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Kutch 370210
Email:cme@deendayalport.gov.in

No.: EL/AC/EOI **Date: 01.06.2026**

BUDGETARY ENQUIRY

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for

"Design, Engineering, Supply, Installation, Testing & Commissioning of 66 kV Line-In/Line-Out (LILO) Connectivity and Associated Works for Power Supply to SIPC, Kandla"

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1. Introduction

Deendayal Port Authority (DPA) intends to establish a dedicated, high-capacity 66 kV electrical infrastructure to provide reliable power supply to the proposed Green Hydrogen facilities at Kandla. The proposed system comprises the detailed design, engineering, supply, installation, testing, and execution of a 66 kV Line-In/Line-Out (LILO) connectivity arrangement, including erection of 132/66 kV towers for the LILO arrangement, laying of underground 66 kV XLPE cable including HDD/Railway crossing works, and comprehensive earthing and protection systems in compliance with GETCO specifications.

2. Purpose of Budgetary Enquiry

This enquiry is issued only for the purpose of obtaining indicative cost estimates for project planning, fund allocation, and budgeting. It shall not be treated as a tender or request for proposal. Submission of budgetary offers does not confer any right of award. DPA may initiate a separate tendering process later. No contractual obligation shall arise from this enquiry.

3. Scope of Work (Brief)

- Route survey, detailed engineering, profiling, and approval drawings
- Supply and erection of towers for LILO arrangement
- Supply and laying of underground 66 kV 1C x 630 sq.mm Poly Aluminium Sheath Cable
- HDD/thrust boring for railway crossing and RCC cable trench works
- Supply and installation of cable terminations, Earth Link Boxes, and lightning arresters
- Earthing, testing, approvals, and system energization

4. Technical Standards

All equipment and execution methodologies shall conform to the latest applicable IS, IEC standards, IE Rules, strictly adhering to GETCO-approved specifications and drawings. The design shall also comply with applicable CEA regulations and utility practices.

5. Submission of Budgetary Offer

- Indicative project cost
- Technical assumptions/deviations if any
- Proposed execution timeline

6. Submission Details

- **Submission deadline:** On or before 10.06.2026
- **Mode:** Email : **cme@deendayalport.gov.in** , hard copy to the Office of the Chief Mechanical Engineer, DPA
- **Completion period:** 5 months

7. General Notes

- All quoted rates and prices shall be strictly **excluding GST**. GST, if applicable, shall be indicated separately by the bidder.
- Quoted prices shall, however, be inclusive of all other duties, levies, freight, insurance, transportation, handling, loading, unloading, labour, tools & tackles, testing, commissioning, and all incidental charges required for complete execution of the work.
- Assumptions and conditions shall be clearly stated
- DPA may seek clarifications, if required

8. Contact for Clarification

Office of Chief Mechanical Engineer, Deendayal Port Authority, Email: cme@deendayalport.gov.in

9. Time period:

Project completion period shall be 05 months.

10. Enclosures

- Annexure I: Detailed Scope of Work & Specifications
- Annexure III: Detailed Price Break-up (BOQ)
  - Part A: 66 kV Cable
  - Part B: Cable for LILO Connection at SIPC
  - Part C: 66 kV Tower Works
  - Part D: Feeder Bays
  - Part E: Metering Bays
- Annexure II: Technical Specifications

Sd/-
Chief Mechanical Engineer
Deendayal Port Authority

Annexure I: Detailed Scope of Work

The scope of work under this Contract shall include complete Design, Detailed Engineering, Survey, Supply, Manufacture, Procurement, Loading, Transportation, Unloading, Storage, Handling, Insurance, Erection, Installation, Testing, Pre-Commissioning, Commissioning and successful energization of 66 kV Double Circuit LILO connectivity arrangement from existing GETCO FTZ–Kandla line to proposed 66 kV SIPC Substation of Deendayal Port Authority (DPA), Kandla through underground cable system along with associated transmission line works, feeder bays, metering arrangement, railway crossing, civil works, statutory approvals and all allied works on total turnkey basis.

The work shall be carried out strictly in accordance with GETCO specifications, relevant IS/IEC standards, approved drawings, statutory regulations and directions of Engineer-In-Charge.

The detailed scope of work shall include, but not be limited to, the following:

1. Detailed Survey, Investigation, Engineering & Design

The scope of work shall include carrying out detailed route survey, profiling, site investigation and collection of all field data required for execution of complete 66 kV Double Circuit LILO connectivity work from existing GETCO FTZ–Kandla line to proposed SIPC Substation of Deendayal Port Authority (DPA). The survey work shall include identification of suitable cable route, tower locations, interconnection points, railway crossing alignment, underground utilities, existing services and all other site constraints required for successful execution of the work.

The scope shall also include complete detailed engineering and preparation of design calculations for underground cable system, HDD/railway crossing, cable trench arrangement, cable termination arrangement, feeder bay layout, earthing system, transmission tower foundations and associated civil works. Preparation of detailed construction drawings, layout drawings, route drawings, termination drawings, tower foundation drawings, equipment foundation drawings and all other drawings necessary for execution of the work shall be included in the scope of Contractor.

The Contractor shall prepare and submit all drawings, calculations, documents and technical details required for approval from GETCO, Railway Authorities, CEI, DPA and other concerned authorities prior to execution of work. The scope shall further include revision/modification of drawings as per comments of approving authorities and submission of final approved drawings. Preparation and submission of as-built drawings, completion drawings and final documentation after successful completion and commissioning of the work shall also be included in the scope.

2. Supply of 66 kV Underground Cable System

The scope of work shall include complete design verification, manufacture, routine testing at manufacturer's works, supply, loading, transportation, transit insurance, unloading, handling, storage and delivery at site of 66 kV, 1C x 630 sq.mm XLPE insulated, Poly Aluminium Sheathed underground power cable conforming to GETCO specifications, relevant IS/IEC standards and approved technical specifications for complete execution of Double Circuit LILO connectivity arrangement from existing GETCO FTZ–Kandla line to proposed SIPC Substation of Deendayal Port Authority (DPA).

The complete underground cable system shall comprise 03 Nos. single core cables for Line-In circuit (R-Y-B), 03 Nos. single core cables for Line-Out circuit (R-Y-B) and 01 No. spare cable, thereby forming complete 66 kV Double Circuit LILO arrangement including spare provision. The total approximate route length of cable system shall be around 1.6 km including railway crossing section and associated interconnection arrangements. The Contractor shall verify the route length during detailed survey and no extra claim on account of route variation within practical execution limits shall be

entertained.

The scope shall include supply of complete cable system suitable for continuous operation under site conditions prevailing at Kandla and suitable for installation in underground trench, RCC trench, HDPE pipe and HDD crossing sections. The cable shall be suitable for operation under specified system voltage, fault level and environmental conditions and shall conform to GETCO approved specifications and standards. All cables shall be supplied with factory test certificates and routine/type test reports as applicable.
The scope shall further include supply of all associated materials, accessories and fittings required for complete installation, testing and commissioning of underground cable system including but not limited to:

- HDPE pipes of suitable diameter
- Cable glands
- Cable lugs
- Ferrules
- Brass compression glands
- Cable cleats and clamps
- Connectors
- Identification tags
- Cable markers
- Route markers
- Warning tapes
- Danger boards
- Cable support accessories
- Jointing and bonding accessories
- Earthing materials
- Hardware items
- Fasteners
- Consumables
- Any other miscellaneous materials required for satisfactory completion of work

The scope shall also include supply of all accessories required for cable sheath bonding, cable earthing and cross-bonding arrangement including Earth Link Boxes with and without SVL, bonding leads, earthing strips and all associated materials as per GETCO standards and approved drawings. All accessories shall be suitable for 66 kV system and compatible with supplied cable system.

3. Railway Crossing through HDD / Thrust Boring Work

The scope of work shall include complete design, detailed engineering, survey, execution, testing and successful completion of trenchless railway crossing work through HDD/Thrust Boring method for laying of complete 66 kV Double Circuit LILO underground cable system across railway crossing portion. The approximate railway crossing length shall be around 500 meters; however, the Contractor shall verify the exact crossing length, alignment and execution requirements during detailed survey and execution of work.

The scope shall include carrying out detailed route survey, profiling and preparation of railway crossing alignment drawings, methodology drawings and execution scheme for obtaining approvals from Railway Authorities, GETCO and other concerned statutory authorities. Preparation and submission of all drawings, documents, calculations, method statements and technical particulars required for obtaining approvals shall be entirely in the scope of Contractor. Any revision/modification suggested by approving authorities during approval process shall also be carried out by the Contractor without any additional cost implication.

The scope shall include complete mobilization of HDD/Thrust Boring machinery, equipment, manpower, consumables and all associated resources required for execution of railway crossing work. The Contractor shall carry out trenchless boring work suitable for accommodation of complete Line-In, Line-Out and spare cable system including all associated HDPE pipes and protective arrangements as per approved drawings and GETCO standards.

The scope shall include supply, transportation, handling, laying and installation of HDPE pipes of approved diameter including 400 mm and 160 mm HDPE pipes or as per approved drawings/specifications suitable for installation of 03 Nos. Line-In cables, 03 Nos. Line-Out cables and 01 No. spare cable. The Contractor shall ensure proper spacing, alignment and protection arrangement for all cable runs within HDD crossing section.

The scope shall also include execution of all associated civil works required for successful completion of HDD crossing work including excavation, launching pit, receiving pit, shoring, dewatering, barricading, disposal of excavated material, protection works, temporary supports, route restoration and reinstatement of affected areas. All safety measures required during execution of HDD/Thrust Boring work shall be arranged by the Contractor at his own cost.

The Contractor shall provide suitable pipe sealing arrangement at both ends of HDD crossing section to prevent ingress of water, moisture, mud or foreign material into cable duct system. The scope shall also include supply and installation of warning boards, route markers, identification markers and all associated accessories required for proper identification and maintenance of cable crossing system.

The Contractor shall be responsible for complete liaisoning, coordination, follow-up and obtaining all necessary approvals, permissions, shutdowns, inspection clearances and commissioning approvals from Railway Authorities, GETCO and other concerned authorities required for successful execution and completion of railway crossing work. However, statutory fees payable to Railway Authorities or any Government authority towards statutory approvals/permissions shall be paid/reimbursed by Deendayal Port Authority (DPA) on actual basis subject to submission of documentary evidence and approval of Engineer-In-Charge.

