrication & erection of dropper assembly (Conventional OHE) including removal of old droppering.**

Price shall cover Supply of Hard drawn round copper for dropper wire, diameter 5 mm as per IS:282:1982, Supply Contact wire Dropper clip (107) with locking wire as per RDSO Drawing no. RE/33/P/1181 Rev. G or latest & Supply 65 Sq.mm copper catenary dropper clip assembly consisting of catenary clip SS bolt M-10X30X35mm (10/16), spring washer B-10, Split pin 2.5X20mm, as per RDSO Drg. No. ETI/OHE/P/1192 Mod. C or latest.

The price shall also cover fabrication, and erection of 5 mm dropper assembly including contact & 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 the consultation of Railways site supervisor. The cost also includes dismantling of existing dropper assembly, wherever involved.

**Manual erection of Overhead equipment:**

- (i) The price shall cover transportation of copper catenary, copper contact wires from the Railway's Store depot including loading & unloading with contractor's own men, tools, tackles & machineries, stringing of both catenary & contact wire as per the Railways proper procedure & specification.
- (ii) The price shall cover erection of all components and wires and conductors including contact wire, Catenary, droppers, jumpers and terminating wires, but excluding small part steel work.
- (iii) Contractor shall use such jigs, fixtures and mechanisms (of his own), which would avoid kinks and twists in overhead conductors while manual erection under this item. Trolley should be used to load the conductor drum.
- (iv) Proper anti theft arrangement is to be provided by the contractor so far the OHE is not charged with Traction supply. Any type of theft or loss shall have to be borne by the contractor, till issue of PAC.
- (v) The price shall not include termination of conductors, cut in insulators and section insulators, and bracket assemblies which will be paid for under relevant item.
- (vi) Price shall not include supply and erection of "G" jumper required for turn outs, cross overs and overlaps for jumpering two OHE which shall be paid under relevant item.
- (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.

**Material will be supplied by Railway.**

Notes for measurement:-

- 1. For the purpose of payment against this item the length of overhead equipment which shall include length occupied by terminating wires section insulators/ cut in insulators length shall be measured from the center lines of the traction masts/structures at which the two ends of each tension length of overhead equipment are anchored.
- 2. The length shall be the difference between the actual changes of the two traction masts/structures at which the ends of each tension length are anchored or by the sum of the actual spans between the same two point whichever is higher as included in the "as erected" layout plans. For purpose of progress payment reference to lay out plan as approved shall be made. The price under this item does not cover the cost of supply and erection of cut in insulators, section insulators & bracket assemblies the supply and erection of which shall be paid for under relevant item.
- 3. Unit indicated against this item is meant for stringing of 1 km catenary & contact wire both.

**Supply of Contact wire splice (toothed type) complete with stainless steel stud bolt M12, 25/20, as per RDSO drg. No. ETI/OHE/P/1080-1 Mod-'C'.**

**Supply of Catenary Splice (65) as per RDSO drg. No. ETIOHE/O/1090 or latest.**

**Splicing & extension of anchored over head equipment.**

The price shall cover supply of Contact wire splice (toothed type) complete with stainless steel stud bolt M-12, 25/20, as per RDSO drg. No. ETI/OHE/P/1080-1 Mod-'C', supply of Catenary Splice (65) as per RDSO drg. No. ETIOHE/O/1090 or latest & splicing of terminated overhead equipment (Conventional type) for extension and consequent adjustment of the affected equipment. Price shall include the cost of erection of all material for extension of OHE by splicing or equalizing plate and accessories for extension of OHE using single large span wire. The dismantled equipment (excluding portions embedded in concrete) shall be returned to concern SSE/TRD of the section at work site. It includes cost of dismantling of overhead equipment of the anchoring span portion irrespective of the physical position of the splices. The extended overhead equipment shall be deemed as starting from the centerline of the structure preceding the old terminating structure and the remaining dismantled overhead equipment shall be paid for under relevant items. Splice shall be supplied by contractor.

**Supply & Erection of OHE termination assembly including porcelain 9-Tonne insulators (For BWA, FTA) for Conventional type OHE.**

The price shall cover supply & erection of all material necessary for the termination of conductor of Over Head Equipment or terminating wire on a Traction Mast or Structure using appropriate mast anchor fitting, clevis assembly and other fittings.

