SECTION- PROJECT

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SECTION- PROJECT

1.0 GENERAL

1.1 Preamble:

Power Grid Corporation of India Ltd. (POWERGRID), A Govt. of India Enterprise is responsible for Bulk Power Transmission of electrical energy from various central Govt. Power Projects to various utilities/ beneficiaries and interconnecting regional grids, operating and maintaining the National Electrical Grid of India. It is established with the mission of "We will become a Global Transmission Company with Dominant Leadership in Emerging Power Markets with World Class Capabilities by:

a) World Class: Setting superior standards in capital project management and operations for the industry and ourselves

b) Global: Leveraging capabilities to consistently generate maximum value for all stakeholders in India and in emerging and growing economies.

c) Inspiring, nurturing and empowering the next generation of professionals.

d) Achieving continuous improvements through innovation and state of the art technology.

e) Committing to highest standards in health, safety, security and environment."

1.2 Govt. of Maharashtra has identified the execution of *Intra-State Transmission system for "Establishment of 765kV GIS Pune West (District-Pune) in the State of Maharashtra"* through Tariff Based Competitive Bidding (TBCB) route. POWERGRID has emerged as successful bidder for implementation of the above transmission scheme.

1.3 The following elements are envisaged under "*Intra-State Transmission system for "Establishment of 765kV GIS Pune West (District-Pune) in the State of Maharashtra"* through TBCB route:

A. Substations:

i) Establishment of 765/400 kV GIS Pune West Substation with 2x1500 MVA, 765/400kV ICTs along with 1x240 MVAr (765kV) Bus Reactor
ii) 02 Nos of 400kV GIS Line bays at 400kV GIS Hinjewadi Substation for termination of 400kV Pune West-Hinjewadi D/c Line

B. Transmission lines:

i) LILO on 765kV Pune-III to 765kV South Kalamb 765kV D/C Line at 765kV GIS Pune West
ii) 400kV GIS Pune West to 400kV GIS Hinjewadi 400kV D/C Line (Quad Moose-2100 MVA per circuit at nominal voltage)

This Specification covers

a. Establishment of 400kV GIS at 765/400kV Pune (West) S/s.
b. Extension of 400kV Hinjewadi GIS S/s.

However, following elements envisaged in transmission scheme are covered under separate packages:

a. Establishment of 765kV GIS at 765/400kV Pune (West) S/s.
b. Supply, erection, testing & Commissioning of 2x1500MVA,765/400 kV ICTs and 765 kV 1x240 MVAR Bus reactor at 765 kV Pune (West) GIS Substation.
c. Associated transmission Lines.

1.4 It is the intent of this specification to describe primary features, materials, and design & performance requirements and to establish minimum standards for the work. The specification is not intended to specify the complete details of various practices of manufactures/ bidders, but to specify the requirements with regard to performance, durability and satisfactory operation under the specified site conditions.

1.5 The work to be done under this specification shall include all labour, plant, equipment, material and performance of all work necessary for the complete installation and commissioning of switchyard. All apparatus, appliances, material and labour etc. not specifically mentioned or included, but are necessary to complete the entire work or any portion of the work in compliance with the requirements implied in this specification is deemed to be included in the scope of contractor.

1.6 Before proceeding with the construction work, the Contractor shall fully familiarize himself with the site conditions and General arrangements & scheme etc. Though the Employer shall endeavor to provide the information, it shall not be binding for the Employer to provide the same. The bidders are advised to visit the substation sites and acquaint themselves with the topography, infrastructure and also the design philosophy. The contractor shall be fully responsible for providing all equipment, materials, system and services specified or otherwise which are required to complete the construction and successful commissioning, operation & maintenance of the substation in all respects. All materials required for the Civil and construction/installation work including cement and steel shall be supplied by the Contractor.

Complete design (unless specified otherwise in specification elsewhere) and detailed engineering shall be done by the Contractor.

2. SCOPE OF WORK

2.1 The broad scope for Establishment of **765/400kV Pune (West) GIS** Substation is as following:

S. No.	Scope
1.	**765/400kV Pune (West) GIS S/S** **765kV GIS (To be Constructed under separate package-SS198T):** • 765/400kV, 1500 MVA ICT: 2 Nos. (7x500MVA single phase ICTs including 1x500MVA spare ICT) along with its auxiliaries • 765kV ICT bays: 2 Nos. (GIS) • 765kV ICT Bay#: 1 No. (GIS) (**"#"-** 01 no. of 765kV GIS ICT Feeder Bay shall be constructed for completion of 01 no. of diameter, which shall be utilized in future for termination of Third ICT bank) • 765kV, 240 MVAr Bus reactor: 1 No. (4x80 MVAR, 765/√3kV, 1-phase reactors including one spare unit) along with its auxiliaries • 765kV Bus Reactor Bay: 1 No. (GIS) • 765kV Line Bays: 04 Nos. (GIS) (2N**os.** for Pune (West)-Pune-III D/C line and 2N**os.** for Pune (West)-South Kalamb D/C line) • All associate 765kV Tie bays: 04 Nos. (GIS) **400kV GIS (Under Scope of 400kV GIS New Substation Package-SS199T):** • 400 kV ICT bays for IV side of 765/400 kV ICTs: 2 Nos. (GIS) • 400 kV Line Bays: 2 Nos. (GIS)

	• Associated 400kV Tie bays: 2 Nos. (GIS) • Future 400 kV Line bay along with Switchable Line Reactor bay: 8 Nos. • Future bays for IV side of 765/400kV ICT: 1no. • Future bays for 400kV Bus Reactor: 1no. • Future 400 kV Tie Bays: 5 Nos.
2.	**Extension of 400kV Hinjewadi GIS S/S** **400kV GIS (Under Scope of 400kV GIS New Substation Package-SS199T):** • 400 kV Line Bays: 2 Nos. (GIS)

2.2 The detailed scope of work of the substation package is brought out in subsequent clauses of this section.

2.2.1 **400kV Pune (West) New GIS Substation**

2.2.1.1 Design, engineering, manufacture, testing, supply including transportation & insurance, unloading, storage, erection, testing and commissioning at site of following equipment and items complete in all respect:

A. 420kV Gas Insulated Switchgear

The SF6 gas insulated switchgear (50 Hz) shall be of the indoor metal-enclosed type.

420kV SF6 gas insulated switchgear shall have one and a half breaker bus bar arrangement. The Switchgear shall be complete with all necessary terminal boxes, SF_6 gas filling, interconnecting power and control wiring, grounding connections, gas monitoring equipment & piping and support structures along with necessary base plate & foundation bolts. In addition all necessary stairs, platforms, supports, fixed & movable ladders and walkways etc. as required for operation & maintenance work shall also be provided.

a) 420kV GIS Modules/Equipment as per BPS and description given in **Annexure-IV**.
b) Controlled Switching Devices for 420kV GIS Circuit Breaker as per BPS.
c) Mandatory Spares for 420kV GIS as per BPS.
d) EOT crane for 400kV GIS hall under present scope.
e) Any other equipment/material required to complete the specified GIS scope of work.