The Contractor shall execute the complete railway crossing work strictly as per approved drawings, Railway standards, GETCO specifications and directions of Engineer-In-Charge. Any damage caused to existing railway property, utility services, underground installations or surrounding infrastructure during execution of work shall be rectified by the Contractor at his own cost.

The Contractor shall carry out all necessary inspection, testing and verification activities for HDD crossing section as required by Railway Authorities, GETCO and Engineer-In-Charge prior to cable laying and commissioning of the system. Any item, material, accessory, equipment or activity not specifically mentioned but required for satisfactory execution, approval, testing, commissioning and successful completion of railway crossing work shall be deemed to be included within the scope of work without any extra cost implication to Deendayal Port Authority.

The Contractor shall ensure that all supplied materials are new, unused, of latest design and free from manufacturing defects. All materials shall be of approved make and shall conform to relevant standards/ specifications. The Contractor shall obtain approval of makes, technical particulars and drawings from Engineer-In-Charge/GETCO prior to procurement and supply of materials.

The Contractor shall also be responsible for proper storage, handling and preservation of cable drums and associated materials at site. Suitable arrangements shall be made to avoid damage to cable drums during transportation, unloading, storage and shifting activities. Damaged materials, if any, shall be replaced by the Contractor at no extra cost to Deendayal Port Authority.

The Contractor shall carry out all inspection, testing and quality assurance activities required for supplied materials as per GETCO specifications and approved Quality Assurance Plan. Inspection of materials at manufacturer's works by Owner/GETCO representative, if required, shall be facilitated by the Contractor without any additional cost implication.

The Contractor shall be fully responsible for compatibility of complete cable system with existing GETCO network and proposed DPA SIPC Substation system. Any item, accessory, fitting or hardware not specifically mentioned in BOQ/specifications but required for satisfactory installation, testing, commissioning and successful operation of complete underground cable system shall be deemed to be included within the scope of work without any extra cost implication to Deendayal Port Authority.

4. Underground Cable Laying Works

The scope of work shall include complete laying, installation, handling, protection, testing and commissioning of 66 kV underground cable system from GETCO interconnection point up to proposed 66 kV SIPC Substation of Deendayal Port Authority (DPA) including complete Double Circuit LILO arrangement comprising Line-In circuit, Line-Out circuit and spare cable system. The work shall be carried out strictly as per GETCO specifications, approved drawings, applicable standards and directions of Engineer-In-Charge.

The scope shall include excavation of cable trenches in all types of soil strata including hard soil, murum, soft rock, mixed strata and other site conditions encountered during execution of work. The Contractor shall carry out trench excavation, dressing, leveling, sand bedding, laying of power cables, protective covering, warning tape laying, backfilling and compaction complete in all respects as per approved drawings and GETCO standards. Wherever required, the scope shall also include construction of RCC cable trench, cable protection arrangement and associated civil works.

The scope shall include supply and laying of HDPE pipes, cable protection covers, route markers, cable identification tags, danger boards, warning tapes and all accessories required for proper identification, protection and maintenance of underground cable system. The Contractor shall ensure proper spacing, alignment and phase identification of all cable runs throughout the cable route.

The scope shall include cable pulling using suitable rollers, winches, cable jacks, drum handling equipment and approved tools & tackles required for safe installation of 66 kV cable system. The Contractor shall make all necessary arrangements for unloading, shifting, handling and positioning of cable drums at site. Any damage caused to cable or accessories during transportation, handling or installation shall be rectified/replaced by the Contractor at his own cost.

The scope shall also include execution of road cutting works, crossing works, utility crossings, temporary protection works, barricading, dewatering arrangements, disposal of surplus excavated material and restoration of roads, pavements and affected areas to original condition after completion of work. All permissions required for excavation, road cutting and restoration shall be arranged by the Contractor in coordination with concerned authorities.

The Contractor shall take all necessary precautions during cable laying work to avoid damage to existing underground utilities, pipelines, cables, drains, railway infrastructure and other installations. Any damage caused to existing utilities or infrastructure during execution of work shall be rectified by the Contractor at his own cost and risk.

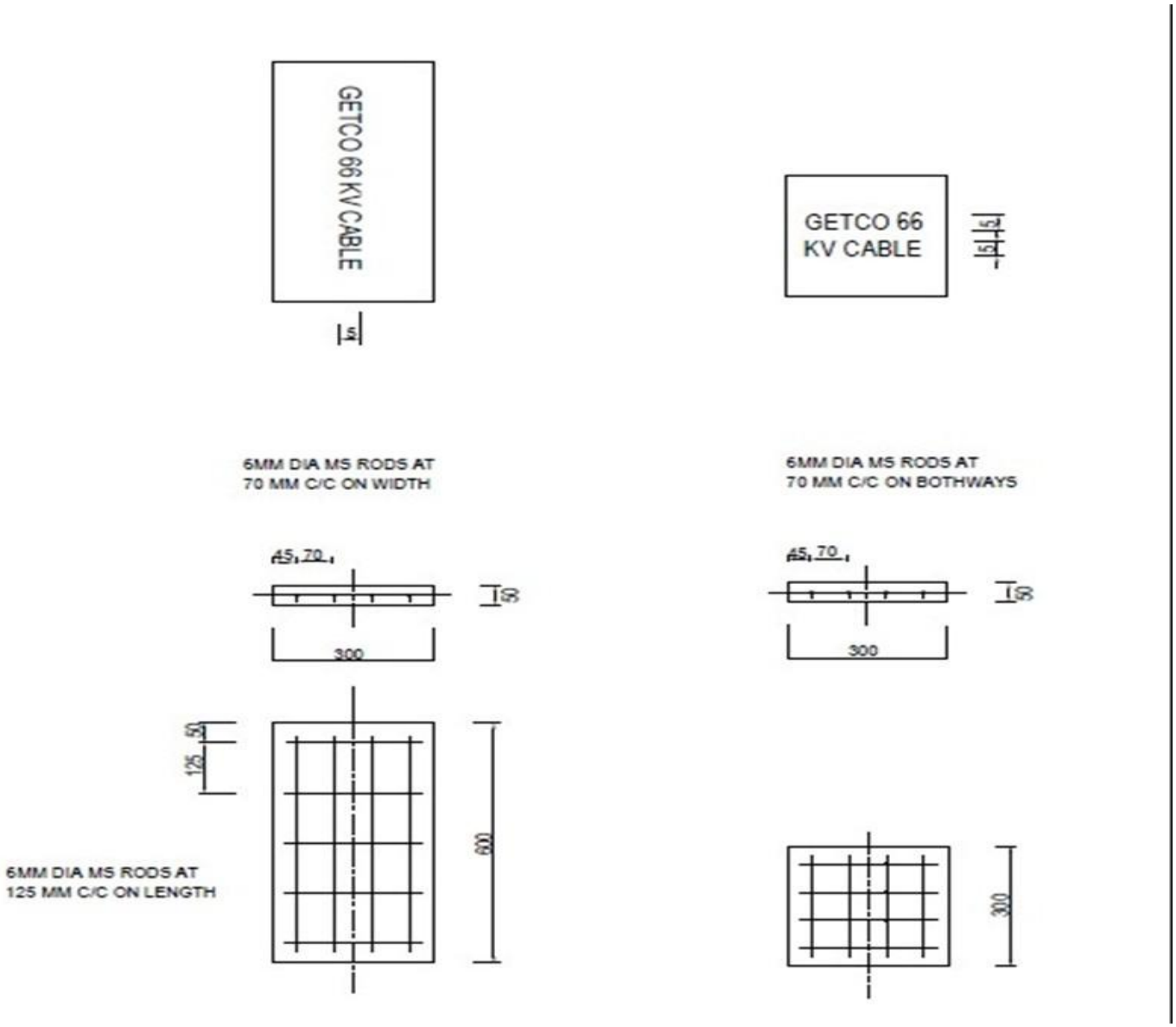
The Contractor shall carry out all inspection, testing and verification activities related to cable laying works as per

GETCO specifications and approved Quality Assurance Plan. Any item, material, accessory, consumable or activity not specifically mentioned but required for satisfactory installation, protection, testing, commissioning and successful operation of underground cable system shall be deemed to be included within the scope of work without any extra cost implication to Deendayal Port Authority.

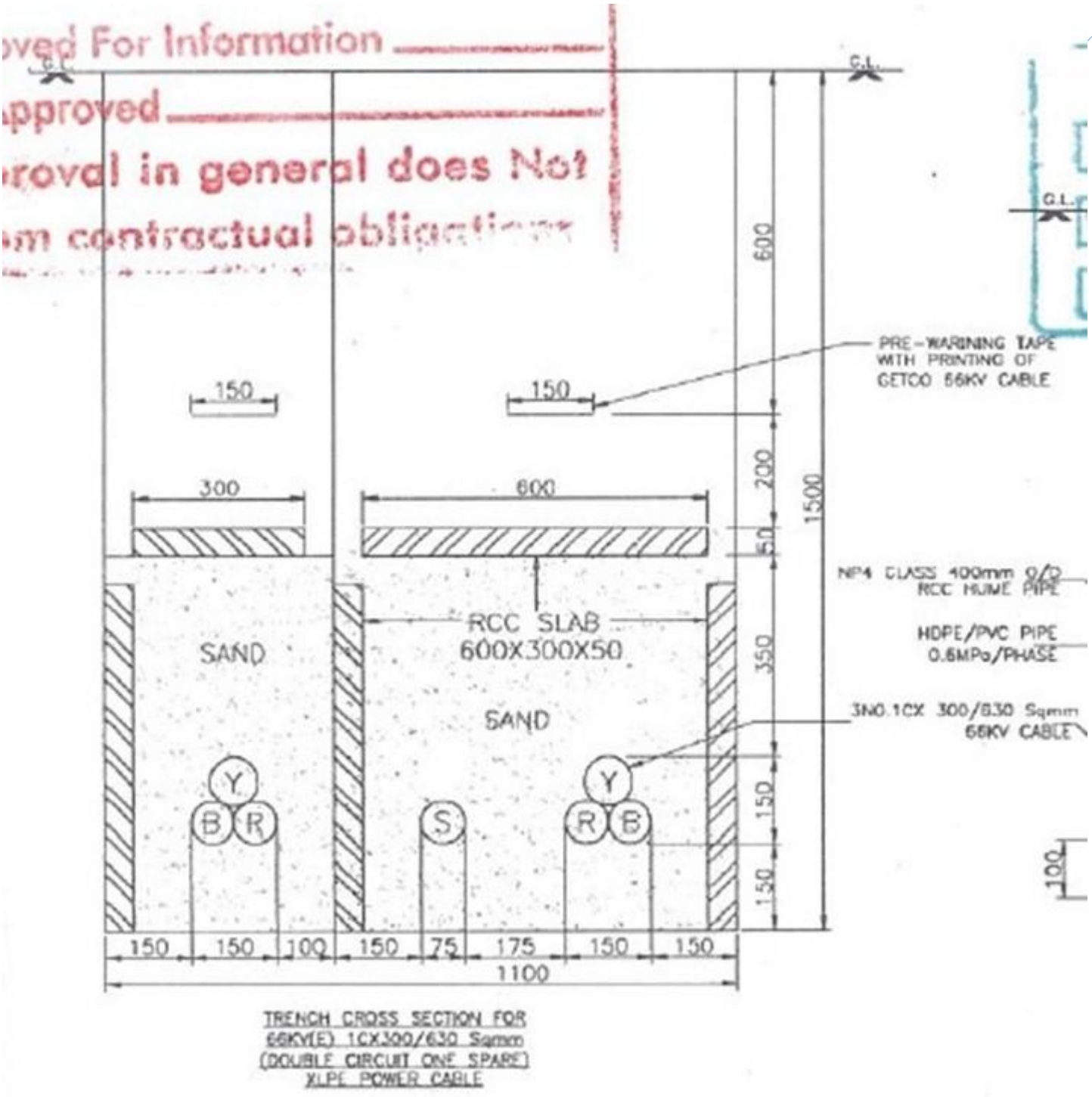
4A. Highlighted Method of Laying of Cable and Linkage with BOQ