The price shall also cover supply & erection of all materials as below (including sufficient qty. of relevant Nut/bolts and rivets required for above assembly):

| S.N . | Description of material         | RI No. | Qty. for BWA Conv. OHE | Qty. for FTA Conv. OHE | Qty. for BWA Tramway OHE | Qty. for FTA Tramway OHE |
|-------|---------------------------------|--------|------------------------|------------------------|--------------------------|--------------------------|
| 1     | 9 TONNE adjuster assembly.      | 5020   | 4                      | 3                      | 2                        | 1                        |
| 2     | Anchor double strap assembly.   | 5030   | 6                      | 5                      | 2                        | 2                        |
| 3     | Double eye distance rod.        | 5183   | 1                      | 0                      | 1                        | 1                        |
| 4     | Contact wire ending cone.       | 1110-1 | 1                      | 1                      | 1                        | 1                        |
| 5     | Catenary wire ending cone.      | 1120-1 | 1                      | 1                      | --                       | --                       |
| 6     | Compensating plate.             | 5191-1 | 1                      | 0                      | --                       | --                       |
| 7     | Equalising plate.               | 5192   | 0                      | 1                      | --                       | --                       |
| 8     | 9 Tonne insulator assembly.     | 6020   | 1                      | 1                      | 1                        | 1                        |
| 9     | 18 mm clevis modified assembly. | 5040   | 0                      | 1                      | --                       | 1                        |

**Supply & Erection of OHE termination assembly including porcelain 9-Tonne insulators (For BWA, FTA). (Suitable for 2x25 KV AT supply system)**

The price shall cover supply & erection of all material necessary for the termination of conductor of Over Head Equipment or terminating wire on a Traction Mast or Structure using appropriate mast anchor fitting, clevis assembly and other fittings. 9 Tonne Insulator RI-6020-1 (Minimum CD 1050 mm) conforming to RDSO Specification no. TI/SPC/OHE/ INS/0070 (04/2022) with A & C Slip no. 1 & 2 or latest.

The price shall also cover supply & erection of all materials as below (including Sufficient qty. of relevant Nut/bolts and rivets required for above assembly):

| S.N. | Description of material            | RI No. | Qty. for BWA<br>Conv. OHE | Qty. for FTA<br>Conv. OHE |
|------|------------------------------------|--------|---------------------------|---------------------------|
| 1    | 9 TONNE Adjuster assembly.         | 5020   | 4                         | 3                         |
| 2    | Anchor double strap assembly.      | 5030   | 6                         | 5                         |
| 3    | Double eye distance rod.           | 5183   | 1                         | 0                         |
| 4    | Contact wire ending cone.          | 1110-1 | 1                         | 1                         |
| 5    | Catenary wire ending cone.         | 1120-1 | 1                         | 1                         |
| 6    | Compensating plate.                | 5191-1 | 1                         | 0                         |
| 7    | Equalising plate.                  | 5192   | 0                         | 1                         |
| 8    | 9 Tonne insulator assembly.        | 6020   | 1                         | 1                         |
| 9    | 18 mm clevis modified<br>assembly. | 5040   | 0                         | 1                         |

**Supply & Erection of 3 pulley type ATD assembly for conventional type OHE.**

The price shall cover supply & erection of 3 pulley type regulating equipment assembly complete with counter-weight assembly suitable for conventional type/tramway type OHE, including 9 tonne adjuster, double strap assembly and normal/anti-theft guide tube assembly, stainless steel wire rope, required for the regulating equipment but excluding small part steel work, if any. The price shall also cover adjustment of the entire regulating equipment. The price shall not include supply / erection of termination, which will be paid for under appropriate item. Price shall include erection of anti-falling arrangement as per RDSO Drawing No. – TI/DRG/OHE/ATD/RDSO/00001/99/2 (Latest) & TI/DRG/OHE/ATD/RDSO/00009/06/0 (Latest). The anchor fittings required for erection of regulating equipment & anti-falling device will be paid separately under appropriate item of SPS.

**Supply & Erection of 3 pulley type ATD assembly for conventional type OHE suitable for 2x25 KV AT supply system.**

The price shall cover supply & erection of 3 pulley type regulating equipment assembly complete, suitable for conventional type OHE for 2x25 KV AT supply system , including 9 tonne adjuster, double strap assembly and normal/anti-theft guide tube assembly, stainless steel wire rope, required for the regulating equipment but excluding small part steel work, if any. Price shall not cover supply of Counter weight, which will be supplied by Railways. The price shall also cover adjustment of the entire regulating equipment. The price shall not include supply / erection of termination, which will be paid for under appropriate item. Price shall include erection of anti-falling arrangement as per RDSO Drawing No. – TI/DRG/OHE/ATD/RDSO/00001/99/2 (Latest) & TI/DRG/OHE/ATD/RDSO/00009/06/0 (Latest). The anchor fittings required for erection of regulating equipment & anti-falling device will be paid separately under appropriate item of SPS.

Regulating equipment (Three Pulley Type higher tension) should be provided as per RDSO specification no. TI/SPC/OHE/3PHTATD/0150 with ACS (1) with counter weight eye rod as per drawing no. ETI/OHE/SK/588 Rev. B.

**Erection of Anti creep arrangement Assembly**

The price shall cover erection of all material necessary for Erection of Anti creep arrangement Assembly of Over Head Equipment using appropriate mast anchor fitting, clevis assembly and other fittings.