B. Air insulated switchgear (AIS) and Other Main Equipment

a) 400kV VOLTAGE CLASS AIS EQUIPMENT {as per BPS}:

400kV Bus Post Insulators including BPI for Wave Trap (Pedestal Mounted), Capacitor Voltage Transformers, Wave Trap and 336 kV Surge Arresters.

b) CONTROL, RELAY & PROTECTION SYSTEM:

Complete control, relay and protection system as per Section–Control and Relay panels. New Decentralized (distributed) type of Low Impedance Bus bar Differential protection system shall be provided for Pune (West) GIS Substation at 400kV Level along with Peripheral units of the bays covered under present scope. However, Central unit must have capability to accommodate all present and future 400kV bays as per clause no 2.1 above.

c) SUBSTATION AUTOMATION SYSTEM:

Augmentation of Substation Automation System for Bays as per BPS (bay as defined in technical specification, Section-Substation Automation System):

- 400kV Main Bays: 4 nos.
- 400kV Tie Bays : 2 nos

Pune (West) GIS Substation is being equipped with substation automation system (based on IEC61850) in another separate package. The Substation Automation System (SAS) being provided shall be suitable for the operation and monitoring of the complete substation including present scope bays/elements. Make & Model of Existing SAS shall be shared with the successful bidder, during detailed engineering.

Under present scope, the bidder shall include BCUs required for bays mentioned above, including all necessary hardware & software to integrate with the substation automation system. The scope of bidder shall include but not limited to integration of IEDs under present scope of work with existing substation automation (which is based on IEC 61850) including up-dating of system database, displays, development of additional displays and reports as per requirement.

Necessary configuration of data at Gateway for remote operation from NTAMC, Backup NTAMC, RTAMC & supervision from RLDC/SLDC (as per requirement) and Backup RLDC/SLDC (as per requirement) is included in present scope. However, no work is envisaged at remote end (RLDC/SLDC/Backup RLDC/SLDC /RTAMC/ NTAMC / Backup NTAMC) under the present scope.

Integration of CSD (being supplied under present scope) with substation automation system is also included under present scope.

d) DIRECT STOKE LIGHTNING PROTECTION (DSLP):

The lightning protection (DSLP) for complete switchyard area under present scope including Buildings is to be provided by the contractor. The contractor shall design the lightning protection by utilizing the structures being provided under present scope. In case, additional structures (Lightning Masts) are required to meet the lightning protection, the same shall be supplied based on employer provided drawings and shall be paid in metric tonnage. The associated civil works shall be payable as per relevant item of BPS, however, earthing of the LMs, buildings as required shall be deemed to be included as part of Erection Hardware BPS item for bays & no additional payment shall be admissible under this head.

e) FIRE PROTECTION SYSTEM

(i) Extension of existing hydrant system from the nearest available existing header for New 400 kV GIS building is envisaged under present scope of work. The cost of the same shall be deemed to be included under BPS item of Hydrant system, complete U/G piping and accessories etc. outside the Pump House for Fire Protection of 400/220kV GIS (New) Substation. Any dismantling, modification and shifting of existing piping (if required) at site for the above-mentioned scope for New 400kV GIS building is also envisaged under present scope of contractor. No additional payment shall be admissible under this head and cost of the same shall be deemed to be included under BPS item of Hydrant system, complete U/G piping and accessories etc. outside the Pump House for Fire Protection of 400/220kV GIS (New) Substation.

(ii) Fire detection & Alarm system shall be provided for New 400kV GIS Hall including CRP Rooms/AHU rooms. The Fire Fighting Annunciation Panels are being provided under separate Package. Integration of present scope Fire zone alarm & annunciation signals for New 400kV GIS Hall including CRP Rooms/AHU rooms with the existing Fire Fighting Annunciation cum Alarm Panel (being placed inside the existing CRB) & further integration with existing SAS/Aux. BCU is also covered under present scope of contractor. All necessary items/cables etc. as required for the above said work shall be provided by the contractor

under present scope & cost of the same shall be deemed to be included under respective BPS items of Fire detection & Alarm system for GIS Buildings.

f) AIR CONDITIONING & VENTILATION SYSTEM:

Air Conditioning System for Relay panel Room of 400kV GIS Building including ventilation system of 400kV GIS Hall.

g) LT SWITCHGEAR:

LT Switchgear (AC/DC Distribution boards) considering all present and future 765kV, 400kV & 220kV bays as mentioned at Clause no. 2.1 above shall be provided under separate package- SS198T, which shall be placed inside the existing Control room building. LT feeders required for present scope are already available and necessary Cabling and connection works for present scope bays/equipments shall be provided by the contractor under present scope of work.

h) 1.1kV POWER & CONTROL CABLE:

1.1 kV grade Power & Control cables (and special cables, if any) along with complete accessories under present scope of work as per BPS. Cable Sizes Shall be used as per Sizing of 1.1kV Power & Control cables specified as per Annexure-S1 (Revised) enclosed with Section: Project at **Annexure-VII.**

i) ERECTION HARDWARE:

This item of BPS includes Insulator strings hardware, Disc Insulators/Long Rod Insulators (as applicable), conductor(s), Al tube, bus-bar materials, cable trays & covers, Cable Pull pit, Bay MB (as applicable), spacers, clamps & connectors (including terminal connectors for 400kV bushings of owner supplied 765kV class Transformers), Junction box, earth wire, earthing material risers, auxiliary earth mat, buried cable trenches/pipes for equipment & lighting, cable supporting angles/channels, Insulating mats, cable sealing arrangement, all accessories etc. as required.

j) MAIN EARTHMAT (As per BPS):

Main Earthmat for 765kV Pune (West) New GIS substation is being provided under separate package. Main earthmat shall be extended for the area covered under present scope of work and Payment against main earthmat shall be regulated as per actual Length laid at site

All the equipments, GIS building, Structures, cable trenches, auxiliary earth mat etc. under present scope shall be earthed by connecting them to the main Earth mat by the Contractor. Cost against the same shall be deemed to be included in the respective items under Erection Hardware.

For 400kV GIS grounding inside the GIS building, contractor shall refer Annexure-S10 of Specific requirement, Rev 10 and the same shall be deemed to be included as Part of GIS equipment.

k) ILLUMINATION SYSTEM:

LED based Lighting and illumination for the switchyard area under present scope and 400kV GIS building including Relay Panel Room & AHU room etc shall be provided by the contractor.

All required items /equipment /fixtures/ panels/ receptacles/ switches/ switchboards etc. for Illumination of 400kVGIS Hall including Relay Panel Room & AHU room etc. are deemed to be included under corresponding item of BPS.

