

**ANNEXURE-I**

**BOQ for Erection Testing & Commissioning (ETC) Works      Rev 0**

**Project : 400 kV GIS (new switchyard) & 400kV Air Insulated Switchyard Extension for Wanakbori ( already charged switchyard)**

S.No.	Voltage Class (kV)	Type	Description	Unit	400kV switchyard (AIS extn +GIS)	Unit Rate	Total
1	400 kV	Indoor GIS	<b>GIS ( 400kV- 40kA for 3 sec) - 400kV GIS as per enclosed SLD with Double Bus Bar scheme</b>				
			Work shall include unloading, verification, upkeeping, storage, shifting, Erection / Installation, Testing and commissioning of 400kV GIS including <u>LCC</u> . The supervision shall be provided by manufacturer of GIS. Arrangement of Tools & testing instruments (other than the list as per <b>Annexure-B</b> ), Shall be part of scope. <b>REFER NOTE 18 FOR DETAILS</b> . The scope includes earthing / grounding work for GIS, cabling work between GIS & LCC . BHEL Drawing & Siemens GIS layout shall be referred for bus duct layout .				
1.1			BusBar Modules (1 set is for three phase)	Set	2	1,18,250	2,36,500
1.2			400kV Voltage Transformer module (for Busbars)	Set	2	85,250	1,70,500
1.3			400kV SF6 GIS Line bay module	Set	2	2,03,500	4,07,000
1.4			400kV SF6 GIS Tie Line bay module	Set	2	2,03,500	4,07,000
1.5			400kV SF6 Generator Transformer Bay module	Set	1	1,76,000	1,76,000
1.6			400kV SF6 GIS Station Transformer Bay module	Set	1	1,76,000	1,76,000
1.7			400kV SF6 GIS Bus Coupler bay module	Set	1	2,09,000	2,09,000
1.8			Bay Control Cabinet (LCC)	Nos.	9	10,000	90,000
1.9			400kV SF6 to Air Bushing	Set	18	11,000	1,98,000
1.10			400kV GIS bus duct (single phase) from GIS GT/Tie Line/ST/Line Bays to SF6 to Air bushing including installation of support structure , foundation bolts ,base frame and grouting etc.	m	510	1,000	5,10,000
1.11			SF6 Gas Filling/Recovery/Re-filling Cycle. The cycle of the gas filling/recovery/re-filling will be followed multiple time till the Completion of the HV test. Gas processing and filling unit ( DILO machine) shall be in the scope of BHEL/manufacturer.	lot	1	1,81,500	1,81,500
1.12			Structure work for Installation of GIS including (excluding bus duct) support structure, fixing of foundation bolts/ base frame, aligning, jointing, welding , fixing of embedded parts / support plates in floors etc., which are required for installation of GIS as per the specification.	bays	11	12,500	1,37,500

**BOQ for Erection Testing & Commissioning (ETC) Works      Rev 0**

**Project : 400 kV GIS (new switchyard) & 400kV Air Insulated Switchyard Extension for Wanakbori ( already charged switchyard)**