For abundant clarity, the method of laying of the 66 kV cable system shall be read in conjunction with the typical trench/cable protection details, approved construction drawings, GETCO specifications, and the relevant items of Annexure III (BOQ), Part B. The cable laying arrangement is intended for Double Circuit LILO connectivity comprising Line-In, Line-Out, and one spare system, together with the associated trench, pipe, protection, warning, testing, and restoration works.

Highlighted cable laying method: The indicative detail shows laying of 66 kV single-core XLPE cables in sand bed/fill with proper phase segregation, protective RCC slab cover, pre-warning tape marked for GETCO 66 kV cable, and route protection arrangements. For crossing and protected sections, the arrangement also includes RCC hume pipe / HDPE-PVC pipe provisions, pipe sealing, cable pulling arrangements, and associated civil works. The protective mesh detail indicates 6 mm diameter MS rods arranged at specified spacing for cable protection, as shown in the reference drawing. All dimensions and execution methodology shall ultimately conform to the approved AFC drawings and GETCO/DPA requirements.



Typical cable protection detail showing 6 mm dia MS rod arrangement for protection over/around the GETCO 66 kV cable alignment.



Typical trench cross-section indicating sand surround, RCC slab protection, warning tape, and pipe/cable arrangement for 66 kV Double Circuit LILO cable laying.

Indicative linkage of cable laying method with BOQ Part B

BOQ Item No.	BOQ Description	Method of Laying / Construction Relevance
2	Thrust boring / HDD work for railway crossing with HDPE pipe arrangement	Covers trenchless crossing methodology, pipe carrier arrangement, and protected passage of Line-In, Line-Out, and spare cable systems across the railway crossing portion.

3	Underground laying / installation of 66 kV cable through HDD crossing including warning tape, route markers, testing, and restoration	Directly linked to cable laying methodology, including laying of single-core 66 kV XLPE cables, warning tape, route identification, testing, and restoration as reflected in the typical trench and protection details.
5 & 13	HDPE pipe end sealing arrangement for railway crossing section	Linked to protection of cable entry/exit points in crossing sections and prevention of ingress of water, debris, and foreign matter into the pipe system.
6	Laying of 1 Core x 630 sq.mm 66 kV cable in RCC cable trench including excavation, sand filling, laying, and backfilling	Directly linked to the trench cross-section detail showing trench excavation, sand cushioning/surround, cable positioning, protective RCC slabs, and backfilling/restoration sequence.

BOQ Item No.	BOQ Description	Method of Laying / Construction Relevance
14	Cable route markers, identification tags, and danger boards	Linked with identification and warning provisions forming part of safe underground cable laying and long-term route traceability.
18	Route survey, detailed engineering, profiling, and preparation of approval drawings	Linked with finalization of trench profile, crossing profile, approved construction detail, and execution drawings governing the actual method of laying.
19	Cable pulling arrangement including rollers, winch machine, cable drum handling, and accessories	Linked with actual installation methodology and safe pulling/placing of 66 kV cables in trench, pipe, and crossing portions.
20	Dewatering arrangement during cable trench work	Linked with maintenance of dry working conditions during excavation, bedding, laying, jointing interface work, and restoration in water-logged or marine-influenced areas.

Note: The above drawings are indicative for highlighting the method of laying of cable and its linkage with BOQ Part B. Final execution shall be strictly as per approved construction drawings, GETCO requirements, site conditions, and directions of Engineer-In-Charge.

5. Cable Termination, Jointing & Interconnection Works

The scope of work shall include complete Supply, Installation, Testing and Commissioning of outdoor cable termination system suitable for 66 kV, 1C x 630 sq.mm XLPE underground cable complete with all associated accessories, support structures, interconnection arrangement and allied works required for successful completion of Double Circuit LILO connectivity system.

The scope shall include supply and installation of outdoor heat shrinkable/pre-moulded cable termination kits of GETCO approved make suitable for 66 kV application complete with stress control arrangement, sealing arrangement, termination hardware, lugs, connectors, clamps, support insulators and all associated accessories required for satisfactory installation and operation of cable termination system.

The scope shall include termination of existing GETCO transmission line on newly erected LILO towers and interconnection of overhead transmission line with underground cable system. The Contractor shall carry out complete jumper arrangement, flexible connection arrangement, conductor interconnection and associated works required for successful completion of LILO connectivity arrangement.

The scope shall also include termination of underground cable system at DPA feeder bays, GETCO interconnection points and all other designated termination locations complete in all respects. Supply and erection of termination support

structures, mounting arrangements, gantry interconnection arrangement, connectors, clamps, jumper conductors and associated hardware required for complete termination works shall be included within the scope.

The scope shall further include supply and erection of Lightning Arresters suitable for 66 kV system at cable termination locations complete with support structure, earthing arrangement and associated accessories as per GETCO specifications and approved drawings. The Contractor shall also carry out earthing and bonding of all cable terminations, metallic sheath and associated equipment as per approved earthing scheme.

The Contractor shall ensure that all termination and interconnection works are carried out by skilled and experienced personnel strictly in accordance with manufacturer's recommendations, GETCO specifications and approved installation procedures. Necessary precautions shall be taken during termination works to avoid ingress of moisture, dust or contaminants into cable insulation system.

The scope shall include carrying out all pre-commissioning tests, continuity tests, insulation resistance tests, sheath tests and other required testing activities for cable termination and interconnection system prior to energization. All test reports shall be submitted to Engineer-In-Charge/GETCO for approval before commissioning of the system.

Any item, fitting, accessory, hardware, consumable or activity not specifically mentioned but required for satisfactory installation, testing, commissioning and successful operation of cable termination and interconnection system shall be deemed to be included within the scope of work without any extra cost implication to Deendayal Port Authority.

6. LILO Transmission Tower Works

The scope of work shall include complete design verification, survey, excavation, foundation, erection, testing and commissioning of new 66 kV LILO transmission towers required for providing Double Circuit LILO connectivity from existing GETCO FTZ–Kandla transmission line to proposed underground cable system for SIPC Substation of Deendayal Port Authority (DPA). The entire work shall be executed strictly in accordance with GETCO approved drawings, technical specifications, applicable standards and directions of Engineer-In-Charge.

The scope shall include detailed tower spotting, check survey, route verification and preparation/submission of tower foundation drawings and associated documents required for execution and approval of works. The Contractor shall verify existing site conditions, soil conditions, clearances, existing utility crossings and all other parameters necessary for successful execution of tower works.

The scope shall include supply, transportation, unloading, storage, handling and erection of complete hot dip galvanized tower structures including stub materials, bolts, nuts, washers, bracings, extensions, tower accessories and all associated hardware required for complete erection of LILO towers. All tower materials shall conform to GETCO specifications and approved technical standards.

The scope shall include excavation for tower foundations in all types of soil strata including black cotton soil, submerged soil, marine soil, hard soil and mixed strata complete with shoring, shuttering, dewatering and protection works as required. The Contractor shall carry out reinforcement work, concreting, curing, stub setting, alignment checking and all associated foundation works complete in all respects.

The scope shall also include erection of tower superstructure, fixing of insulators, hardware fittings, conductor accessories, anti-climbing devices, danger plates, phase plates and all associated tower accessories. Tack welding of bolts and application of zinc rich paint after welding shall also be carried out as per GETCO specifications.

The scope shall include complete stringing and jumper arrangement works for interconnection of existing GETCO line with proposed underground cable termination arrangement including conductor handling, tensioning, clamping, jumper

loop arrangement and all associated fittings required for successful completion of LILO arrangement.

The scope shall further include dismantling/modification of existing line portion, if required, for completion of LILO arrangement and transportation/stacking of dismantled materials at designated GETCO location as directed by Engineer-In-Charge.

The scope shall also include supply and installation of complete earthing system for towers including GI pipe earthing, GI strips, connectors, fasteners and associated materials complete in all respects as per approved drawings and GETCO standards.

The Contractor shall carry out all inspection, testing, alignment verification and quality checks required for successful commissioning of LILO transmission tower system. Any item, material, fitting, accessory or activity not specifically mentioned but required for satisfactory erection, testing, commissioning and successful operation of LILO tower system shall be deemed to be included within the scope of work without any extra cost implication to Deendayal Port Authority.

7. 66 kV Feeder Bays at DPA SIPC Substation

The scope of work shall include complete design, engineering, supply, installation, testing and commissioning of 03 Nos. 66 kV feeder bays at proposed SIPC Substation of Deendayal Port Authority (DPA) comprising 02 Nos. feeder bays for Line-In and Line-Out LILO connectivity and 01 No. feeder bay for outgoing power supply arrangement complete with all associated equipment, structures, protection system, metering system, control system, civil works and allied works.