Layouts for indoor and outdoor illumination shall be prepared by Contractor. The fixtures for indoor illumination shall be supplied as per the Qty. specified in the attached **Annexure-VI** meeting the required Lux Level and the fixtures for outdoor illumination shall be as per BPS.

l) PLCC EQUIPMENTS:

PLCC equipment including Analogue protection coupler, Digital Protection Coupler (suitable for interfacing with E1 port of SDH equipment), FO Boxes, FODP on gantry, signal converters, Power & communication cables etc. for both substation ends of following lines:

i. Pune (West)-Hinjewadi 400kV D/C Line

The New PLCC panels at Pune (west) Substation shall be placed inside the New Relay panel room of 400kV GIS Building being constructed under present scope and similarly, the new PLCC Panel at existing remote end (i.e. Hinjewadi Substation) shall be suitably placed at the available vacant space inside existing PLCC panel room of Control room building.

m) Augmentation of Visual Monitoring System (VMS) for area under present scope. Make & details of existing VMS system (being provided under separate package) shall be provided to the successful bidder during detailed engineering. The contractor shall provide total 4 Nos of Fixed Color IP Camera suitably located in the New 400kV GIS Hall and total 2 Nos Color IP camera with PAN, Tilt & Zoom facility suitably located in 400kV outdoor Switchyard. The scope of contractor shall include all items, accessories, line interface units, Fibre patch cards, Power supply units, Junction boxes, cables, Fibre optic cables, Hardware and software including License etc., as applicable to the product design, to meet functional requirements of VMS specification.

The cameras to be supplied under present scope to be integrated with existing NVR at Site for successful reporting to NTAMC. The make of NVR & other details of existing VMS shall be provided at the time of detailed engineering. All SDK (Software development kit)/APIs (Application programming interface) are in the scope of bidder.

Advisory on deployment of CCTV issued by Ministry of Electronics and Information Technology (MEITY) shall be followed.

n) TELECOMMUNICATION SYSTEM:

The broad Scope of the procurement of FO based Communication Equipment shall include planning, designing, engineering, supply, transportation, insurance, delivery at site, unloading handling, storage, installation, termination, testing, training and demonstration for acceptance, commissioning and documentation for following:

i) SDH Equipment along with suitable interfaces and line cards.

ii) All cabling, wiring, Digital Distribution frame patch facilities and interconnection to the supplied equipment at the defined interfaces,

iii) System integration of all supplied subsystem

iv) Integration with the existing communication system based on SDH and PDH of employer

v) Integration of supplied subsystem with SCADA system, PLCC equipment, PABX of RLDC/SLDC, VOIP (SIP compliant) for voice.

vi) Fibre Optic Approach Cable (FOAC) along with associated hardware set and Fibre Optic Distribution Panel (FODP)

vii) Integration of new Communication equipment in the existing regional UNMS through regional NMS. All required support to existing NMS and UNMS vendor for integration of new Communication equipment.

o) PHASOR MEASUREMENT UNIT (PMU):

i) The broad Scope of the procurement of PMU shall include planning, designing, engineering, supply, transportation, insurance, delivery at site, unloading handling, storage, installation, termination, testing and demonstration for acceptance, commissioning, and documentation for PMU as per BPS.

ii) The PMU shall comply with latest version of IEC/IS 60255-118-1-2018 and IEEE C 37.118.2 protocols standards.

iii) The PMU shall be integrated with Phasor data Concentrator (PDC) at respective Regional Load Dispatch Centre (RLDC)/State Load Dispatch Centre (SLDC).

iv) The Contractor shall extend technical support at Substation end for seamless integration of PMU with PDC at respective RLDC/SLDC end. The integration work at RLDC/SLDC end will not be under the scope of the Contractor. The PDC at RLDC/SLDC is of M/s GE make.

v) The PMU supplied in this project shall support measurement of voltages and currents of at least 2 feeders/bays.

vi) All cabling and interconnections for extension of CT/CVT, Digital inputs from the Line Bays, ICTs/Reactors/STATCOM bays up to PMU panel for measurement by PMU, shall be in the scope of the Contractor. Accordingly, the associated 1.1KV Control cables as required for Non-Adjacent Inter- Control and Relay panel (CRP) CT /PT connections & Digital input connections to PMU panel shall also be under the Contractor's scope. The scope of these cabling work (supply, laying & termination), as applicable in the subject project, shall be deemed to be included in the price of PMU equipment.

vii) Validity of Type Test for PMU shall be as per CEA Guidelines January 2026.

p) Any other equipment/material required to complete the specified scope.

2.2.1.2 Design, engineering, manufacture, testing, supply including transportation & insurance, unloading, storage, testing at site of Mandatory spares as per bid price schedule. The Break-up of Mandatory Spares for items except GIS Equipment shall be as per **Annexure-II**.

2.2.1.3 **Civil works:**

A. The design of foundation shall be based on the soil investigation report and other parameters as per relevant IS codes & technical specification. The foundations may be open foundation or pile foundation as per the site requirement / soil report.

B. The scope of civil work shall include but shall not be limited to the following based on **drawings developed by the contractor:**

(i) Site levelling work: The item site levelling works includes Contouring of the present scope of switchyard area within the sub-station boundary as per technical specification. The final area of

levelling may be less than the contouring area, which will be decided during detailed engineering.

a) The Quantity of earthwork cutting & filling, borrowed earth and FGL shall be proposed by vendor for approval of POWERGRID based on the approved contour level drawing and site HFL data.
b) Mode of measurement of this item is in Cum of earthwork as per BOQ and technical specification. The contouring of the plot area in scope as per technical specification is also deemed to be included in quoted rates of this item.
c) HFL data duly verified by POWERGRID Site is required to be arranged by contractor for finalization of FGL (Finished Ground Level).

(ii) Slope Protection Works & Retaining Walls: Design & Drawings pertaining to slope protection works & retaining walls (if required) shall be finalized during detailed engineering and same shall be measured under respective line items of BPS.

(iii) Switchyard Cable Trenches: Cable trenches including cable trenches in Reactor/Transformer area along with covers including road/rail crossing, sump pits, culverts etc. shall be constructed as per the following:

a) Cable trench layout shall be prepared by vendor for approval of POWERGRID.
b) The cable trenches shall be precast RCC type (except for Section 1-1 which shall be cast in situ).
c) The tray arrangement to support cables shall be provided using MS angles.
d) Sump pits for cable trench network shall be cast in situ.
e) The cable trench drawing attached in the tender documents shall be referred for trench width, depth and tray arrangement (number, pattern and angle section for trays) only.
f) The design and drawings shall be prepared and submitted by contractor for approval.
g) Minimum grade of concrete for precast members shall be M25.
h) Precast members shall be reinforced with steel reinforcement which shall be as per Technical Specification.
i) Minimum thickness of precast members shall be 80 mm.
j) Standard Field Quality Plan for *Pre-cast Concrete of Cable Trench/Precast Covers & Columns, Wall Panels of Boundary* available on POWERGRID website shall be followed.
k) Mode of measurement for precast RCC cable trench in switchyard shall be in running meter. The items Excavation, PCC, RCC, Reinforcement steel, Structural steel, cable trench crossings, RCC Hume pipes in crossing, RCC cover, erection etc. wherever required and all other civil works required as per technical specification and drawings complete in all respect for successful completion of the works are deemed to be included in quoted rates.
l) Mode of measurement for sump pits for precast cable trench network in switchyard: various items shall be measured and paid under respective heads {quantity of earth work (excavation, backfilling, disposal etc.), PCC, RCC, reinforcement steel and structural steel}.