S.No.	Voltage Class (kV)	Type	Description	Unit	400kV switchyard (AIS extn +GIS)	Unit Rate	Total
1.13			Grounding for GIS using braided Cu wire (insulated/ non-insulated)/ earthstrip (Cu/Al/GI flat). Work includes cutting, lug crimping , bolting , fixing etc. and connecting with riser/earth strip (GI/AL /Cu flat). Grounding Material will be supplied by GIS Supplier /BHEL, however, contractor has to arrange for hardware and lug for grounding.	Module	11	10,681.82	1,17,500
1.14			Cabling between GIS and LCC including including termination, ferruling , laying, dressing, tagging etc including arrangement of consumables etc .	bays	9	22,000	1,98,000
2	400 kV	Without PIR	SF6, 3 Phase <b>Circuit Breaker</b> alongwith lattice type GS supporting structure, terminal connectors, Breaker Control Cabinets, ladder and interpole cabling. (Supervision of Erection, Testing and commissioning will be done by supplier. Supplier will bring Timing kit and Gas leak detector only. Necessary manpower support, tools, tackles and testing kit to be in scope of ETC contractor).	Nos.	6	42,500	2,55,000
3	400 kV	HCB (Mechanically engaged)	3 Ph, <b>Isolator</b> , motor/ manual operated complete with 6 nos. of support insulators & terminal connectors without support structure - with one earth switch (motor/ manual operated)	Nos.	22	16,000	3,52,000
4	400 kV	Upto 2000 A	1 Ph, <b>Current Transformer</b> (2000 A), dead tank complete with terminal connectors without support structure.	Nos.	24	8,500	2,04,000
5	400 kV		1 Ph, <b>CVT</b> complete with terminal connector without support structure.	Nos.	18	8,500	1,53,000
6	390/ 360 kV		1 Phase, Gapless type Metal Oxide <b>Surge Arrester</b> complete with surge counter, leakage current meter, insulating base, connecting cable and terminal connectors.				
6.1			Low level (upto 8 m height from plinth)	Nos.	18	3,500	63,000
6.2			High level (above 8 m to 11 m height from plinth)	Nos.	6	4,500	27,000
7	400 kV	Pedestal type	1 phase, <b>Wave Trap</b> complete with 3 nos. post insulators per WT with terminal connectors without support structure.	Nos.	18	10,000	1,80,000
8	400 kV	Solidcore with corona	<b>Post Insulators</b> complete with corona ring & terminal connectors without support structure				
8.1			low level (upto 8 m height from plinth)	Nos.	42	1,150	48,300
8.2			High level (above 8 m to 11 m height from plinth)	Nos.	6	1,850	11,100
9	<b>Stringing hardware</b>						
9.1	400 kV	Double Tension	Tension insulator string with double/single anchoring point , string comprising 2X28 nos. disc with hardware set with all accessories including tension clamp with/ without Turn Buckle set suitable for twin/quad conductor.	Set	36	3,000	1,08,000
9.2	400 kV	Single Suspension	Suspension insulator string comprising 1X28 nos. disc with hardware set with all accessories including drop/through type suspension clamp suitable for single/twin/quad conductor.	Set	39	2,000	78,000

**BOQ for Erection Testing & Commissioning (ETC) Works      Rev 0**

**Project : 400 kV GIS (new switchyard) & 400kV Air Insulated Switchyard Extension for Wanakbori ( already charged switchyard)**