The price shall also cover erection of all materials as below (including Sufficient quantity of relevant Nut/bolts and rivets required for above assembly):

| S.N. | Description of material         | RI No. | Qty. for ACA with Copper Catenary |
|------|---------------------------------|--------|-----------------------------------|
| 1    | 9 TONNE Adjuster assembly.      | 5020   | 2                                 |
| 2    | Anchor double strap assembly.   | 5030   | 4                                 |
| 3    | Double suspension clamp         | 1170   | 1                                 |
| 4    | Catenary wire ending cone.      | 1120-1 | 2                                 |
| 5    | 9 Tonne insulator assembly.     | 6020   | 2                                 |
| 6    | 18 mm clevis modified assembly. | 5040   | 2                                 |
| 7    | Counter Weight                  |        |                                   |

### **Supply & Erection of guy rod assembly.**

The price shall cover supply & erection of guy rod assembly for traction masts, feeder line towers or portals or other supports. Price shall include supply & erection of following items:

| S. N. | Description of material  | RI No. | Qty. For Dwarf Mast Anchor | Qty. For Normal Anchor |
|-------|--|--------|----------------------------|------------------------|
| 1     | Guy Rod (5.35mtr)  | 5006-1 | 1                          | --                     |
| 2     | Guy Rod (9.70mtr)  | 5005   | --                         | 1                      |
| 3     | Guy Rod Stirrup  | 5002   | 1                          | 1                      |
| 4     | Anchor Bolt (0.85mtr)  | 5001-3 | 2                          | --                     |
| 5     | 'V' bolt with Nut, Lock Nut, Punched Washer A22, Split Pin 4X40. | 5007-1 | --                         | 1                      |
| 6     | Guy Rod Double strap.  | 5222   | 1                          | 1                      |
| 7     | Dia. G. I. 24x70/54 N.B.L. with hole.                            | 24/1LN | 2                          | 2                      |
| 8     | Split pin 5x40- annealed Cu as per IS:549                        |        | 1                          | 1                      |
| 9     | Anchor Loop  | 5008   | --                         | 1                      |

### **Supply & Erection of section insulator assembly along with all fittings including Porcelain sectioning insulators & porcelain 9-tonne insulators suitable for conventional type OHE.**

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

### **Supply of 25 KV 1600 A single pole isolator assembly with insulators & pad lock with 3 Nos. Keys.**

### **Supply & Erection of 25 KV 1600 A single pole isolator assembly with insulators & earthing heels.**

### **Supply of Integral lock for Isolators with 02 nos. keys.**

**Erection of 25 KV 1600 A single pole isolator assembly.**

The price shall cover supply, erection, testing & commissioning of a 25 KV,1600 Amp single pole isolator assembly complete with all accessories, insulators, pad lock with 3 nos. keys, earthing heels wherever required, with flexible tinned copper strip and Integral lock with 02 nos. keys as per RDSO spec & drawing. The price shall include mounting of the isolator assembly including insulators and the operating pipe with handle in position and their alignment for smooth and trouble free operation as per RDSO spec. The price shall cover erection of earthing heel if any with flexible tinned copper strip. Price shall also include testing and commissioning of an isolator.

**Supply & Erection of 25 KV Post insulator.**

Price shall cover Supply & Erection of 25 KV **porcelain** Post insulator assembly & all material, components necessary for the supply & erection as per RDSO latest specification.

**Supply & Erection of single earth electrode.**

The price shall cover supply and erection of an earthing station as per RDSO Drawing No. – ETI/PSI/222-1(For PSI work) OR ETI/OHE/P/7021(For OHE work) with a single pipe electrode. The pipe shall be embedded as far as possible vertically into the ground, except when hard rock is encountered, where it may be buried inclined to the vertical, the inclination being limited to 30° from the vertical. The pipe shall be provided with welded lug at one end suitable for taking directly two separate & distinct MS flat of size 75x8 mm/50x6 mm. The price shall cover the provision of a protective concrete box with top cover as shown in the drawing. The price shall also include the testing of earth resistance value & painting the same on protection box. This includes excavation and provision of charcoal and salt as per site requirement. The price shall cover supply & erection of all additional materials required for embedding the earth pipe. Price shall also include where an earth electrode is embedded by excavation in rocky area and extra volume is to be filled with charcoal and salt. The payment will be made for the actual MS strip used at site for earthing & not for residual portion of MS strip leftover during fabrication / cutting.

**Slewing & re-slewing of OHE.**

The price shall cover temporary slewing or lowering of erected OHE adjusted / unadjusted to ground for special work, as per the direction of Railway & restoration & readjustment of the equipments after completion of special work. The price shall be per span or part thereof including anchoring span.