(iv) 400 kV GIS Building, LCR and AHU Room:

a) GIS Hall Building, Relay Room and AHU room shall be provided for the same. Indicative architectural drawing of 400kV GIS Hall is attached with the tender drawings for reference.

b) The drawing shows GIS Hall in Modular units of 6mX15.5m, LCR Room in Modular Units of 3mX3.5m and one AHU Room of size 6mX5m. However, the dimensions of the building as per actual requirement shall be finalized during detailed engineering based on the

equipment layout considering all present & future bays as mentioned at Clause 2.1 above and requirement of technical specifications.

c) The details pertaining to location of doors/ windows/ rolling shutters and entry / exit points shall be as per the attached drawing.

d) Complete Structural Design and Structural Drawings of the 400kV GIS Hall shall be prepared by the contractor as per Technical Specifications and submitted for approval of employer.

e) Other details of the GIS Hall like architecture, finishing, joinery, drainage, cable trenches etc. shall be prepared by the contractor as per Technical Specifications and submitted for approval of employer.

f) EOT crane shall be provided in the 400 kV GIS Building as per relevant section of technical specification.

g) All civil works including foundations associated with erection of SF6 gas insulated metal enclosed switchgear along with its SF6 bus ducts upto the outer edge of the wall of GIS building. Civil works including all foundations for all equipment inside GIS building.

h) The cable trenches inside GIS halls & associated LCC/Relay rooms.

i) Foundation for Bus duct supporting structures outside GIS Hall & GIS (SF6/Air) bushing.

j) Mode of measurement for Pre-engineered Steel Building shall be made on plinth area basis. Plinth area shall be calculated based on IS 3861-2002. However, the quantity of earth work (excavation, backfilling, disposal etc.), concrete (all type), reinforcement steel shall be measured & paid separately as per relevant clauses as per TS. The payment for remaining finishing items shall be made on plinth area basis for each building including cable trenches, internal & external finishes, stone soling for flooring, plinth protection, drain along plinth protection, electrical conduit & junction boxes, fan boxes, cable transit system, miscellaneous structural steel required for seating of GIS equipments, cable supports in cable trenches, chequered plates etc inside GIS building complete in all respect.

(v) Other miscellaneous requirements & scope:

a) Stone spreading and anti-weed treatment in the switchyard for area under present scope. Layout for the same shall be developed by the contractor.

b) Providing & laying of non-woven Geo-synthetics fabric of minimum 200 GSM in separation layer between sub grade and stone spreading in switchyard.

c) Foundation for lighting poles, bay marshalling boxes, panels and control cubicles wherever required. The cost of these foundations shall deemed to be included in erection/installation of corresponding item/ equipment of BPS.

d) For all building leaving labor hut, all doors except fire escape doors, windows, glazed partitions shall be of UPVC type.

(vi) Any other item/design/drawing required for successful completion of scope of works.

C. The scope of civil work shall include but not be limited to the following based on **drawings developed by POWERGRID:**

(i) **Soil Investigation Report**: Soil investigation report is provided to successful bidder during detailed engineering.

(ii) **Gantry tower, beam and LM:** Gantry tower, beam & LM shall be provided as per Employer's drawings during detailed engineering.

(iii) **Equipment support structure**: 400kV Equipment support structure shall be provided as per Employer's drawings during detailed engineering.

(iv) **Foundation for 400kV Gantry Towers, LM & 400kV Equipment support structures**: The foundations of these structures are including of embedment/grouting of foundation bolts.

(v) **Bituminous Road including Road Crossing:**
Bituminous Road including approach road (if any), shall be constructed as per POWERGRID standard drawings provided in tender. However, Road layout shall be prepared by vendor for approval.

(vi) **Drains:** Drain layout including peripheral drains if any required along the boundary shall be prepared by vendor and to be submitted for approval of POWERGRID based on the standard sections. Diversion of existing Nallah/ Surface runoff, if required, the design & drawing of drains shall be prepared by contractor along with the drain layout and same shall be submitted to POWERGRID for approval. Payment shall be made under respective items of BPS. The rate shall include the cost of all works such as excavation, PCC, RCC, Reinforcement Steel, screed concrete, plastering, NP-3 RCC Hume pipes in crossings, culverts, brick work etc. as per drawings and technical specifications.

D. For buildings, the complete civil works including internal and external finishing, stone soling for flooring, Structural steel, plinth protection, drain along plinth protection, electrical conduit and junction boxes, fan boxes, cable transit system etc. required to complete the building in all respect as per the drawing shall be payable in the plinth area rate. However, the quantity of earthwork (excavation, backfilling, disposal etc.), concrete (all types), reinforcement steel, shall be measured and paid under respective items under BPS.

2.2.2 **Extension of 400kV Hinjewadi GIS S/S**

2.2.2.1 Design, engineering, manufacture, testing, supply including transportation & insurance, unloading, storage, erection, testing and commissioning at site of following equipment and items complete in all respect:

A. <u>400kV Gas Insulated Switchgear</u>

The SF6 gas insulated switchgear (50 Hz) shall be of the indoor metal-enclosed type.

- The existing 400kV SF6 gas insulated switch gear (located in the existing 400kV GIS building) has Double Main bus bar arrangement. Presently M/s GE make 400kV GIS is already installed at Hinjewadi S/s inside the existing 400kV GIS building, which shall be further extended for 02 nos. of 400kV GIS line bays by a separate TSP under separate package. Further, after the 02 nos. of 400kV GIS bays being constructed by separate TSP, present scope 02 nos. of 400kV GIS Line feeder bays are going to be constructed inside the vacant space available inside the existing 400kV GIS Hall. Make of existing 400kV GIS shall be provided during detailed engineering stage.

- The 400kV bays under present scope shall be kept in the existing 400kV GIS building and 400kV GIS Main Buses (4000A) for proposed 400kV GIS bays under present scope, are to be extended from the respective existing 400kV GIS buses available in the existing 400kV

GIS building. The extension piece interface module required for Main Buses (for connection between present scope bus duct and existing bus duct) shall be as per respective BPS items. The details of existing GIS end piece (Interface) module shall be provided during detailed engineering stage. Any modification required in the existing 400kV GIS building for extension of GIS and taking out the GIB Duct outside the existing building is also deemed to be included.

- The Switchgear shall be complete with all necessary terminal boxes, SF6 gas filling, interconnecting power and control wiring, earthing materials, grounding connections, gas monitoring equipment & piping and support structures along with necessary base plate & foundation bolts. In addition, all necessary stairs, platforms, supports, fixed ladders and walkways etc. as required for operation & maintenance work shall also be provided.

  a) 420kV GIS Modules/Equipment as per BPS and description given in **Annexure-IV**.
  b) Mandatory Spares for 420kV GIS as per BPS.
  c) Any other equipment/material required to complete the specified GIS scope of work.