S.No.	Voltage Class (kV)	Type	Description	Unit	400kV switchyard (AIS extn +GIS)	Unit Rate	Total
10		<b>GI shield wire</b>					
10.1	-	7/9 SWG	GI Stranded Shield wire including tension clamp, PG clamp and clamping on structure for down conductor, fixing/bolting with earth strip etc to complete . (Shield wire to be quoted against item 10.2 below)	Km	2.50	31,000	77,500
10.2		7/9 SWG	<b>Supply</b> of GI Shield wire (7/9 SWG) as per Technical specification TB-375-316-013	km	2.50	42,000	1,05,000
11	-	ACSR Moose	Conductor complete with Tee connectors for droppers to equipment connections, PG clamps for busbar jumpering, Twin/Quad bundle spacers etc to complete.	Km	4.90	61,000	2,98,900
12		4.0"	Al Tube (ETC of Al.Tube includes Aluminium welding and bending to be included. Welding sleeve tube will be supplied by BHEL.)	m	550.00	345	1,89,750
13			<b>AUXILIARY SUPPLY - (LT DISTRIBUTION BOARDS, BATTERY, CHARGER), SLD for reference</b>				
13.1			415V ACDB	Set	2	40,000	80,000
13.2			415V AC MAIN LIGHTING DISTRIBUTION BOARD (MLDB) with Lighting Transformer.	Set	2	15,000	30,000
13.3			415V AC Emergency Lighting Distribution board (ELDB) with Lighting Transformer	Set	1	10,000	10,000
13.4			48 V Float Cum Boost Battery Charger	Set	4	6,000	24,000
13.5			48 V Battery Bank (NiCd Battery)	Set	2	25,000	50,000
13.6			48 V DC Distribution board	Set	2	20,000	40,000
13.7			220 V DC distribution board	Set	2	25,000	50,000
13.8			220V Float Cum Boost Battery Charger	Set	8	6,000	48,000
13.9			220 V Battery Bank (NiCd Battery)	Set	4	25,000	1,00,000
13.10			DRY TYPE LT transformer - 630 kVA alongwith LT busduct	Set	2	15,000	30,000
13.11			DRY TYPE LT transformer - 200 kVA alongwith LT busduct	Set	2	15,000	30,000
13.12			Battery discharge resistor bank	Set	2	10,000	20,000
14			<b>Marshalling Kiosks &amp; CT / CVT Junction Boxes</b>				-
14.1			Bay Marshalling Kiosks ( Outdoor, Floor mounted on cable trench)	Nos.	6	3,900	23,400
14.2			CT Junction Box (on foundation/structure)	Nos.	6	2,300	13,800
14.3			VT Junction Box (on foundation/structure)	Nos.	8	2,000	16,000
15			<b>400kV Control and Relay Panels</b>				
			<b>400kV Control and Relay Panels &amp; 61850 Based Sub station Automation system (Testing and commissioning of relays in scope of panel supplier. Necessary manpower support, tools, tackles and testing equipment to be in scope of ETC contractor).</b>				
15.1			400kV Tie Line-1&2 Relay Panel ( Approx 800mm Wide) ( AIS End) {1Set = 2 Nos. Panel}	Set	2	10,000	20,000
15.2			400kV Tie Breaker Relay Panel ( Approx 800mm Wide) ( AIS End) { 1 Set = 1 No. Panel}	Set	2	5,000	10,000
15.3			400kV Centralized Busbar Relay Panel ( Approx 800mm Wide) ( AIS End) ( 1 Set=6 Panels)	Set	1	30,000	30,000

**BOQ for Erection Testing & Commissioning (ETC) Works      Rev 0**

**Project : 400 kV GIS (new switchyard) & 400kV Air Insulated Switchyard Extension for Wanakbori ( already charged switchyard)**