**Supply of Porcelain 9 Tonne Insulator RI-6020-I (Minimum CD 1050 mm) conforming to RDSO Specification no.TI/SPC/OHE/ INS/0070 (04/2007) with A & C Slip no. 1 & 2 or latest for Cut- in insulator/suspension.**

**Supply of Contact Wire Ending Clamp (107) as per ID no. 1110-2 & DRG.No ETI/OHE/1110-2 each set comprising of 01 no contact wire ending clamp body part no. 1118. 01 No contact wire ending clamp wedge part no. 1119 for Cut- in Insulator/ suspension.**

**Supply of Catenary Wire Ending Clamp (65 Sq.mm) Part No. 1121, 1092 &1094, with fasteners as per Drg NO.ETI/OHE/P/ 1120 Rev-B or Latest for Cut- in insulator/suspension.**

**Erection of cut-in insulator assembly for contact wire/ catenary wire.**

Price shall cover Supply & Erection of 25 KV 9 Tonne cut in insulator of **porcelain only** for contact wire / catenary wire. Price shall also cover supply & erection of all

material required for erection of Large Span Wire termination assembly as per RDSO latest specification as described above in each schedule item.

**Supply of Copper jumper wire (160 sq mm).**

**Supply of P.G.Clamp (1030-3) complete assembly.**

**Erection of any type jumper assembly such as "G" jumper, AT jumper, Isolator jumper etc.**

Price shall cover Supply of Copper jumper wire (160 sq. mm), supply of P.G. Clamp (1030-3) complete assembly as per RDSO latest specification & fasteners required for erection and assembling.

The price shall also cover erection (as per Railways guidelines) of any type jumper assembly such as "G" jumper, AT jumper, Isolator jumper etc. between two sets of overhead equipment, conductor at a turnout, diamond crossing, overlaps or neutral section including complete assembly of P.G. Clamps (1030-2), (1030-3), (1050-3) as per RDSO latest specification including all additional components, nut-bolts, washer, fittings and bimetallic parallel clamps.

**Supply, Fabrication & fixing of 40mm X 6mm galvanized traction bond for bonding including hole drilling in rail.**

The price shall cover supply of Galvanized GI Flat 40x6 mm confirming to IS: 2062/2011 or latest. Grade Designation E-250 (Semi-Killed/ Killed) for material. IS:1730 for dimension & IS:1852 for Quantity tolerance. Length 5.5 to 13.5 Meters. Galvanization may be done as per RDSO Specification No. ETI/OHE/13(4/84) with A&C slip No.1 to 4 or latest (the weight of the zinc coating to be adopted is 610g/m<sup>2</sup>) required for a structure bond connecting a traction mast or structures to the nearest non-track circuited rail, or earth electrode, or as a longitudinal / inter rail bonds / transverse bonds or any other required bonding work including all fasteners at both ends. The price shall include cutting, shaping and drilling of the bond and erection of all materials including the bond. The price shall also include painting as per code of practice for earthing and provision of heat shrinkable PVC tube for structure bond under track-circuited rail. The price also includes drilling of holes in rail. Price shall include Supply of G. I. Nut Bolts size 16X50X38 mm. wherever required.

**Supply & Erection of Retro reflective type Location number plates.**

Price shall cover supply & erection, of Retro reflective type Location number plates along with mounting clamp & nut bolts, fasteners etc. required for erection on structures as per relevant RDSO drgs.

**Supply & Erection of Caution board for 25 KV AC electrified area as per RDSO Drawing.**

The price shall cover supply & erection of an enameled caution plate 25000 Volts AC as per RDSO Drawing No. – ETI/OHE/P/7531, Alt-C with mounting clamp made of 50 X 6 mm MS flat & G.I. fasteners etc in approved manner and as shown in RDSO Drawing. No. – ETI/PSI/036, Rev-G for OHE & AT station.

**Painting of "OHE parameters" on OHE structures.**

The painting of OHE parameters like Rail level, Implantation, Contact height, Stagger, Emergency telephone socket location & bottom of balance weight location at 5°C, 35°C & 50°C temperatures marking is to be done on the various OHE structures i.e. main line locations in mid-section, within station limits as well as on other than main line structures including the leftover locations, as per the need of the Railway.

The procedure & specification for painting of parameters is mentioned in detail in the Drawing. The figures shown in the drawing are only indicative. Irrespective of type of OHE structure and number of bands to be painted (Since the painting of Band No. – 1, 2, 3, 8 & 10, require on BWA locations), rate for painting per OHE structure is uniform.

The paint to be used shall be any of the reputed make like “Asian” or “Nerolac” or “Dulux” or “Jenson & Nicholson” or “Berger” or “Shalimar” make & shall confirm to the relevant Indian Standard Specification as mentioned in the above noted drawing.

The work is to be carried out by manual painting method only. The cost includes all tool & plants and materials and consumable like ladder, painting brushes, thinner & cleaner, cotton waste etc. required for completion of work including transportation thereof. Only aluminium ladder to be used.

#### **Painting of "Location Numbers" on backside of OHE structures.**

The painting of location number is to be done on the back side of the various OHE structures i.e. main line locations in mid-section, within station limits as well as other than main line masts as per the need of the Railway.