B. Air insulated switchgear (AIS) and Other Main Equipments

a) 400kV VOLTAGE CLASS AIS EQUIPMENT {as per BPS}:

400kV Bus Post Insulators including BPI for Wave Trap (Pedestal Mounted), CVT, Wave Trap and Surge Arresters as per BPS.

b) CONTROL, RELAY & PROTECTION SYSTEM:

Complete control, relay and protection system as per Section–Control and Relay panels for the 400kV bays covered under present scope. CRP panel for bays under present scope shall be placed inside the existing Control Room Building Relay Panel room.

- Decentralized (distributed) type of single bus bar protection of M/s GE Make (P741 -Central Unit and P743 - Peripheral Unit) is existing at 400kV Hinjewadi (GIS) S/s.
- The PUs for 02 nos. of 400kV Line bay under the present scope are already available at site and shall be relocated from the Busbar Protection Panel to the respective Relay Panels under the present scope of work.
- Necessary modifications including shifting of PUs, auxiliary / trip relays, wiring, etc. for completion of the bus bar protection scheme for the present scope of 400kV bays shall be carried out by contractor. Any modification as required in the existing protection scheme is also included in the present scope.

  Cost of the above is to be quoted under respective items available in Installation schedule of BPS.

c) SUBSTATION AUTOMATION SYSTEM:

The present scope includes augmentation of existing substation automation system by providing bay IEDs along with associated equipment for the following bays (bays as defined in technical specification Section-Substation Automation System):

- 400kV Main Bays- 2 Nos

Existing Hinjewadi GIS Substation is equipped with substation automation system (based on IEC-61850) of M/s GE make.

Under present scope, the Bidder shall include BCUs required for bays mentioned above, including all necessary hardware & software to integrate with the existing substation automation system. The scope of bidder shall include but not limited to integration of IEDs under present scope of work with existing substation automation (which is based on IEC 61850) and capability enhancement of same as required, including License, up-dating of system database, displays, development of additional displays and reports as per requirement.

The necessary interface and integration work at Gateway for remote operation from RCC (Remote Control Centre) and transferring data to RLDC (RSCC)/SLDC through optical fiber based SDH communication link is also under present scope. However, no work is envisaged at remote end (RCC/RLDC/SLDC etc.) in the present scope.

d) DIRECT STOKE LIGHTNING PROTECTION (DSLP):

DSLP Protection for switchyard area (under present scope) including calculation of Direct Stroke Lightning Protection (DSLP) is to be provided by the contractor. DSLP protection is to be proposed, optimized & provided by contractor utilizing Tower structures, Shield wire & spikes under the present scope.

Required DSLP, if not met as specified above, shall be designed & provided with LCLM as per BPS. The associated civil works shall be payable as per relevant item of BPS, however, earthing of the LCLM, as required shall be deemed to be included in respective erection items in BPS for LCLM & no additional payment shall be admissible under this head.

e) LT switchgear: Existing (AC/DC Distribution boards) are located in existing LT Switchgear room of Control room building. Under present scope, extension of existing 415 Volt ACDB, 220 V DCDBs & 48V DCDB for the present scope bays are envisaged as per details mentioned below and the same shall be covered under the respective BPS Items:

- **415V ACDB EXTENSION:**

  Extension of existing 415V AC distribution Board (ACDB) placed in the existing LT Switchgear room of Control room Building with the following requirement:

  a) Providing 2 nos. New ACDB Panel (i.e. ACDB-1 & ACDB-2), which shall be placed in the vacant space available adjacent to existing ACDB panel inside the same existing LT Switchgear room of Control room building under present scope, for catering the AC loads required for 400kV system as per the specified present scope of work. These ACDB-1 & 2 panels shall be connected with the existing 415V ACDB Panel through 1.1kV, 3.5Cx300sqmm XLPE cable, to be paid under respective BPS LOT item of XLPE Power Cable (i.e. ACDB-1 shall be connected with existing ACDB DG Section-1 & ACDB-2 shall be connected with existing ACDB NON-DG Section-2).

  b) Each 415V ACDB-1 & 2 New Panels to be placed in existing LT Switchgear room of Control room building under present scope, shall include – One number incoming feeder module (250A, 4P MCCB), Five number outgoing feeder modules (5x63A, 4P MCCB), Two number outgoing feeder modules (2x32A, 4P MCCB) & Four number outgoing feeder modules (4x32A, 4P MCB).

  c) Existing 415V ACDB Panel has spare 250A, 4P MCCB feeder available at each section & necessary cabling and connections with the existing 415V ACDB Buses is envisaged under the present scope of work.

- **220V DCDB EXTENSION:**

  Extension of existing 220V DC Distribution Boards (DCDB-I & II) placed in the existing LT Switchgear room of Control room Building with the following requirement:

  a) Providing 2 nos. New Panel (i.e. DCDB-1 & DCDB-2), placed in the vacant space available adjacent to existing DCDB panel inside the same existing LT Switchgear room of Control room building under present scope, for catering the DC loads required for 400kV system as per the specified present scope of work. These DCDB-1 & 2 panels shall be connected directly with the existing available vertical Main buses inside the existing 220V DCDBs Panel through 1.1kV, 2x1Cx150sqmm PVC cable, to be paid under respective BPS LOT item of PVC Power Cable (i.e. DCDB-1 shall be connected with existing DCDB-I & DCDB-2 shall be connected with existing DCDB-II). Suitable modification in the existing DCDBs panels including necessary items, etc. as required for connecting the interconnection Cable with the existing Main vertical buses is also covered under the present scope of work.

  b) Each 220V DCDB-1 & 2 New Panels to be placed in existing LT Switchgear room of Control room building under present scope, shall include – One number incoming feeder module (63A, 2P MCCB), Six number outgoing feeder modules (6x32A, 2P MCCB).

- **48V DCDB EXTENSION:**

  Extension of existing single 48V DC Distribution Board placed in the existing Control room Building with the following requirement:

  a) Providing 4 nos. x Outgoing feeder modules (32Amp, 2P MCB) at vacant space available in the existing 48V DCDB. The vacant space for mounting of these MCBs are available in the existing 48V DCDBs. Necessary cabling and connections of these modules with the existing 48V DCDBs Busses shall be in the present scope.

f) 1.1kV POWER & CONTROL CABLE:

1.1 kV grade Power & Control cables (and special cables, if any) along with complete accessories under present scope of work as per BPS. Cable Sizes Shall be used as per Sizing of 1.1kV Power & Control cables specified as per Annexure-S1 (Revised) enclosed with Section: Project at **Annexure-VII.**

g) MAIN EARTHMAT (As per BPS):

The Main Earthmat in some parts of the present scope switchyard area (i.e. near the existing 400kV GIS Building area) is already existing. For the balance portion of switchyard area covered under present scope, Main earthmat shall be laid maintaining the same existing grid spacing (Existing Outdoor earthmat layout drawing is attached with tender drawing) and further it shall be suitably interconnected with the existing Main earthmat. The Payment against main earthmat shall be regulated as per actual Length laid at site.