The scope shall include supply, erection, testing and commissioning of all primary equipment including 66 kV SF6 Circuit Breakers, Current Transformers (CTs), Potential Transformers (PTs), Lightning Arresters, Isolators with and without Earth Switch, bus structures, gantry structures, connectors, clamps, insulators and all associated equipment required for complete feeder bay arrangement.

The scope shall include supply, installation, testing and commissioning of Control & Relay Panels complete with numerical protection relays, annunciation system, mimic arrangement, interlocking system, control switches, meters, wiring, terminal blocks and all associated accessories required for proper operation and protection of feeder bays.

The scope shall further include supply, installation and commissioning of complete RTU system, communication interface, ABT metering system, check metering system and associated communication arrangement suitable for integration with GETCO system as per applicable technical requirements and specifications.

The scope shall include supply and laying of all control cables, power cables, cable trays, cable glands, lugs, ferrules and associated accessories required for complete interconnection of feeder bay equipment, protection system, metering system and control system.

The scope shall also include execution of all associated civil works including excavation, PCC/RCC works, equipment foundations, gantry foundations, cable trench construction, marshalling kiosk foundations, earthing pits, grouting works and all associated civil activities required for successful installation and commissioning of feeder bay system.

The scope shall include design, supply and installation of complete earthing and lightning protection system for feeder bays including GI strips, earth pits, equipment earthing, structure earthing, cable earthing and bonding arrangement complete in all respects as per GETCO standards and approved drawings.

The Contractor shall carry out all routine, pre-commissioning and commissioning tests for complete feeder bay system including breaker testing, CT/PT testing, relay testing, functional testing, interlock checking, metering testing, RTU testing and complete system testing prior to energization.

The Contractor shall coordinate with GETCO, CEI and DPA for shutdowns, inspections, approvals and energization activities related to feeder bay works. Any item, material, equipment, fitting, accessory, consumable or activity not specifically mentioned but required for satisfactory installation, testing, commissioning and successful operation of feeder bay system shall be deemed to be included within the scope of work without any extra cost implication to Deendayal Port Authority.

8. Metering Arrangement at GETCO FTZ Substation

The scope of work shall include complete design, supply, installation, testing and commissioning of metering arrangement at existing GETCO FTZ Substation for 66 kV Double Circuit LILO connectivity system as per GETCO metering requirements, applicable regulations and approved technical specifications.

The scope shall include supply and installation of metering Current Transformers (CTs), metering Potential Transformers (PTs), ABT energy meters, check meters, associated metering panels, wiring, control cables, terminal blocks, connectors, mounting structures and all accessories required for complete metering arrangement.

The scope shall include supply and erection of support structures, gantry modifications, interconnection arrangement and associated hardware required for installation of metering equipment at GETCO FTZ Substation. Any modification works required in existing structures, equipment arrangement or interconnection system for successful integration of metering system shall also be included within the scope.

The scope shall include laying and termination of control cables, power cables and communication cables required for metering system integration and data communication with GETCO system. The Contractor shall ensure compatibility of metering system with GETCO requirements and communication protocols.

The scope shall further include complete earthing, bonding, testing and commissioning of metering system including calibration, accuracy verification, polarity checks, functional testing and integration testing in coordination with GETCO officials.

The Contractor shall coordinate with GETCO authorities for shutdowns, inspections, meter testing, sealing, approvals and final commissioning of metering arrangement. All drawings, test certificates, calibration reports and technical documents required by GETCO shall be prepared and submitted by the Contractor.

Any item, material, accessory, fitting, hardware or activity not specifically mentioned but required for satisfactory installation, testing, commissioning and successful operation of metering system shall be deemed to be included within the scope of work without any extra cost implication to Deendayal Port Authority.

9. Earthing & Lightning Protection System

The scope of work shall include complete design, engineering, supply, installation, testing and commissioning of earthing and lightning protection system for entire 66 kV Double Circuit LILO connectivity arrangement including underground cable system, LILO towers, feeder bays, metering arrangement, termination structures and all associated equipment as per GETCO specifications, relevant IS standards and approved drawings.

The scope shall include supply and installation of GI earthing strips, earthing conductors, earthing electrodes, pipe earthing, earth pits, connectors, clamps, fasteners, chemical compounds, charcoal, salt and all associated materials required for complete earthing system. The Contractor shall provide complete equipment earthing, structure earthing, cable sheath earthing, neutral earthing, bonding arrangement and interconnection of all earthing systems as per approved design and GETCO standards.

The scope shall include supply and installation of Earth Link Boxes with and without SVL, cross bonding arrangement, bonding leads, sheath voltage limiting devices and all associated accessories required for proper bonding and earthing of 66 kV underground cable system. The Contractor shall ensure proper cable sheath bonding arrangement suitable for safe operation of underground cable network.

The scope shall further include supply and erection of Lightning Arresters suitable for 66 kV system complete with mounting structures, connectors, earthing arrangement and associated hardware at designated locations including cable termination points and feeder bay locations. All lightning protection equipment shall conform to GETCO approved specifications and applicable standards.

The Contractor shall carry out earthing resistance testing, continuity testing, bonding verification and all associated testing activities required for successful commissioning of earthing and lightning protection system. All test reports and measurement records shall be submitted to Engineer-In-Charge/GETCO for approval.

Any item, material, accessory, fitting, hardware or activity not specifically mentioned but required for satisfactory installation, testing, commissioning and successful operation of earthing and lightning protection system shall be deemed to be included within the scope of work without any extra cost implication to Deendayal Port Authority.

10. Testing, Pre-Commissioning & Commissioning

The scope of work shall include complete testing, pre-commissioning, commissioning, charging and successful energization of complete 66 kV Double Circuit LILO connectivity system including underground cable system, LILO towers, feeder bays, metering arrangement, RTU system, earthing system and all associated equipment as per GETCO specifications, relevant IS/IEC standards and approved procedures.

The scope shall include carrying out all routine tests, site tests, pre-commissioning tests and commissioning tests required for underground cable system including insulation resistance test, continuity test, sheath integrity test, HV withstand test, phasing test and all other tests required as per GETCO standards and approved commissioning procedures.

The scope shall include testing and commissioning of all feeder bay equipment including SF6 Circuit Breakers, CTs, PTs, Lightning Arresters, Isolators, Control & Relay Panels, RTU system, ABT meters, check meters and associated control/protection system. The Contractor shall carry out relay testing, secondary injection testing, interlock checking, breaker timing test, functional testing, communication testing and complete system integration testing prior to energization.

The Contractor shall arrange all testing equipment, testing instruments, skilled manpower, consumables and temporary arrangements required for carrying out testing and commissioning activities. Calibration certificates of testing instruments shall be submitted prior to commencement of testing activities.

The scope shall further include coordination with GETCO, CEI, Railway Authorities and DPA for shutdowns, inspection, trial operation, synchronization and final charging/energization of the complete system. The Contractor shall attend all observations raised during inspection/testing process and shall carry out necessary rectification/modification works required for obtaining commissioning approval.
The work shall be treated as complete only after successful testing, commissioning, charging and energization of complete system and obtaining final commissioning approval from GETCO/CEI and handing over the system to Deendayal Port Authority in all respects.

Any item, material, consumable, equipment or activity not specifically mentioned but required for satisfactory testing, commissioning and successful operation of complete system shall be deemed to be included within the scope of work

without any extra cost implication to Deendayal Port Authority.

11. Statutory Approvals, Liaisoning & Coordination

The scope of work shall include complete liaisoning, coordination, follow-up and obtaining approvals/permissions required from GETCO, CEI, Railway Authorities, DPA and all other concerned statutory authorities for successful execution, testing, commissioning and energization of the complete 66 kV Double Circuit LILO connectivity system.

The scope shall include preparation and submission of all drawings, documents, calculations, applications, method statements, inspection reports, test certificates, compliance documents and technical particulars required by statutory authorities for obtaining approvals and clearances. The Contractor shall attend all meetings, inspections and technical discussions with concerned authorities during execution and commissioning stage.

The Contractor shall be responsible for obtaining drawing approvals, shutdown approvals, railway crossing permissions, work permits, inspection clearances, energization approvals, CEI approvals and all statutory permissions required for successful completion of the work. All liaisoning and follow-up activities with statutory authorities shall remain entirely within the scope of Contractor.

However, statutory fees payable to Government Authorities/Statutory Bodies such as Railway Authorities, CEI, GETCO or any other Government agency towards statutory approvals/permissions shall be paid/reimbursed by Deendayal Port Authority (DPA) on actual basis subject to submission of documentary evidence and approval of Engineer-In-Charge.

The Contractor shall also be responsible for attending observations/comments raised by statutory authorities and carrying out all modifications, rectifications and compliance works required for obtaining final commissioning approval and successful energization of the complete system.

Any delay arising due to incomplete documentation, non-compliance, poor coordination or failure to obtain approvals attributable to Contractor shall be solely to Contractor’s account and no additional claim on such account shall be entertained by Deendayal Port Authority.

12. Civil Works, Safety Arrangements & Restoration Works

The scope of work shall include execution of all associated civil works required for successful completion of 66 kV Double Circuit LILO connectivity system including cable laying works, HDD crossing works, tower foundation works, feeder bay works, metering arrangement works and associated infrastructure works.

The scope shall include excavation, PCC works, RCC works, foundation works, grouting works, trench construction, cable trench covers, equipment foundations, structure foundations, earth pit construction, backfilling, compaction and all associated civil activities required for satisfactory installation and commissioning of the complete system.

The scope shall include shoring, shuttering, dewatering, disposal of excavated earth/debris, anti-water logging arrangements and all temporary civil arrangements required during execution of work. The Contractor shall make all necessary arrangements to protect nearby structures, utilities, railway infrastructure, roads and public property during execution of civil works.

The Contractor shall provide complete safety arrangements during execution of work including barricading, caution boards, safety signage, traffic diversion/protection, illumination, PPEs, fire protection equipment and all statutory safety requirements as per applicable regulations and safety standards. The Contractor shall be solely responsible for safety of manpower, equipment and surrounding infrastructure during execution of work.

The scope shall also include restoration of roads, pavements, drains, railway land, cable routes and all affected areas to original condition after completion of work. Any damage caused to existing utilities, roads, drains, railway infrastructure. or surrounding property during execution of work shall be rectified/restored by the Contractor at his own cost.

Any item, material, equipment, consumable or activity not specifically mentioned but required for satisfactory completion of civil works, safety arrangements and restoration works shall be deemed to be included within the scope of work without any extra cost implication to Deendayal Port Authority.