The procedure & specification for painting work is mentioned in detail in the Drawing. The font & size of the letters and figure shall be of “Gill San” as per RDSO Drawing No. – RE/33/527 (100 mm) & RE/33/302-B (75 mm).

The paint to be used shall be any of the reputed make like “Asian” or “Nerolac” or “Dulux” or “Jenson & Nicholson” or “Berger” or “Shalimar” make & shall confirm to the relevant Indian Standard Specification as mentioned in the above noted drawing.

The painting of location number is to be carried out by manual painting method only and no stenciling work is allowed. The cost includes all tool & plants and materials and consumable like ladder, painting brushes, thinner & cleaner, cotton waste etc. required for completion of work including transportation thereof. Only aluminium ladder to be used.

#### **Painting of counter weight of ATD by silver paint & painting of location number on bottom 3 pieces of counter weight with similar color of enameled number plate.**

Painting of counter weight of ATD by silver/aluminium paint & painting of location number on bottom 3 pieces of counter weight with similar colour of enamelled number plate. The cost includes all material, tool & tackles, manpower etc. required for painting of counter weight of ATD by silver paint & painting of location number on bottom 3 pieces of counter weight with similar colour of enameled number plate.

#### **Transfer of equipment from one mast or support to another including old bracket removal.**

The price shall cover transfer of an overhead equipment to a new support from the old mast or support and consequent final adjustment to overhead equipment. The foundation, steel work and erection of cantilever assembly for the new mast or structure will be paid for under appropriate items. The cost also includes dismantling of existing bracket assembly/assemblies including insulators and SPS. The price shall also include the necessary adjustment of the OHE termination arrangement including regulating equipment, required due to consecutive transfer of OHE as per the new alignment. The dismantling of existing dropper assembly and provision of new droppers for leveling and to maintain proper OHE profile will be paid separately under the appropriate schedule item.

**Dismantling of overhead equipment including SPS, DA etc. but excluding structure.**

The price shall cover dismantling of overhead equipment including SPS, bracket etc. with all associated fittings from old location at work site and it shall be handed over to concerned SSE (TRD) of the section at work site.

**Dismantling of OHE termination assembly**

Price shall include the cost of dismantling of termination assembly and associated fittings from old location and it shall be transported to concerned SSE (TRD) depot of the section from work site. The price shall cover transportation & handing over of released material to concerned OHE depot including loading and unloading.

**Dismantling of any type of ATD assembly**

The price shall cover dismantling of any type of regulating equipment with counter weight assembly from old location with all associated fittings and it shall be transported to concerned SSE (TRD) depot of the section from work site. The price shall cover transportation & handing over of released material to concerned OHE depot including loading and unloading.

**Dismantling of Anti-creep arrangement Assembly**

The price shall cover Dismantling of Anticreep arrangement Assembly including SPS with all associated fittings from old location at work site. The price shall cover transportation & handing over of released material to concerned OHE depot including loading and unloading.

**Dismantling of guy rod assembly**

The price shall cover removal of old guy rod assembly with their associated fittings and SPS from old location excluding portion embedded in concrete and it shall be transported to concerned SSE (TRD) depot of the section from work site. The price shall cover transportation & handing over of released material to concerned OHE depot including loading and unloading.

**Dismantling of section insulator assembly.**

The price shall cover dismantling of section insulator assembly from old location with all associated fittings and it shall be transported to concerned SSE (TRD) depot of the section from work site. The price shall cover transportation & handing over of released material to concerned OHE depot including loading and unloading.

**Dismantling of single pole isolator assembly.**

The price shall cover removal of single pole isolator assembly with their associated fittings and SPS from old location excluding portion embedded in concrete and it shall be transported to concerned SSE (TRD) depot of the section from work site. The price shall cover transportation & handing over of released material to concerned OHE depot including loading and unloading.

**Dismantling of cut-in insulator assembly.**

The price shall cover dismantling of Dismantling of cut-in insulator assembly from old location with all associated fittings and it shall be transported to concerned SSE (TRD) depot of the section from work site. The price shall cover transportation & handing over of released material to concerned OHE depot including loading and unloading.

**Dismantling OHE structures by cutting and transporting to Railway depot including loading and unloading.**

The price shall cover dismantling of OHE structures such as CTL/POM/Single mast including SPS, bracket etc. and with all associated fittings at old location at work site and transporting to Railway depot including loading and unloading.

**Manual /with Road crane dismantling of Portal / TTC boom including SPS.**

The price shall cover dismantling of Portal / TTC boom including SPS and with all associated fittings at old location at work site manually or with the help of Road Crane. The price shall also include the cost of and transporting to Railway depot including loading and unloading.

**Breaking of foundation up to 200 mm. below track formation.**

Price shall cover on per cubic metre basis, breaking of existing redundant OHE foundation in the vicinity of Railway track by suitable tools, up to 200 mm below track formation or as advised by Railway representative. The price shall also cover, removal of debris from site and shift to suitable site, as per discretion of Railway representative. The price shall cover filling of the evacuated foundation with soft soil / murrum if required, to avoid any accident / mishap.