All the equipment's, structures, cable trenches, auxiliary earthmat etc. under present scope shall be earthed by connecting them to the main Earthmat by the contractor. Cost against the same shall be deemed to be included in the respective BPS items under Erection Hardware.

For grounding of the present scope 400 kV GIS inside the existing GIS building, the Contractor shall follow the GIS manufacturer's recommendations, taking into consideration the existing 400

kV GIS earthing layout attached with the tender drawings. The indoor GIS grounding shall be deemed to be included as Part of GIS equipment.

h) ERECTION HARDWARE:

This item of BPS includes Insulator strings hardware, Disc Insulators/Long Rod Insulators (as applicable), conductor(s), Al tube, bus-bar materials, cable trays & covers, Cable Pull pit, Bay MB (as applicable), spacers, clamps & connectors, Junction box, earth wire, earthing material risers, auxiliary earth mat, buried cable trenches/pipes for equipment & lighting, cable supporting angles/channels, Insulating mats, cable sealing arrangement, all accessories etc. as required.

i) PLCC EQUIPMENTS:

PLCC equipment including Analogue protection coupler, Digital Protection Coupler (suitable for interfacing with E1 port of SDH equipment), FO Boxes, FODP on gantry, signal converters, Power & communication cables etc. for Hinjewadi end have been considered in BOQ of 400kV Pune (West) GIS S/s.

However, integration of these PLCC/DPC panels with CRP & SAS at Hinjewadi S/s including necessary Cabling and connection works with PLCC/DPC Panel is envisaged under present scope.

j) ILLUMINATION SYSTEM:

LED based Outdoor Lighting and illumination system for the switchyard area under present scope using the light fixture as part of LCLM and as per BPS and as specified in Technical Specification Section-Lighting System shall be provided.

k) TELECOMMUNICATION SYSTEM:

The broad Scope of the procurement of FO based Communication Equipment shall include planning, designing, engineering, supply, transportation, insurance, delivery at site, unloading handling, storage, installation, termination, testing, training and demonstration for acceptance, commissioning and documentation for following:

i) SDH Equipment along with suitable interfaces and line cards.
ii) All cabling, wiring, Digital Distribution frame patch facilities and interconnection to the supplied equipment at the defined interfaces,
iii) System integration of all supplied subsystem
iv) Integration with the existing communication system based on SDH and PDH of employer
v) Integration of supplied subsystem with SCADA system, PLCC equipment, PABX of RLDC/SLDC, VOIP (SIP compliant) for voice.
vi) Fibre Optic Approach Cable (FOAC) along with associated hardware set and Fibre Optic Distribution Panel (FODP)
vii) Integration of new Communication equipment in the existing regional UNMS through regional NMS. All required support to existing NMS and UNMS vendor for integration of new Communication equipment.

l) PHASOR MEASUREMENT UNIT (PMU):

i) The broad Scope of the procurement of PMU shall include planning, designing, engineering, supply, transportation, insurance, delivery at site, unloading handling, storage, installation, termination, testing and demonstration for acceptance, commissioning, and documentation for PMU as per BPS.
ii) The PMU shall comply with latest version of IEC/IS 60255-118-1-2018 and IEEE C 37.118.2 protocols standards.

iii) The PMU shall be integrated with Phasor data Concentrator (PDC) at respective Regional Load Dispatch Centre (RLDC)/State Load Dispatch Centre (SLDC).
iv) The Contractor shall extend technical support at Substation end for seamless integration of PMU with PDC at respective RLDC/SLDC end. The integration work at RLDC/SLDC end will not be under the scope of the Contractor. The PDC at RLDC/SLDC is of M/s GE make.
v) The PMU supplied in this project shall support measurement of voltages and currents of at least 2 feeders/bays.
vi) All cabling and interconnections for extension of CT/CVT, Digital inputs from the Line Bays, ICTs/Reactors/STATCOM bays up to PMU panel for measurement by PMU, shall be in the scope of the Contractor. Accordingly, the associated 1.1KV Control cables as required for Non-Adjacent Inter- Control and Relay panel (CRP) CT /PT connections & Digital input connections to PMU panel shall also be under the Contractor's scope. The scope of these cabling work (supply, laying & termination), as applicable in the subject project, shall be deemed to be included in the price of PMU equipment.
vii) Validity of Type Test for PMU shall be as per CEA Guidelines January 2026.

m) Any other equipment/material required to complete the specified scope.

2.2.2.2 Design, engineering, manufacture, testing, supply including transportation & insurance, unloading, storage, testing at site of Mandatory spares as per bid price schedule.

2.2.2.3 **Civil works**

A. The design of the foundation shall be based on the soil investigation report and other parameters as per relevant IS codes & technical specification. The foundations may be open foundation or pile foundation as per the site requirement / soil report.

B. The scope of civil work shall include but shall not be limited to the following based on **drawings developed by the contractor:**

(i) **Site levelling work:** The item site levelling works includes Contouring of the present scope of switchyard area within the sub-station boundary as per technical specification. The final area of levelling may be less than the contouring area, which will be decided during detailed engineering.
a) The Quantity of earthwork cutting & filling, borrowed earth and FGL shall be proposed by vendor for approval of POWERGRID based on the approved contour level drawing and site HFL data.
b) Mode of measurement of this item is in Cum of earthwork as per BOQ and technical specification. The contouring of the plot area in scope as per technical specification is also deemed to be included in quoted rates of this item.
c) HFL data duly verified by POWERGRID Site is required to be arranged by contractor for finalization of FGL (Finished Ground Level).

(ii) **Soil Investigation work (2-borehole)**
a) Soil investigation needs to be conducted as per the technical specification. The necessary soil investigation layout and final soil report shall be proposed by vendor for approval of POWERGRID.
b) Mode of measurement of this item is Lumpsum as per BOQ.

(iii) **Slope Protection Works & Retaining Walls**: Design & Drawings pertaining to slope protection works & retaining walls (if required) shall be finalized during detailed engineering and same shall be measured under respective line items of BPS.

(iv) Structure and foundation of LCLM required for DSLP**.**

(v) **Other miscellaneous requirements & scope:**

a) Stone spreading and anti-weed treatment in the switchyard for area under present scope. Layout for the same shall be developed by the contractor.
b) Stone has already been laid in some portion of the switchyard area under present scope. In this area scope shall be Removal, cleaning and washing of existing stone and re-spreading after doing anti-weed treatment.
c) Providing & laying of non-woven Geo-synthetics fabric of minimum 200 GSM in separation layer between sub grade and stone spreading in switchyard.
d) Foundation for lighting poles, bay marshalling boxes, panels and control cubicles wherever required. The cost of these foundations shall deemed to be included in erection/installation of corresponding item/ equipment of BPS.
e) All civil works including foundations associated with erection of SF6 gas insulated metal enclosed switchgear along with its SF6 bus ducts up to the outer edge of the wall of GIS building. Civil works including all foundations for all equipment inside GIS building.
f) The cable trenches inside GIS halls & associated LCC/Relay rooms.
g) Foundation for Bus duct supporting structures outside GIS Hall & GIS (SF6/Air) bushing.
h) Dismantling of fence/ dismantling & re-erection of existing fence.
i) Dismantling of RCC road, RCC Concreate as required.