13. General Conditions & Complete Responsibility of Contractor

The work covered under this Contract shall be executed on total turnkey basis and shall include complete design, engineering, manufacture/procurement, supply, transportation, unloading, storage, handling, erection, installation, testing, commissioning, charging and successful energization of the entire 66 kV Double Circuit LILO connectivity system complete in all respects.

The Contractor shall be solely responsible for complete execution of the work from initial survey stage up to successful commissioning, charging, energization and obtaining final commissioning approval from GETCO, CEI, Railway Authorities and all other concerned statutory authorities. The work shall be deemed to be completed only after successful commissioning and handing over of complete system to Deendayal Port Authority (DPA) in all respects.

The scope shall include provision of all materials, equipment, consumables, tools & tackles, temporary works, construction equipment, manpower, supervision, transportation, insurance and all incidental items required for satisfactory completion of the work whether specifically mentioned in the BOQ/specifications or not.

All liaisoning, coordination, follow-up and obtaining approvals/permissions/NOCs required for execution, shutdowns, inspections, railway crossing, testing, charging and final energization of the system shall be entirely within the scope of Contractor. However, statutory fees payable to Government Authorities/Statutory Bodies such as GETCO, CEI, Railway Authorities or any Government agency towards statutory approvals/permissions shall be paid/reimbursed by Deendayal Port Authority on actual basis subject to submission of documentary evidence and approval of Engineer-In-Charge.

The Contractor shall prepare and submit all drawings, calculations, applications, method statements, test reports, inspection reports and technical documents required by statutory authorities during execution and commissioning stage. The Contractor shall also attend all observations/comments raised by statutory authorities and shall carry out all necessary rectification/modification works required for obtaining final approval and successful energization of the system.

The Contractor shall be fully responsible for safety of all personnel, equipment, installations and surrounding property during execution of work. All works shall be carried out strictly in accordance with applicable safety regulations, GETCO specifications, approved drawings and directions of Engineer-In-Charge. Any accident, damage, loss or statutory non-compliance during execution of work shall be entirely to Contractor's account.

The Contractor shall ensure compatibility and proper coordination of all supplied equipment/materials with existing GETCO system and proposed DPA SIPC Substation system. Any discrepancy noticed during execution or commissioning stage shall be rectified by the Contractor without any additional cost implication to Deendayal Port Authority.

Any item, material, equipment, fitting, accessory, hardware, software, structure, civil work, service or activity not specifically mentioned in the BOQ/specifications but required for satisfactory design, engineering, erection, testing, commissioning and successful operation of the complete system shall be deemed to be included within the scope of work without any extra cost implication to Deendayal Port Authority.

The Contractor shall maintain proper housekeeping at site during execution of work and shall clear all temporary materials, debris and surplus earth after completion of work. The site shall be handed over in clean and safe condition after successful completion and commissioning of the project.

The Contractor shall submit complete documentation including approved drawings, as-built drawings, test certificates, commissioning reports, OEM manuals, warranty certificates, inspection reports and completion dossier for the entire project prior to final handing over of the system.

14. Documentation, Completion Dossier & Handing Over

The scope of work shall include preparation, submission and handing over of complete technical documentation, drawings, test reports, approvals and completion records for the entire 66 kV Double Circuit LILO connectivity system executed under this Contract. All documents shall be submitted in required number of hard copies as well as in soft copy format as directed by Engineer-In-Charge/GETCO/DPA.

The scope shall include submission of all approved drawings, detailed engineering drawings, construction drawings, cable route drawings, HDD crossing drawings, feeder bay drawings, earthing drawings, tower drawings and all associated technical documents required for execution and future maintenance of the system. The Contractor shall also submit revised drawings incorporating modifications carried out during execution stage.

The Contractor shall prepare and submit complete as-built drawings showing actual execution details of underground cable route, HDD crossing alignment, tower locations, feeder bay arrangement, metering arrangement, earthing system and all associated installations after successful completion of work. The as-built drawings shall be duly certified and approved by Engineer-In-Charge.

The scope shall also include submission of all factory test certificates, routine test reports, type test reports, inspection reports, calibration certificates, commissioning reports, relay setting reports, cable test reports, earthing test reports and all other technical records related to supplied equipment and executed works.

The Contractor shall submit complete Operation & Maintenance Manuals, OEM literature, guarantee/warranty certificates, equipment catalogues, approved makes list and recommended maintenance procedures for all supplied equipment/materials forming part of the project.

The scope shall further include preparation and submission of complete completion dossier containing all approved drawings, statutory approvals, inspection clearances, test certificates, commissioning records, handing over documents and all associated project documents required for final acceptance of work.

The Contractor shall hand over the complete system in healthy operating condition after successful testing, commissioning and energization of the system and obtaining final commissioning approval from GETCO/CEI and other concerned authorities. The work shall be treated as complete only after submission and acceptance of all required documentation and formal handing over of the complete system to Deendayal Port Authority in all respects.

15. Defect Liability Period & Guarantee

The Contractor shall guarantee the complete 66 kV Double Circuit LILO connectivity system including underground cable system, HDD crossing works, transmission towers, feeder bays, metering arrangement, earthing system, control system and all associated equipment/materials supplied and installed under this Contract against any manufacturing defects, defective workmanship, improper installation and unsatisfactory performance during the Defect Liability Period

as specified in the Contract.

During the Defect Liability Period, the Contractor shall be responsible for attending and rectifying all defects, failures, damages, leakages, malfunctions, loose connections, improper operation or any other deficiencies observed in the system at no extra cost to Deendayal Port Authority (DPA). The Contractor shall replace/repair defective equipment, components, accessories or materials including transportation, dismantling, reinstallation, testing and commissioning complete in all respects.

The Contractor shall remain fully responsible for satisfactory performance, reliability and safe operation of the complete system during the Defect Liability Period. Any defect noticed during operation or pointed out by DPA/GETCO/Engineer-In-Charge shall be attended by the Contractor within reasonable time as instructed by Engineer-In-Charge.

The guarantee shall cover all materials, equipment, accessories, structures, cable system, terminations, feeder bay equipment, control system, metering system, earthing system and all associated works executed under the Contract irrespective of whether manufactured by Contractor or procured from sub-vendors.

The Contractor shall also be responsible for any rectification/modification required due to defective design, improper engineering, faulty erection, poor workmanship or non-compliance with approved specifications and standards during the Defect Liability Period.

The Defect Liability Period shall commence from the date of successful commissioning and handing over of the complete system to Deendayal Port Authority unless otherwise specified in the Contract.

16. Quality Assurance, Inspection & Compliance

The Contractor shall establish and maintain proper Quality Assurance and Quality Control procedures for all activities covered under this Contract to ensure that all materials, equipment and works conform to GETCO specifications, relevant IS/IEC standards, approved drawings and directions of Engineer-In-Charge.

The Contractor shall submit Quality Assurance Plan (QAP), Inspection & Test Plan (ITP), material specifications, technical datasheets, approved make list and other quality related documents for approval prior to commencement of supply and execution activities. All materials and equipment supplied under the Contract shall be new, unused and of approved make/manufacturer.

The scope shall include arranging inspection of materials/equipment at manufacturer's works and at site as required by DPA/GETCO/Engineer-In-Charge. The Contractor shall provide all necessary assistance, testing facilities, inspection instruments, manpower and documents required during inspection activities without any additional cost implication to Deendayal Port Authority.

The Contractor shall carry out all routine tests, acceptance tests, field tests and inspection activities as per approved Quality Assurance Plan and applicable standards. All test reports, inspection certificates, calibration certificates and quality records shall be maintained properly and submitted to Engineer-In-Charge for approval and record purpose.

Any material, equipment or work rejected during inspection/testing due to non-conformance with specifications, poor workmanship or defective quality shall be replaced/rectified by the Contractor at his own cost without affecting project completion schedule.

The Contractor shall ensure strict compliance with all applicable statutory regulations, safety standards, environmental norms, GETCO specifications and approved technical requirements during execution of work. Any deviation from approved specifications/drawings shall require prior written approval from Engineer-In-Charge/ GETCO.

The Contractor shall also maintain complete traceability and record of supplied materials, test certificates, inspection records and installation details throughout execution and commissioning period of the project.

17. Site Management, Housekeeping & Final Clearance

The Contractor shall make all necessary arrangements for proper site management, storage, safeguarding of materials, housekeeping and maintenance of work areas during entire execution period of the Contract. The Contractor shall maintain the work site in safe, clean and orderly condition at all times to the satisfaction of Engineer-In-Charge and concerned statutory authorities.

The scope shall include deployment of adequate supervisory staff, skilled manpower, site engineers, safety personnel, security arrangements, construction equipment, temporary facilities and all other resources required for smooth execution of the work. The Contractor shall also arrange temporary power supply, lighting, water supply, communication facilities, storage sheds and site office required for execution of work.

The Contractor shall ensure proper stacking, storage and protection of cables, equipment, structures, consumables and all materials at site to avoid damage, deterioration, theft or loss during storage and execution period. Any damage or loss of material prior to handing over of the system shall be entirely to Contractor's account.

The scope shall include regular cleaning of work area, removal of debris, disposal of surplus excavated earth, dismantled materials, packing materials and waste generated during execution of work. The Contractor shall ensure that no obstruction, unsafe condition or environmental nuisance is caused due to execution activities.

After completion of work, the Contractor shall dismantle and remove all temporary arrangements, surplus materials, construction equipment, scrap materials and debris from site and restore the entire area to neat and clean condition to the satisfaction of Engineer-In-Charge.

Final clearance and handing over of site shall be carried out only after successful commissioning of complete system, removal of temporary facilities and restoration of all affected areas in all respects.

18. Completion of Work

The work covered under this Contract shall be deemed to be complete only after successful execution, testing, commissioning, charging and energization of complete 66 kV Double Circuit LILO connectivity system and handing over the entire installation to Deendayal Port Authority (DPA) in healthy operating condition along with submission of all statutory approvals, test certificates, as-built drawings, completion dossier and other required documents as specified in the Contract.

Any item, material, equipment, fitting, accessory, service or activity not specifically mentioned in the BOQ/specifications but required for satisfactory completion, safe operation, testing, commissioning and successful performance of the complete system shall be deemed to be included within the scope of Contractor without any extra cost implication to Deendayal Port Authority.