**Supply & Erection of solid core suspension insulator (porcelain) assembly for AT supply system :**

The price cover on a flat rate basis supply & erection of 9 Tone suspension insulator (porcelain) assembly for AT supply system, along with supply of all components and fittings required for erection of assembly.

**Supply & erection of 25 KV DO fuse switch assembly including 25 KV solid core porcelain post insulators.**

The price shall cover supply and erection of 25 KV DO fuse switch complete with all mounting accessories and terminal connectors as required as per RDSO Specification No. – ETI/PSI/14 (01/86) of April 1987 (or Latest), including 25 kV solid core porcelain post insulators (R. I. No. – 6090-1) as per RDSO Specification no. TI/SPC/OHE/ INS/0071 (04/2022) or latest with A & C Slip if any. The erection of DO Fuse to be done as per Drawing No. – BSL/TD/SK-400. Supply & erection of small parts steel work, is covered under appropriate item.

**Supply & erection of termination box assembly for 25 KVA AT Supply as per drawing.**

Price shall include the cost of supply and erection of Termination Box assembly (along with all fittings required for erection of assembly) for CLS cable, as per drawing to be provided in Station Superintendent's Room / Cable Hut end. The location and requirement of the Termination Box shall be given by concerned SSE/TRD.

**Supply & Erection of LV box assembly for 25 KVA Auxiliary Transformer as per drawing.**

Price shall cover Supply & Erection of LV box assembly for 25 KVA Auxiliary Transformer as per drawing.

**Supply & laying of 100 mm dia. (OD) 'A' class GI pipe with GI flat clamp & required hardware.**

The price shall cover supply of 100 mm dia. (OD) light "A" class GI pipe with GI flat clamp & required hardware & is to be laid underground in excavated trench or to be provided on wall or along the mast/pole with proper clamping arrangement for cable laying.

For cable entry inside changeover rooms compatible bend shall be used.

**Supply & erection of anti-climbing device with GI barbed wire etc. for AT mast.**

The price shall cover on a lump sum basis the supply and erection of anti-climbing device as per Part No. – P-9063 of RDSO Drawing No. – ETI/PSI/037, consisting of galvanized steel fixtures & hardwares for mounting below the transformer on AT mast.

**Supply & Erection of 50X6 G.I strips for equipment earthing**

The price shall cover supply & erection of 50X6 G.I strips along with fasteners for equipment earthing as per relevant RDSO drgs.

**Transportation, Trenching, and Laying of LT/HT, various sizes of PVC/XPLE cables along the Railway track.**

The price shall cover Transportation of various sizes of PVC/XPLE cables for AT supply for signaling at each hut. The price shall cover making of cable trench of suitable width & required depth in ordinary soil, black cotton soil, red soil, sandy loam, clay or soft murrum on road or track crossing portion. Before cable laying in the cable trench, bedding of minimum 75 mm riddled soil or sand at the bottom of the trench is to be provided. After cable laying (Covered under respective schedule item), it should be covered with an additional layer of riddled soil or sand of minimum 75 mm & cable shall be protected by means of RCC warning cover (Slab) (Covered under respective schedule item). The excavated earth is to be back filled in to the cable trench in an approved manner after cable laying. Cable trench & back filling shall be as per IS-1255:1983.

Due to soil conditions, it may not be possible to achieve the desired depth of trench at some locations. In such cases following course of action is to be followed:

- 1) If portion of cable trench with depth less than desired is up to 10% of total length of cable trench for particular AT / Location, DEE/TRD - ADEE/TRD, can permit the reduced depth of cable trench by citing reason thereof in writing and visiting site to verify, genuineness of reasons put up.
- 2) If portion of cable trench with depth less than desired is more than 10% of total length of cable trench for particular AT / Location, decision will be taken by Sr.DEE/TRD.
- 3) There will be no change in rate of payment for making cable trench with reduced depth.
- 4) For portion of cable trench with reduced depth, additional one layer of RCC warning cover (Slab) shall be provided by Contractor without any extra cost as additional safety. This additional layer will be same, over and above being provided as per tender conditions for normal locations.

Price shall also cover Laying of LT/HT cable across the Railway track/Road in RCC Hume Pipe with collar, wherever required as per the instructions of SSE/Incharge.

**Supply & laying of RCC warning cover:**

The price shall cover fabrication of RCC warning covers of size 450 mm (L) X 180 mm (W) X 40 mm (Thick) as per Drawing No. - BSL/TD/SK-398. The proportion of cement concrete shall be 1:2.5:5. For reinforcement expanded metal or 1/8th inch

diameter iron rods to be used. The iron rods are to be provided at 3 places with equal spacing parallel to length and at 8 places with equal spacing parallel to width. The iron rods shall be either welded or binded with 18 SWG binding wire. The thickness, size and shape of the expanded metal reinforcement, if used, shall be exactly same as that of prepared with iron rods. The fabricated RCC warning covers are to be used for protection of underground cable laid in the trench.