(vi) Any other item/design/drawing required for successful completion of scope of works.

C. The scope of civil work shall include but not be limited to the following based on **drawings developed by POWERGRID:**

(i) **Gantry tower, beam:** Gantry tower & beam shall be provided as per Employer's drawings during detailed engineering.

(ii) **Equipment support structure**: Equipment support structure shall be provided as per Employer's drawings during detailed engineering.

(iii) **Foundation for Gantries & Equipment support structure**: The foundations of these structures are including of embedment/grouting of foundation bolts.

(iv) **Bituminous Road including Road Crossing:**
Bituminous Road including approach road (if any), shall be constructed as per POWERGRID standard drawings provided in tender. However, Road layout shall be prepared by vendor for approval.

(v) **Drains:** Drain layout including peripheral drains if any required along the boundary shall be prepared by vendor and to be submitted for approval of POWERGRID based on the standard sections. Diversion of existing Nallah/ Surface runoff, if required, the design & drawing of drains shall be prepared by contractor along with the drain layout and same shall be submitted to POWERGRID for approval. Payment shall be made under respective items of BPS." The rate shall include the cost of all works such as excavation, PCC, RCC, Reinforcement Steel, screed concrete, plastering, NP-3 RCC Hume pipes in crossings, culverts, brick work etc. as per drawings and technical specifications.

(vi) **Rain water harvesting.**

(vii) **Switchyard Gate**

(viii) **Switchyard barbed wire fencing:** Fence layout shall be prepared by vendor and to be submitted for approval of POWERGRID based on the standard sections.

(ix) **Cable Trenches:**

Cable trenches including cable trenches in Reactor/Transformer area along with covers including road/rail crossing, sump pits, culverts etc. shall be constructed as per POWERGRID standard drawings provided in tender. However, Cable trench layout including invert levels shall be prepared by contractor based on the standard sections and to be submitted for approval of POWERGRID.

Mode of measurement of this item is in RM as per BOQ. All works such as Excavation, PCC, RCC, Reinforcement, Misc. Structural steel, cable trench crossings (using RCC Hume Pipe (NP-3)), sumps, RCC covers etc. required as per technical specification and drawings for successful completion of the works are deemed to be included in quoted rates.

2.3 Any other items not specifically mentioned in the specification but which are required for erection, testing and commissioning and satisfactory operation of the substation are deemed to be included in the scope of the specification unless specifically excluded.

2.4 Employer has standardized its technical specification for various equipment and works for different voltage levels. Items, which are not applicable for the scope of this package as per schedule of quantities described in BPS, the technical specification for the items should not be referred to.

3. SPECIFIC EXCLUSIONS

The following items of work are specifically excluded from the scope of the specifications:

a) Employer's site office.
b) Store Building
c) Transit camp.
d) Approach road outside Substation boundary wall.
e) Control room Building.
f) Boundary Wall & Security Hut.

4. PHYSICAL AND OTHER PARAMETERS

4.1 Location of the Substation - The location of substation is indicated below:

Sr. No	Name of Substation	Name of State	Nearest Rail Head
1.	765/400 kV Pune (West) GIS S/s	Maharashtra	Pune
2.	400 kV Hinjewadi GIS S/s	Maharashtra	Chinchwad

4.2 Meteorological data

The meteorological data are as below

Station Name	765/400 kV Pune (West) GIS S/s	400 kV Hinjewadi GIS S/s
Altitude	Less than 1000 meter above mean sea level (MSL)	
Snow fall	NIL	
Seismic Zone	As per IS 1893 (Part 1)	
Wind Zone	NBC 2016	
Min./Max. Ambient Temperature	0 / 50 degree centigrade	
Coastal Area consideration	**No**	

4.3 Fault level shall be considered as mentioned below:-

Sl. No.	Name of Substation	765kV	400kV
1.	765/400 kV Pune (West) GIS S/s	50kA for 1 Sec	63kA for 1 Sec
2.	400 kV Hinjewadi GIS S/s	-	63kA for 1 Sec

5. SCHEDULE OF QUANTITIES

The requirement of various items/equipments and civil works are indicated in Bid price Schedules.

All equipments/items, Structures and civil works for which quantities has been given in the BPS shall be payable on unit rate basis. During actual execution, any variation in such quantities shall be paid based on the unit rate under each item incorporated in Letter of award.

Wherever the quantities of items/works are indicated in Set/LOT/LS, the bidder is required to estimate the quantity required for entire execution and completion of works and incorporate their price in respective Bid price schedules. For erection hardware items, Bidders shall estimate the total requirement of the works and indicate module-wise lump sum price bay wise and include the same in relevant Bid price schedules. Any material/works for the modules not specifically mentioned in the description in BPS, as may be required shall be deemed to be included in the module itself.

No cost compensation shall be considered on account of "Set/LOT/LS" items in any case if number of bays specified in section project remains unchanged.

Bidder should include all such items in the bid proposal sheets, which are not specifically mentioned but are essential for the execution of the contract. Item which explicitly may not appear in various schedules and required for successful commissioning of substation shall be included in the bid price and shall be provided at no extra cost to Employer.

6. BASIC REFERENCE DRAWINGS

a) Design of substation and its associated electrical & mechanical auxiliaries systems includes preparation of single line diagram, electrical layout, foundation & cable trench layouts (including invert levels), erection key diagrams, direct stroke lightning protection, electrical and physical clearance diagrams, Control and protection schematics, wiring and termination schedules, design of firefighting system, outdoor lighting/illumination and other relevant drawings & documents required for engineering of all facilities within the fencing to be provided under this contract, are covered under the scope of the Contractor.

b) The substation shall be designed considering current ratings as indicated below-

Sl. No	Description of bay	765/400 kV Pune (West) GIS S/s	Extension of 400kV Hinjewadi GIS S/s
		400kV	400kV
1.	Bus Bar	4000A	4000A
2.	Line bay	3150A	3150A
3.	ICT bay	3150A	-
4.	Tie bay	3150A	-
5.	Auxiliary Busbar for ICT	3150A	-

c) Following switching schemes are envisaged under present scope:

Name of substation	400kV Bus switching scheme
765/400 kV Pune (West) GIS S/s	One & half breaker scheme
Extn. of 400kV Hinjewadi GIS S/s	Double Main scheme

d) The reference drawings, which form a part of the specifications, are given at **Annexure-I**. The bidder shall maintain the phase to earth clearance, phase to phase clearance and sectional clearances, clearances between buses, bus heights but may alter the locations of equipment to obtain the statutory electrical clearances required for the substation.

e) It is responsibility of contractor to develop general arrangement drawing, layout drawings, single line drawing, foundation & cable trench layout, erection key diagram & all other layout drawings for present scope of work.

f) INPUTS TO BE PROVIDED DURING DETAILED ENGINEERING

i. Location of identified land and Plot plan for land shall be provided to successful bidder during detailed engineering.

ii. Transmission line side conductor type & configuration of conductors for transmission lines of various voltage levels.