All works shall be executed strictly in accordance with GETCO specifications, approved drawings, relevant IS/IEC standards and directions of Engineer-In-Charge.

Annexure III: Detailed Price Break-up (BOQ)

PART A - Supply of 1 Core 630 sq.mm Poly Aluminium Sheath Cable

Sr. No.	Description	Unit	Qty	Unit Rate	Total
1	Supply of 1 Core 630 sq.mm Poly Aluminium Sheath Cable as per GETCO Specification	Meter	12000		
				Subtotal (Part A)	

PART B - Supply, Installation, Testing and Commissioning of Cable for LILO Connection at SIPC

Sr. No.	Description	Unit	Qty	Supply Rate	Total Supply Rate	Service Rate	Total Service Rate	Total
2	Thrust boring/HDD work for railway crossing suitable for trenchless cable laying to accommodate Line-In (3 runs), Line-Out (3 runs), and one spare cable system complete as per approved Railway and GETCO drawings, including 400 mm and 160 mm HDPE pipe arrangement	Meter	750					
3	Underground laying/installation of 66 kV 1C x 630 sq.mm XLPE cable for LILO arrangement comprising Line-In, Line-Out, and one spare cable through HDD in railway crossing, including HDPE pipe laying, warning tape, route markers, testing, and restoration complete as per GETCO specifications	Meter	2250					
4	SITC of 66 kV XLPE outdoor 1C x 630 sq.mm heat-shrinkable end termination kit, GETCO-approved make, complete with accessories, support structure, and connections	Nos.	14					
5	HDPE pipe end sealing arrangement for railway crossing section complete in all respects	Nos.	14					

6	Laying of 1 Core x 630 sq.mm 66 kV cable for double-circuit LILO arrangement including excavation, bottom sand filling, laying in RCC cable trench, and backfilling	Meter	1500					
7	Supply and laying of 1C x 150 sq.mm copper flexible earthing cable complete with clamps and accessories	Meter	250					
8	SITC of 3-phase Earth Link Box with SVL, IP-65 outdoor weatherproof, complete with mounting structure, connectors, and earthing arrangement	Nos.	2					
9	SITC of 3-phase Earth Link Box without SVL, IP-65 outdoor weatherproof, complete with mounting structure, connectors, and earthing arrangement	Nos.	2					
10	SITC of GI earthing strip for LA, 50 x 6 mm, complete with accessories	Meter	100					
11	Cross-bonding earthing pit arrangement complete with civil work and interconnection	Nos.	2					
12	Earthing resistance testing, continuity testing, and submission of earthing test reports complete as per GETCO/IS standards	Job	1					
13	HDPE pipe end sealing arrangement for railway crossing section complete in all respects	Nos.	14					
14	Cable route markers, cable identification tags, and danger boards complete as per GETCO specifications	Lot	1					
15	Testing, pre-commissioning, and commissioning of 66 kV EHV cable complete as per IE Rules and GETCO specifications	Job	1					

16	Liaisoning with GETCO/CEI/Railway/DPA and other authorities for approvals and energization	Job	1					
17	Supply and erection of lightning arrester suitable for 66 kV cable termination complete with structure and earthing arrangement	Set	2					
18	Route survey, detailed engineering, profiling, and preparation of approval drawings for complete 66 kV cable works including railway crossing	Lot	1					
19	Cable pulling arrangement including rollers, winch machine, cable drum handling, and accessories complete during cable laying work	Job	1					
20	Dewatering arrangement during tower foundation and cable trench work including pumps and accessories	Job	1					
							Subtotal (Part B)	

PART C - Supply, Installation, Testing and Commissioning of 2 Nos. of Towers for LILO Connectivity from GETCO

Sr. No.	Item Description	Unit	Qty	Supply Rate	Total Supply Rate	Service Rate	Total Service Rate	Total
1	Supply and erection of hot-dip galvanized tower structure as per GETCO standard and technical specification with nuts and bolts	MT	18.000					
2	Detailed survey, preparation, and submission of profiles in 6 copies, including PLS-CADD and hard copy	kM	0.500					
3	Check survey along with plotting of line route	kM	0.500					

4	Excavation excluding backfilling, but including shoring, shuttering, dewatering, and tree cutting for tower footings in black cotton/submerged/marine soil where dewatering is necessary	Cu.m	380					
5	Installation of steel reinforcement in concrete foundation including supply of GETCO-approved bars, binding wire, cutting, bending, shaping, and fixing in position	MT	15					
6	Stub setting with prop or template including backfilling, excluding excavation and concreting, for all types of towers/extensions except special towers, up to 6 m extension	MT	5					
7	Concreting of foundation by M25 mixture including shoring, shuttering, compaction, dewatering, and curing, inclusive of GETCO-approved cement	Cum	380.00					
8	Tower grounding with pipe-type earthing including excavation, backfilling, and supply of all required materials	Nos.	2.00					
9	Erection of superstructure up to 6 m extension including fixing of tower accessories and transportation of tower materials from GETCO stores to erection site	MT	18.00					
10	Fixing of anti-climbing devices including supply of plates and GI bolt-nuts with tack welding for 66 kV	Loc	2					
11	Fixing of DP/NP/PP/CIP plates including supply of plates and GI bolt-nuts with tack welding for double circuit	Loc	2					

12	Tack welding of nuts up to approx. 10 m height or two bottom-most panels from ground level, including zinc-rich paint application after welding	Per Bolt	2000.00					
13	Stringing of ACSR/AAAC conductors including laying, jointing, tensioning, clamping, insulator string hoisting, jumpers, and dampers for six conductors - double circuit, ACSR Zebra	Route kM	0.100					
14	D/T hardware set suitable for ACSR Panther conductor and LILO jumper arrangement complete with compression fittings and accessories	Set	12					
15	120 kN polymer/SRI insulator suitable for 66 kV LILO line complete as per GETCO specifications	Nos.	24					
16	Jumper conductor arrangement between incoming/outgoing line and cable termination including jumper loops and connectors complete in all respects	Lot	1					
17	Dismantling of conductors and line materials of existing line including transportation and crediting to nearest GETCO store or substation, cold condition, 6 conductors, double circuit	Route kM	0.100					
							Subtotal (Part C)	

PART D - Supply, Installation, Testing and Commissioning of 03 Nos. of 66 kV Feeder Bays at Deendayal Port Authority SIPC Substation for Connectivity

Sr. No.	Particulars	Qty	Unit	Supply Rate	Total Supply Rate	Service Rate	Total Service Rate	Total
1	66 kV LA	9	Nos.					
2	66 kV Isolator with E/B	3	Set					
3	66 kV Isolator without E/B	3	Set					
4	66 kV SF6 Breaker	3	Set					
5	66 kV CT	9	Nos.					

6	66 kV Feeder C&R Panel	3	Nos.					
7	66 kV PT	3	Nos.					
8	Control/Power Cable with cubicles	L.S.	L.S.					
9	Substation structure material for gantry/LA/CT/PT etc.	20	MT					
10	Bolts and nuts for 66 kV GI structure	2	MT					
11	Civil work for construction of foundation of two 66 kV line bays with 66 kV bus work at SIPC end	L.S.	L.S.					
12	Clamps, connectors, earthing works, and conductor	L.S.	L.S.					
13	66 kV CT metering 0.2S Class	9	Nos.					
14	66 kV PT 0.2 Class (with structure)	9	Nos.					
15	66 kV PT (Protection)	9	Nos.					
16	GETCO-approved ABT meter and check meter	4	No.					
17	RTU and connectivity with GETCO along with 5-year CAMC	2	No.					
							Subtotal (Part D)	

PART E - Supply, Installation, Testing and Commissioning of 02 Nos. of 66 kV Metering Feeder Bays at GETCO's 66 kV FTZ Substation

Sr. No.	Particulars	Qty	Unit	Supply Unit Rate	Total Amount Supply	Service Unit Rate	Total Amount Service	Total
1	66 kV CT metering 0.2S Class	6	Nos.					
2	66 kV PT 0.2 Class (with structure)	6	Nos.					
							Subtotal (Part E)	

BOQ SUMMARY

Part	Description	Amount
Part A	Supply of 1 Core 630 sq.mm Poly Aluminium Sheath Cable	
Part B	Cable for LILO Connection at SIPC	
Part C	Towers for LILO Connectivity from GETCO	
Part D	66 kV Feeder Bays at DPA SIPC Substation	
Part E	66 kV Metering Feeder Bays at GETCO FTZ Substation	
	Grand Total	

*Note: All rates and amounts are to be filled by the bidder on **excluding GST** basis only.*

Annexure II: Technical Specifications

All materials, equipment, testing methodologies, inspections, and workmanship under this project shall strictly comply with GETCO-approved technical specifications, applicable IS/IEC standards, CEA regulations, and Indian Electricity Rules. The Contractor shall ensure that all procured components are from approved manufacturers and are supported by the requisite type test reports, routine test reports, inspection records, and technical documentation necessary for safe, reliable, and compliant high-voltage operation.

1. Technical Specifications of G.I. Earthing Strip

1.1 Scope

This section covers the supply of Galvanized Iron Earthing Strips for the switchyard of 400/220/132/66 kV substations.

1.2 Standards

The galvanizing and testing of materials shall conform to the latest editions of the following standards, except where otherwise specified in this specification:

Sr. No.	Description	Standard
1	Recommended practice for hot-dip galvanizing of iron earthing strips	IS: 2629 (1966)
2	Methods of testing weight, thickness, and uniformity of coating on hot-dip galvanized articles	IS: 2633 (1972)
3	Specification for hot-dip galvanized coating on fasteners	IS: 5358 (1969)
4	Specification for electroplating	IS: 3203
5	Specification for hot-dip zinc coating on structural and allied products	IS: 4759 (1968)

If the offered materials conform to any other authoritative standards, the salient differences shall be clearly brought out in the bid, and four copies of such standards together with an authentic English translation shall be furnished.

1.3 Materials

- The Supplier shall procure raw materials (MS flats) as per the relevant Indian Standards at his own cost.
- The zinc required for galvanizing shall be of Zn-98 quality and shall conform to IS: 209-1966 and its latest amendments.
- The Supplier shall make his own arrangements for procurement of sufficient quantities of electrolytic zinc of proper quality before commencement of the work. The delivery period shall not be linked to the supply of zinc.
- Deendayal Port Authority (DPA) reserves the right to draw samples of the zinc used and have the same tested in any laboratory at its own cost. Any supply found below the specified standard shall be liable for rejection.
- All raw materials required for galvanizing and complete execution of the work shall be stocked in adequate quantities so that the progress of work is not hampered.