The random sampling @ 2 % of lot size shall be done to verify supplied material is in conformity to tender specifications. If any of the sample fails, complete lot will be rejected. No payment shall be made for the samples.

**Supply and erection of cast iron cable Route marker as per drawing.**

The price shall cover supply of cable marker as per Drawing No. - BSL/TD/SK-402 (Rev- 1) and to be erected at nominated location to indicate the route of cables. Cable marker should be provided by the Contractor on straight runs at the distance of 50 meters to 75 meters. Cable marker shall also be provided on both side of the track crossing and also when cable route makes turn or as per instruction of concerned SSE/TRD of the section.

**Supply & laying of 150 mm size RCC hume pipe along with collar / coupler etc.**

The price shall cover supply and laying of 150 mm (ID) & minimum 20 mm thickness size RCC hume pipe conforming to IS:458/2003 or latest in excavated trench across road / track crossing along with required coupling, collar and other accessories.

**Laying of 2 x 150 sq. mm. Al. armoured cable by cleating on wall:**

The price shall cover laying work of 2 X 150 sq. mm aluminum armored cable by cleating in an approved manner on:

Wall - Using spacer made from 6 mm thick & 25 mm wide MS flat & clamped by GI saddles.

Trusses – To be clamped using 22 Gauge X 25 mm wide GI strips.

Spacing between 2 supports on wall or 2 GI clamps on trusses should not be more than 50 centimeters.

For cable connection, the required aluminum lugs of appropriate sizes are to be provided by Contractor. New brass cable glands of appropriate size shall also be provided in case connections are to be done in existing LV Box / Termination Box. The cable in required quantity will be supplied by Railways at work site. All cable openings at GI pipe/terminating boxes shall be closed with “Puff” sealant.

**Supply & erection of junction box assembly for 25 KVA AT with stand, aluminum bus bar etc. as per Drawing No. - BSL/TD/SK/232.**

Price shall include the cost of supply and erection of Junction Box with stand, aluminium busbar etc. as per Drawing No. – BSL/TD/SK/232. Price shall not include the cost of termination of cable and the cable gland, which is covered separately. The location and requirement of the junction box shall be given by concerned SSE/TRD.

**Supply & erection of termination box assembly for CLS cable as per drawing.**

Price shall include the cost of supply and erection of Termination Box for CLS cable, as per Drawing No. – BSL/TD/SK/419 (Or Latest) to be provided in Station

Superintendent's Room / Cable Hut end. The location and requirement of the Termination Box shall be given by concerned SSE/TRD.

**Supply, erection, testing & commissioning of Control & distribution Panel with Auto change over switch, 155 Amp capacity (3 source type) for CLS supply, suitable for 25 KVA 'AT', as per RDSO specification latest.**

Price shall cover supply, erection, testing & commissioning of control & distribution panel, with Auto change over switch, 155 Amp capacity (3 source type) for CLS supply, suitable for 25 KVA 'AT', as per RDSO specification latest. The cost also includes supply, fabrication & erection of steel angle frame, made from ISA – 45X6 and duly painted, of suitable size to be grouted on wall for mounting the panel.

**Dismantling of LV Box, Dismantling of junction box assembly, termination box assembly, Dismantling of Control & Distribution Panel with auto change over switch for CLS supply complete with box including disconnection of cable connection, Removal of Aluminum armored cable cleated on wall, Dismantling of 10KVA/25KVA/50KVA 'AT' complete with all accessories with DO fuse, jumper assembly of AT.**

Price shall cover dismantling of above items including dismantling of 10KVA/25KVA/50KVA, 25KV/240V AC LT supply transformer complete with terminal connector, DO fuse, jumpers, LV box assembly & all associated equipments/accessories. The price shall be applicable for transformers mounted on steel pedestals at switching stations also. Dismantled assets shall be transported to nearest TRD depot & shall be handed over to Railways.

**Dismantling of 10KVA/25KVA/50KVA AT complete with DO fuse, jumpers etc. excluding structure:**

The price shall cover dismantling of 10 kVA, 25KV/240V AC LT supply transformer complete with terminal connector, DO fuse, jumpers, LV box assembly & all associated equipments/accessories. The price shall be applicable for transformers mounted on steel pedestals at switching stations also.

**Dismantling OHE structures by cutting and transporting to Railway depot including loading and unloading.**

The price shall cover dismantling of OHE structures such as CTL/POM/Single mast including SPS, bracket etc. and with all associated fittings at old location at work site and transporting to Railway depot including loading and unloading.

**Supply of DWC HDPE Pipe with one snap fit coupler and O ring fire resistant, antirodent of size 150 mm dia.**

The price shall include Supply of DWC HDPE Pipe with one snap fit coupler and O ring fire resistant, anti-rodent of size 150 mm dia. for laying in excavated trench across road / track crossing along with required coupling, collar and other accessories.