7. DIFFERENT SECTIONS OF TECHNICAL SPECIFICATION

For the purpose of present scope of work, technical specification (Vol. II) shall consist of following sections and they should be read in conjunction with each other.

Sl. No.	Description	Revision
1.	Section - Project	Rev 00
2.	Section - General Technical Requirement	Rev 16
3.	Section - Gas Insulated Switchgear (GIS)	Rev 05A
4.	Section - Switchgear Instrument Transformer	Rev 12
5.	Section - Switchgear SA	Rev 13
6.	Section- LT Switchgear	Rev. 05
7.	Section - Power & Control Cable	Rev 06
8.	Section - Fire Protection System	Rev 06
9.	Section - Air Conditioning System	Rev 04
10.	Section - Lighting System	Rev 07
11.	Section - Switchyard Erection	Rev 10
12.	Section – Structure	Rev 07
13.	Section - Civil Works with corr. Slip 1	Rev 12
14.	Section - Control & Relay Panel	Rev 09
15.	Section - Substation Automation System	Rev 04
16.	Section – PLCC	Rev. 05
17.	Section – Telecommunication System	Rev. 06
18.	Section – PMU	Rev. 01

In case of any discrepancy between Section-PROJECT, Section-GTR and other technical specifications on scope of works, Section-PROJECT shall prevail over all other sections.

In case of any discrepancy between Section-GTR and individual sections for various equipments, requirement of individual equipment section shall prevail. In case of any discrepancy between Main body of Section-Project and Annexure(s) of Section-Project, provisions specified in Main body of Section-Project shall prevail.

In case of any discrepancy between BPS and other sections, BPS shall prevail over the other sections of the technical specifications. However, for rating of the BPS items, associated Section-Project shall be referred to.

8. MANDATORY SPARES

The Mandatory Spares shall be included in the bid proposal by the bidder. The prices of these spares shall be given by the Bidder in the relevant schedule of BPS and shall be considered for evaluation of bid. It shall not be binding on the Employer to procure all of these mandatory spares.

The bidder is clarified that no mandatory spares shall generally be used during the commissioning of the equipment. Any spares required for commissioning purpose shall be arranged by the Contractor. The unutilized spares if any brought for commissioning purpose shall be taken back by the contractor.

Wherever spares in BPS/Technical Specification have been specified as "each type/each rating/each type & rating": If the offered spare/spares is sufficient to replace the respective main equipment of all types/ratings, then such offered spare/spares shall be acceptable. It implies that common spare/spare set fulfilling the spare requirement of all types/ratings shall also be acceptable, provided it is configurable at site itself without special assistance of OEM.

Mandatory Spares, wherever mentioned, are envisaged for the equipment/items being supplied under the main equipment heads under present scope meeting the requirements of Technical Specifications. The component/sub-component of an equipment/item specified in BPS under Mandatory Spare, which is not applicable as per the offered design of respective main equipment, shall not be referred to.

9. SPECIFIC REQUIREMENT

9.1 Relevant/applicable clauses of Specific Requirements as mentioned at C/ENGG/SPEC/SEC-PROJECT/SPECIFIC REQUIREMENT Rev. no. 10 (attached as Annexure-III) shall also be referred for specified scope of work. Any discrepancy between clause 9.0 Section-PROJECT and Specific Requirements as mentioned at C/ENGG/SPEC/SEC-PROJECT/SPECIFIC REQUIREMENT Rev. no. 10 (attached at Annexure-III) on scope of works, the requirement stipulated at clause 9.0 of section project shall prevail.

9.2 Sl. No. A. Section: GTR Rev 15 of Specific requirement, Rev 10 (attached at **Annexure-III)** stands deleted.

9.3 For one and half breaker switching scheme Two transformers of same HV rating shall Not be connected in the same diameter and similarly, two bus reactors of same HV rating shall also Not be connected in the same diameter.

9.4 For one and half breaker switching scheme, any double circuit line consisting of two numbers of feeders and originating from the same transmission or generating switchyard shall Not be terminated in one diameter.

9.5 **400kV GIS Modules/Equipment description** given in **Annexure-IV** shall be referred. 400kV GIS Modules/Equipment description provided at Annexure-S11 of Specific Requirements as mentioned at C/ENGG/SPEC/SEC-PROJECT/SPECIFIC REQUIREMENT Rev. no. 10 (attached as Annexure-III) stands deleted.

9.6 For Circuit breaker(s) controlling 400kV Transmission line(s), with or without Line Reactor and 765kV Transmission line(s) without Line Reactor, Controlled Switching Device (CSD) suitable for Line Switching Application in lieu of PIR shall also be acceptable.

The above CSD provided for the transmission line application shall be used for controlled energization to minimize the switching overvoltage in the line during dead-line charging as well as during re-energization as part of auto-reclosure sequence. It is required that the performance of the circuit breaker with CSD for transmission line switching shall be equivalent to or better than that of a circuit breaker equipped with a Pre-Insertion Resistor (PIR).

9.7 Minimum specified creepage distance for **Switchyard equipments** including insulator string/ long rod insulators/ outdoor bushings shall be 31 mm/kV for both 400kV GIS Pune (West) and 400kV Hinjewadi GIS S/s.

9.8 **Annexure S1** of Specific Requirements Rev 10 is replaced with Annexure S1 (Revised) and enclosed as **Annexure-VII** of Section Project for METHODOLOGY FOR SIZING OF CABLES.

9.9 Establishment of CCTV System for Construction Monitoring of entire switchyard shall be as Sl. No. A.7 of SPECIFIC REQUIREMENT Rev. no 10 enclosed at **Annexure-III.**

9.10 **New Clause no. 8.3.2 under Section: Switchyard Erection (SE), Rev 10 added**:

Polymer BPI in lieu of Porcelain type BPI is also technically acceptable (upto 400kV Voltage level) for support applications (Except for Isolators & Wave Traps). The technical specification for polymer type BPI is attached at **Annexure-V**.

9.11 **Clause no. 3.4.6 of Section Air Conditioning Rev 04 is modified as below:**
Required Features of Various Components
The compressor shall be very reliable, trouble free and long life i.e. hermetically sealed Scroll **or Rotary type** of reputed make suitable for continuous operation. Compressor should be installed on vibration isolated mountings or manufacturer's recommended approved mounting. Valve shall be provided for charging/topping up of refrigerant. The bidder shall furnish details of their compressor indicating the MTBF, life of compressor and continuous run time of compressor without failure. The contractor shall also furnish details of all accessories, i.e. refrigeration system, evaporator coil, condenser coil, evaporator blower, filter, cabinet, indoor supply and return grill etc. during detailed engineering.

9.12 For Switchyard Lighting, all the required cables, accessories, SLP/JB, etc. as required from ACP to luminaires shall be assessed and supplied by the contractor. The price of these items shall be deemed to be included in price of luminaires.

9.13 In Section-GTR and other technical specifications, the term 'Employer and/or 'Purchaser/Customer' may be read as Employer.

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