1.4 Galvanizing

- Fully galvanized iron strips shall be used in the switchyard.
- Galvanized iron strips shall conform to IS: 2629 (1966).

- The zinc deposition shall not be less than 610 grams per square meter of galvanized surface area.
- All galvanized materials shall withstand tests as per IS: 2633 (1972).
- The weight of zinc coating shall be determined as per the method stipulated in IS: 2633.
- The standard length of the G.I. earthing strip shall be minimum 7 meters and maximum 10 meters.

1.5 Inspection

The Purchaser reserves the right to inspect the material at the time of testing. All tests shall be performed in the presence of the Inspecting Authority appointed by the Purchaser and the Supplier. The Bidder shall give due intimation of the place, date, and time of each test so that the Inspecting Authority may remain present to witness the same. All test results shall be recorded in the presence of the Inspecting Authority. No material shall be dispatched without being passed by the Purchaser's duly appointed Inspector and without specific written dispatch instructions from the Chief Engineer (Project).

1.6 Acceptance Tests

- Visual examination test
- Dimensional verification
- Galvanizing/Electroplating test

1.7 Quality Assurance Plan

The Bidder shall invariably furnish the following information along with the offer, failing which the offer shall be liable for rejection:

- Statement giving the list of raw materials proposed to be used, names of sub-suppliers, applicable standards, routine and acceptance tests on raw materials and finished goods, and copies of test certificates.
- List of processing and testing facilities available.
- List of areas where stage inspections are normally carried out for quality control and details of such inspections/tests.
- List of testing equipment available with the Bidder. If the Bidder does not possess all routine and acceptance testing facilities, the tender shall be liable for rejection.
- The Purchaser reserves the right to carry out factory inspection to verify the details furnished in the offer.
- If any information furnished is found to be misleading or incorrect, the offer may be rejected and the Bidder may be blacklisted.

2. Technical Specifications of Current Transformers

Supply, installation, erection, testing, and commissioning of 66 kV metering CTs at the 66/11 kV Receiving Substation of DPT. The current transformers shall be outdoor, oil-impregnated paper insulated, single-phase, 50 Hz, oil immersed, self-cooled, and suitable for operation under the specified climatic conditions.

2.1 Standards

Sr. No.	Standard No.	Title
1	IS: 2165	Insulation coordination for equipment of 100 kV and above
2	IS: 2705 (Parts I to IV)	Instrument Transformers
3	IS: 2099	High-voltage porcelain bushings

4	IS: 3347	Dimensions of porcelain transformer bushings
5	IS: 2071	Method of high-voltage testing
6	IS: 335	Insulating oil for transformers and switchgears
7	IS: 2147	Degree of protection provided by enclosures for low-voltage switchgear and controlgear
8	IEC 61869-2	Instrument Transformers
9	IEC 270	Partial discharge measurement
10	IEC 44(4)	Instrument transformer measurement of partial discharges
11	IEC 171	Insulation coordination
12	IEC 60	High-voltage testing techniques

Sr. No.	Standard No.	Title
13	IEC 8263	Method for RIV test on high-voltage insulators
14	Indian Electricity Rules, 1956	Applicable statutory rules

Equipment conforming to other authoritative standards that ensure equal or better performance may also be considered. In such cases, the Bidder shall clearly indicate the salient points of difference and furnish four copies of such standards with an authentic English translation.

2.2 General Requirements

- The instrument transformers shall comply with the latest editions of IEC 61869-2 / IEC 60044-1 and IS: 2705, as applicable.
- The core shall be of high-grade, non-ageing, silicon laminated steel with low hysteresis loss and high permeability.
- The current transformers shall be hermetically sealed to eliminate breathing and entry of air and moisture into the tank.
- Provision of a pressure releasing device is not permitted.
- For compensation of oil volume variation due to temperature change, stainless steel bellows shall be provided. Rubber bellows or nitrogen gas cushioning shall not be permitted.
- A suitable oil level indicator visible from ground level shall be provided.
- The metering core shall have a sufficiently low saturation factor to avoid damage to instruments under maximum short-circuit current.
- Protective cores shall be suitable for backup, over-current, earth fault, differential, and busbar protection, as applicable.
- The tenderer shall guarantee trouble-free and maintenance-free performance for 60 months from the date of receipt at store.
- All sectional details, G.A. drawings, sealing arrangements, and primary/secondary terminal arrangements shall be furnished with the bid.

2.3 Constructional Requirements

- Flange-type 66 kV bushings for CTs shall be provided.
- Where gasket joints are used, NBR/Viton gaskets shall be used. Cork gaskets shall not be permitted.
- All gaskets/O-rings shall be fixed in machine grooves.
- Dome fixing bolts shall be stainless steel with minimum 6 mm diameter.
- The outer surface of the metal tank shall be hot-dip galvanized; the inner portion shall be painted with oil-resistant, insoluble paint.
- The galvanizing shall comply with IS: 2629 and minimum zinc coating shall be 800 g/sq.m.
- The tank shall be provided internally with 2 mm thick pressboard at the bottom and sides.
- No drain valve for oil sampling/draining shall be provided at the bottom of the tank.
- Minimum tank construction requirements: flange thickness 8 mm, top plate thickness 5 mm, gasket thickness 6 mm.
- CTs shall be suitable for mounting on steel structures or concrete pedestals.

2.4 Winding and Terminals

- The rating of the secondary winding shall be as specified in the technical particulars.
- Primary and secondary windings shall be of electrolytic grade copper.
- The primary winding shall be designed for continuous extended primary current of 120% of rated current.
- Primary terminals shall be heavily tinned electrolytic copper, 30 mm diameter x 80 mm length for CTs rated up to 60 A.
- The secondary terminals shall be easily accessible and provided with brass nickel-plated studs, nuts, and washers.
- A suitable test tap shall be provided for measurement of capacitance, tan delta, and partial discharge, both at works and at site.

2.5 Terminal Box

The exterior of the secondary terminal box shall be hot-dip galvanized. A cable box along with glands suitable for receiving control cables shall be included in the scope. The box shall be provided with a front door and locking arrangement. Secondary terminals shall be taken out through composite epoxy or FRP moulding with single gasket packing. Separate terminal connector blocks shall be provided for control cable connections. The terminal box shall comply with IP-55 degree of protection, and the relevant type test report shall be furnished with the technical bid.

2.6 Climatic and System Conditions

Sl. No.	Description	Value
1	Maximum ambient temperature in shade	50°C
2	Minimum ambient temperature in shade	4°C
3	Maximum daily average ambient temperature	40°C
4	Maximum yearly average ambient temperature	30°C
5	Maximum relative humidity	95%
6	Average thunderstorm days per annum	15
7	Average annual rainfall	150 cm

8	Maximum wind pressure	150 kg/m²
9	Altitude above mean sea level	Not exceeding 1000 m

Sl. No.	Description	Value
1	Nominal system voltage	66 kV
2	Maximum rated voltage	72.5 kV
3	Frequency	50 Hz
4	Number of phases	3
5	Neutral earthing	Solidly earthed

2.7 Technical Particulars of 66 kV CT

Sl. No.	Particular	Requirement
1	CT Ratio	60/1 Amp
2	Core	One
3	Purpose	Tariff Metering
4	Rated burden	5 VA
5	Class of accuracy	0.2S
6	Rated accuracy limiting factor (ALF)	10 at minimum ratio
7	Instrument security factor (ISF)	5 or less at minimum ratio
8	Lightning impulse withstand voltage	350 kV peak
9	Power frequency withstand voltage for one minute	140 kV rms
10	Short-time withstand current	31.5 kA for 3 sec
Sl. No.	**Particular**	**Requirement**
11	Minimum total creepage distance	2247.5 mm
12	Partial discharge level	< 10 pC
13	Power frequency withstand of secondary winding	3 kV for one minute

Each CT, including its supporting structure, shall be designed to withstand repeated earthquake acceleration of 0.08 x 2g together with wind loads of 150 kg/mZ on the projected area (non-simultaneous), without damage and without impairment of operation.

2.8 Tests and Quality Assurance

- All applicable type tests as per IS: 2705 and IEC 60044-1 shall be submitted with the bid; reports shall not be older than five years.
- Routine tests as per the latest edition of IS: 2705 shall be conducted on each CT.
- Additional acceptance tests shall include tan delta test, temperature rise test, partial discharge test, oil tests, thermal

stability test, and thermal coefficient test, as specified.

- The tenderer shall furnish a detailed Quality Assurance Plan covering raw materials, sub-suppliers, standards, testing, stage inspections, and traceability.
- The Purchaser shall have full access to the works for inspection of raw materials, manufacturing processes, accessories, and testing activities.
- No material shall be dispatched without inspection and approval of GETCO and DPT.

3. Technical Specifications for 66 kV Voltage Transformers

3.1 Scope

This section covers supply, installation, erection, testing, and commissioning of voltage transformers for metering and relaying service in a 66 kV, 3-phase system at the 66/11 kV Receiving Substation of DPT.

3.2 Type and Rating

Particular	Requirement
Nominal system voltage	66 kV
Highest system voltage	72.5 kV
Frequency	50 Hz
Earthing	Effective
Number of windings	One
Ratio	38.1 kV / 63.5 V
Rated burden	10 VA
Class of accuracy	0.2 (Tariff metering)
Over-voltage factor	1.2 continuous
Lightning impulse withstand voltage	350 kVp
Power frequency withstand voltage for one minute	140 kV rms
Total minimum creepage distance	2247.5 mm
Partial discharge level	< 10 pC
Powerfrequency withstand of secondary winding	3 kV for one minute

3.3 Standards and General Requirements

- The voltage transformers shall conform to the latest editions of IEC 60044, British Standards 81 & 2046, and IS: 3156, except where specified otherwise.
- VTs shall be outdoor, oil-immersed, self-cooled, hermetically sealed, and suitable for heavily polluted atmosphere.
- Stainless steel bellows shall be provided for compensation of oil volume variation; rubber bellows or nitrogen gas cushioning shall not be permitted.
- The outer surface of the metal tank shall be hot-dip galvanized and the inside shall be painted with oil-resistant paint.
- The tank shall be provided with 2 mm thick pressboard and nylon bush packing of minimum 3 mm thickness between insulator and tank.
- No drain valve at the bottom of the tank shall be provided.
- Minimum tank construction requirements: flange thickness 8 mm, top plate thickness 5 mm, gasket thickness 6 mm.
- The quantity and specification of insulating oil shall conform to IS: 335, and oil make shall be from approved manufacturers only.
- The exterior of the secondary terminal box shall be hot-dip galvanized and shall conform to IP-55 degree of protection.
- All other relevant clauses applicable to CTs shall also apply to VTs wherever relevant.