**Horizontal direction drilling/boring without damage of surface road /track using Auger Machine (HDD machine). The bore shall be upto 200 mm dia. & shall be done at the depth of minimum 1200 mm from the ground level. This include insertion of different dia. DWC-HDPE pipe.**

Price shall cover making horizontal bore as per the procedure specification. The price shall cover making of horizontal boring of size 200 mm dia. to track formation below 1200mm from bottom of sleeper suitable for inserting of 150 mm. dia. HDPE DWC pipe in normal/hard rock soil .

Excavated areas from which jacking and receiving operations are accomplished, jacking pits shall be located at a distance from the roadbed as specified by the appropriate drawing/approval. The pit dimension shall be large enough to provide a safe, adequate working area.

To properly control line and grade, it is imperative that the jacking tracks be rigidly set to the pre determined level and alignment requirements. Controls shall be insured by the use of appropriate engineering instruments.

In approaches to the crossing, contractor shall eliminate unnecessary bending of pipe by confirming to the contour of the ground by gradually deepening the ditch at such approaches as directed by the Railways.

**Supply & Erection of 50 X 39 mm dia. tubular aluminum busbar.**

The price shall cover supply and erection per meter length of 50 x 39 mm (OD/ID) diameter aluminum tube to serve as bus bar or equipment-to-equipment bus connection on 25 KV side of traction sub-station, wherever required. The bus bar shall confirm to IS:5082 (Latest), AL-ALLOY to Grade – 91 E in WP condition and IS:2673 (Accuracy Class – 1). The price shall include bending, shaping and connecting / clamping of the aluminum tube to the equipment terminals/bus bar supports as required

**Supply & erection of different types of connectors/clamps/coupler/junctions etc. :**

The price shall cover supply and erection of a bus bar junction and connectors of the specified type in schedule including bolts, nuts, lock nuts, washers etc. required at the junction of bus bars. The items shall confirm to RDSO Specification No. – ETI/PSI/72(9/85), ETI/OHE/49(9/95) with A&C Slip No. 1- 5 & IS:617-1994 (Grade 4600). The price shall also include supply & erection of 'AL-CU' strip as per RDSO Specification No. – ETI/OHE/55 (4/90) (Or Latest), if required to provide at the junctions.

**Extra on erection charges for power block work on erection/ dismantling of items.**

The price under this item shall cover extra on erection rates of item numbers mentioned above and in tender schedule, for erection of such equipment under power block (shut off of traction power). The price payable under this item shall be extra over the erection rates of the items referred therein, provided such work is not called for on account of non-compliance with specifications, and/or approved drawings and instructions given by the Purchaser from time to time. The extra erection rate under this item will not be payable, if power block is given for a total duration of 4 hours or more in a day in a block section or at a location. Where the prices under this item are applicable, the Contractor shall finalize quantities of various items of work to be done under power block jointly with the Engineer's representative prior to taking the works in hand. Extra for erection will be given only if erection is done in power block.

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### **PAYMENT SCHEDULE**

| <b>Cat. No.</b> | <b>Item</b>  | <b>On account / Stage payment in (%)</b> |                 | <b>Progress payment in (%)</b> |                 | <b>Final payment in (%)</b> |                 |
|-----------------|--|--|-----------------|--------------------------------|-----------------|-----------------------------|-----------------|
|                 |  | <b>Supply</b>                            | <b>Erection</b> | <b>Supply</b>                  | <b>Erection</b> | <b>Supply</b>               | <b>Erection</b> |
| 1               | Preparation of drawing & design  | --                                       | --              | --                             | 50              | --                          | 50              |
| 2               | Steel structure, SPS, Bracket/cantilever assembly, OHE terminations, Auxiliary transformer, ATD, control panel, isolator, Section Insulator.   | 80                                       | --              | 15                             | 95              | 5                           | 5               |
| 3               | Cement concrete foundation items.  | --                                       | 70              | --                             | 25              | --                          | 5               |
| 4               | Number plate, Anti climbing device, Earth electrode, RCC warning cover, GI pipe, hume pipe, cable marker, junction/LV box, bolt, caution plate, PG clamp                               | --                                       | --              | 95                             | 95              | 5                           | 5               |
| 5               | MS/GI Flats for bonding. Cut-in-insulator, post insulators, P.G. Clamp, Insulator, Suspension Assembly. Connectors, Jumper wire, Dropper & dropper clip, splices, Guy rod, DO fuse.    | 70                                       | --              | 25                             | 95              | 5                           | 5               |
| 6               | Erection work, Splicing, Transfer of equipment, removal/dismantling work, power block charges, cable trenching, laying of cable, slewing/re-slewing, painting, breaking of foundation. | --                                       | --              | --                             | 95              | --                          | 5               |

**THE END**