3.4 Tests

- Type test reports as per IS: 3156 shall be submitted and shall not be older than five years.
- Routine tests shall be carried out on each voltage transformer as stipulated in IS: 3156.
- Additional acceptance tests shall include tan delta test, temperature rise test, partial discharge test, and oil tests as specified.
- Guaranteed and technical particulars as called for in Appendix-II shall be furnished with the tender.
- No material shall be dispatched without inspection and approval of GETCO and DPT.

4. Technical Specifications for 66 kV Isolator

4.1 Scope

This section covers supply, installation, erection, testing, and commissioning of 66 kV outdoor horizontal double break, manually operated isolators and earthing switches at the 66/11 kV Receiving Substation of DPT, including support structures and associated accessories.

4.2 Standards

Sr. No.	Standard No.	Title
1	IS: 9921	Alternating current isolators (disconnectors) and earthing switches
2	IEC 129	Alternating current isolators (disconnectors) and earthing switches
3	IS: 2544 / IS: 5350	Insulators
4	IS: 13947	Low-voltage switchgear and controlgear
5	IS: 4691	Degree of protection provided by enclosure

6	IS: 325	Three-phase induction motors
7	IS: 4722	Rotating electrical machines
8	IS: 2629	Recommended practice for hot-dip galvanizing of iron and steel
9	IS: 4759	Hot-dip galvanization coating on structural steel
10	IS: 2633	Method of testing weight, thickness, and uniformity of coating
Sr. No.	**Standard No.**	**Title**
11	IS: 1573	Electroplated coating of zinc on iron and steel
12	IS: 6735	Spring washers
13	IS: 2016	Plain washers
14	IS: 5561	Specification of electric power connectors

4.3 General Design Features

- The isolators shall be of double-break, outdoor, gang-operated type with blades rotating in the horizontal plane, preferably centre-post rotating turn-and-twist type.
- Each pole shall have three pedestal-type insulator stacks.
- Gang-operated links shall ensure simultaneous make-and-break operation in all phases.
- The design shall provide positive control of blades in all positions with minimum mechanical stress on insulators.
- All current-carrying parts shall be non-ferrous. Bolts, screws, and pins shall be suitably locked and made of specified materials.
- The isolators and earthing switches shall be complete with all parts necessary for efficient and safe operation, whether specifically mentioned or not.
- The design shall minimize lubrication requirements and ensure reliable operation in polluted atmospheric conditions.
- Terminal heads/studs shall be robust and suitable for carrying rated current and short-circuit current.

4.4 Contacts and Operating Mechanism

- Moving and fixed contacts shall be of hard-drawn electrolytic copper, heavy-duty, self-aligning, and high-pressure type.
- Contact surfaces shall be silver-plated and designed to provide adequate wiping action without scouring or abrasion.
- Jaw contacts shall have reverse loop finger design with springs not carrying current; minimum silver plating thickness shall be 20 microns.
- Isolators and earthing switches shall be manually operated and capable of operation by a single person without undue effort.
- Mechanical over-centre devices, padlocking arrangements, position indicators, and suitable interlocks shall be provided.
- Operating mechanism housings shall be stainless steel/aluminium, powder coated, weatherproof, vermin-proof, and minimum 3.0 mm thick.
- Auxiliary switches, terminal blocks, heaters, lighting, and complete control cabling shall be included where specified.

4.5 Support Insulators and Technical Particulars

The support insulators shall conform to IS: 2544 and IEC 60168, shall be suitable for heavily polluted atmosphere, and shall provide a minimum total creepage distance of 2247.5 mm for the system. The bidder shall offer 66 kV solid-core post insulators only. All ferrous parts shall be hot-dip galvanized to IS: 2629/1966.

Particular	Requirement
Nominal system voltage	66 kV
Highest system voltage	72.5 kV
Rated current	630/1250 A
Rated short-time current	31.5 kA for 3 sec
Impulse withstand voltage across isolating distance	375 kV peak
Particular	**Requirement**
Impulse withstand voltage to earth and between poles	350 kV peak
One-minute power frequency withstand voltage across isolating distance	160 kV rms
One-minute power frequency withstand voltage to earth and between poles	140 kV rms
Minimum total creepage distance	2247.5 mm

4.6 Tests and Documentation

- Routine and type tests shall be carried out as per IS: 9921 and IEC 60129.
- Type test reports shall not be older than five years and shall be from NABL-accredited laboratories.
- Routine/acceptance tests shall include dry withstand tests, measurement of resistance of main circuit, and mechanical operation tests.
- All tests on galvanized components shall conform to IS: 2633.
- All drawings, test reports, manuals, MQP/FQP, and packing/transport details shall be submitted for GETCO approval before dispatch.

5. Technical Specifications of 66 kV Lightning Arrestors

5.1 Scope

This section covers supply, installation, erection, testing, and commissioning of 66 kV lightning arrestors at the 66/11 kV Receiving Substation of DPT, complete in all respects and including hot-dip galvanized support structures as per GETCO standards.

5.2 Standards and General Requirements

- The lightning arrestors shall comply with the latest edition of IEC Publication No. 60099-4, except where otherwise specified.
- Equivalent authoritative standards ensuring equal or better quality may also be accepted, provided deviations are clearly brought out in the bid.
- The arrestors shall be metal-oxide type without series gaps and shall be suitable for maximum protection against

lightning and switching surges.

- Each unit shall be hermetically sealed and protected against ingress of moisture.
- Pressure relief class 'A' devices shall be provided.
- Porcelain housings shall be wet-process, vitrified, non-porous, and free from defects.
- Terminal connectors shall be compression type, suitable for ACSR conductor, and suitable for vertical/horizontal take-off.
- All exposed ferrous parts shall be hot-dip galvanized as per IS: 2629.
- Each lightning arrestor shall be provided with a recording-type surge counter with vertical mounting.

5.3 Technical Parameters

Particular	Requirement
Nominal system voltage	66 kV
Highest system voltage	72.5 kV
Rated arrester voltage	60 kV
Nominal discharge current	10 kA (8/20 microsecond)
Class	Heavy-duty station class, long-duration Class-3
Particular	**Requirement**
Maximum residual voltage at nominal discharge current	190 kV peak
Maximum continuous operating voltage	48 kV minimum
Energy absorption capability	5 kJ/kV
Minimum creepage distance	1810 mm
Live part to plinth level clearance	4000 mm

5.4 Tests

- All lightning arrestors shall be fully type tested at a Government-approved laboratory.
- Type test reports shall not be older than five years and shall remain valid up to the validity of the offer.
- Routine and acceptance tests shall be carried out as per IEC 99-4 and submitted for approval before dispatch.
- All drawings of equipment, accessories, and structures shall be approved by GETCO and PMC before manufacture/dispatch.

6. General Design Features of Circuit Breakers

- The circuit breakers shall be capable of rapid and smooth interruption of current under all operating conditions and shall be restrike-free.
- The breaker shall limit overvoltage while switching inductive or capacitive loads to within 2.5 times the highest phase-to-neutral voltage.
- The circuit breakers shall be suitable for interrupting kilometric faults, line charging currents, and small inductive

currents without undue strain or restrike.

- The breaker shall be suitable for remote and local operation and shall be complete with required auxiliary switches, position indication, and weatherproof operating mechanism cabinet.
- The operating mechanism shall be motor spring-charged, trip-free electrically and mechanically, and suitable for the specified DC control voltage range.
- All ferrous parts shall be hot-dip galvanized as per relevant IS standards.
- Type and routine test reports as per IS: 13118 shall be furnished.

7. Technical Specifications for 66 kV SF6 Circuit Breaker

7.1 Climatic and System Conditions

Particular	Requirement
Maximum ambient temperature	50°C
Minimum ambient temperature	4°C
Maximum daily average temperature	40°C
Maximum yearly average temperature	30°C
Maximum relative humidity	95%
Average thunderstorm days per annum	15
Average annual rainfall	150 cm
Maximum wind pressure	150 kg/m²
Altitude above mean sea level	Not exceeding 1000 meters
Nominal system voltage	66 kV
Maximum rated voltage	72.5 kV

Particular	Requirement
Frequency	50 Hz
Number of phases	3
Neutral earthing	Solidly earthed

7.2 Technical Requirements

Particular	Requirement
Number of poles	3
Lightning impulse withstand voltage	350 kVp
One-minute power frequency withstand voltage	140 kV rms
Rated normal current	1600 A
Rated symmetrical breaking capacity	3000 MVA
Rated short-circuit breaking current	25 kA rms
Rated duration of short circuit	3 seconds
Total break time	3 cycles
Closing time	Not more than 10 cycles
Rated line charging current breaking capacity	10 A
Rated short-circuit making current	50 kAp
Rated operating duty	O–0.3s–CO–3min–CO
Rated SF6 gas pressure at 20°C	5 kg/cm²
Total creepage distance	1810 mm
Live part to plinth level clearance	4000 mm

7.3 General Design of 66 kV SF6 Gas Circuit Breaker

- The SF6 gas circuit breaker shall consist of three identical single-phase units with common spring operating mechanism suitable for the specified duty.
- Separate SF6 gas cylinders and a suitable gas system with stop valves, copper piping, pressure switches, and gas pressure gauge shall be provided.
- Absorbent material shall be provided in each interrupting unit to keep the SF6 gas dry and absorb decomposed products formed during arcing.
- The breaker shall be capable of automatic tripping and lockout when SF6 gas pressure falls below the specified safe limit.
- Pressure switches shall provide separate functions for low-pressure alarm and low-pressure cut-out.
- The breaker and its supporting structure shall be designed to withstand earthquake acceleration of 0.08 x 2g and wind loads of 150 kg/mZ on projected area (non-simultaneous).

7.4 Notes

- Actual values/figures shall be furnished wherever required and not merely references to drawings, IS codes, or literature.
- All technical data, test reports, drawings, and guaranteed particulars shall form part of the tender submission.
- Annexure A for Underground Railway Crossing and Annexure B for RCC Cable Trench, if any, shall be read along with the approved drawings and construction details.