S.No.	Voltage Class (kV)	Type	Description	Unit	400kV switchyard (AIS extn +GIS)	Unit Rate	Total
15.4			400kV Tie Line - Tie-Future diameter Backup Control Panel ( Approx 1000mm Wide) ( AIS End ) { 1 Set = 1 Panel }	Set	2	5,000	10,000
15.5			400kV Busbar Relay Panel ( Approx 800mm Wide) ( GIS End ) ( 1 Set=2 Nos Panels)	Set	1	10,000	10,000
15.6			400kV Tie Line-1&2 Relay Panel ( Approx 800mm Width) (GIS End) { 1 Set = 2 Nos. Panels }	Set	2	10,000	20,000
15.7			400kV Line-1&2 Relay Panel ( Approx 800mm Width) (GIS End) { 1 Set = 2 Nos. Panels }	Set	2	10,000	20,000
15.8			400kV GT Breaker Relay Panel ( Approx 800mm Wide) ( GIS End) { 1 Set = 1 No. Panel}	Set	1	5,000	5,000
15.9			400kV ST Breaker Relay Panel ( Approx 800mm Wide) ( GIS End) { 1 Set = 1 No. Panel}	Set	1	5,000	5,000
15.10			400kV Bus Coupler Relay Panel ( Approx 800mm Wide) ( GIS End) { 1Set = 1 No. Panel }	Set	1	5,000	5,000
15.11			Islanding Relay Panel ( Approx 800mm Wide) (GIS End) {1 Set = 1 No. Panel}	Set	1	5,000	5,000
15.12			400kV Tie Line-1 & 2 Bay Backup Control Panel (GIS End) (Approx 800mm Width) { 1 Set = 1No. Panel}	Set	2	5,000	10,000
15.13			400kV Line-1 & 2 Bay Backup Control Panel (GIS End) (Approx 800mm Width) { 1 Set = 1No. Panel}	Set	2	5,000	10,000
15.14			400kV GT Bay Backup Control Panel ( Approx 800mm Wide) ( GIS End) { 1 Set= 1 No. Panel}	Set	1	5,000	5,000
15.15			400kV ST Bay Backup Control Panel ( Approx 800mm Wide) ( GIS End) { 1 Set= 1 No. Panel}	Set	1	5,000	5,000
15.16			400kV Bus Coupler Bay Backup Control Panel ( Approx 800mm Wide) ( GIS End) { 1 Set = 1 No. Panel}	Set	1	5,000	5,000
15.17			Aux Network Panel for LT Switchgear ( Approx 800mm Wide) (GIS End) { 1 Set = 1No. Panel }	Set	1	5,000	5,000
15.18			Synchronizing Trolley ( Approx. 600mm wide)	Nos.	2	5,000	10,000
15.19			Metering Panel comprising of main and check meters ( Approx 800mm Wide) ( GIS End ) { 1 Set = 1 No. Panel}	Set	1	5,000	5,000
15.20			Secondary injection test kit	Nos.	1	5,000	5,000
15.21			SAS : Armoured Fibre Optic system Cable for SAS and Busbar protection ( to be laid in GI Pipe) ( Scope - Laying of the cables in the 25mm GI PIPE), SUPPLY OF GI PIPE (GSECL accepted make) shall also be in contractor's scope	m	4400	250	11,00,000
15.22			Network Controllers ( Hot and Standby) at GIS Control room	Nos.	2	1,000	2,000
15.23			Operator Work Station at GIS / AIS Control room	Nos.	3	1,000	3,000
15.24			Engineering Work Station at GIS/AIS Contro room	Nos.	2	1,000	2,000
15.25			Colour Laser printer at GIS/AIS Contro room	Nos.	2	1,000	2,000
15.26			Dot Matrix printer at GIS/AIS Contro room	Nos.	2	1,000	2,000
15.27			UPS with Battery Backup at GIS/AIS Contro room	Nos.	2	5,000	10,000
15.28			67 inch Large Video Screen at GIS control room	Nos.	1	1,000	1,000
15.29			Laptop with relay parameterisation software	Nos.	1	1,000	1,000
15.30			GPS receiver with 100mm TDU complete in all respects including antenna, all cables, processing equipment etc.	Nos.	1	7,000	7,000
15.31			Handling & installation of furniture required in switchyard control room & Power house control room for OWS, printer, chairs etc.	Lot	1	15,000	15,000

**BOQ for Erection Testing & Commissioning (ETC) Works      Rev 0**

**Project : 400 kV GIS (new switchyard) & 400kV Air Insulated Switchyard Extension for Wanakbori ( already charged switchyard)**

S.No.	Voltage Class (kV)	Type	Description	Unit	400kV switchyard (AIS extn +GIS)	Unit Rate	Total
15.32			67 inch Large Video Screen at central control room	Nos.	1	1,000	1,000
15.33			UPS with Battery Backup at central control room	Nos.	1	5,000	5,000
15.34			Gateway to Plant DCS at central control room	Nos.	2	1,000	2,000
15.35			Operator Work Station at Central Control room	Nos.	1	1,000	1,000
15.36			Metering master Work Station located at GIS Control room	Nos.	1	1,000	1,000
16			<b>PLCC</b>				
16.1			Coupling device(Phase to Phase) 650W	Nos.	6	7,500	45,000
16.2			HF Cable	m	2000	12	24,000
16.3			PLCC Panels	Nos.	5	7,500	37,500
16.4			4 Wire telephone instrument along with telephone with wires	Nos.	1	350	350
16.5			5 Pair telephone cable , armoured ,0.5sq.mm annealed copped conductor and petroleum jelly filled with polyethene outer jackets	m	300	12	3,600
16.6			EPAX ( 24/8) with 24 Telephones , Cables and accessories .	Set	1	6,000	6,000
17			<b>LT Cabling</b> including laying, tagging , dressing, ferruling, Glanding, lugging ,soldering, tapping, jointing, crimping, termination, and drilling/ cutting holes in cable gland plates laying can be either on trays, supports, underground, buried in ground or through GI pipe over ground, through wall etc. All erection materials viz. ferrules, copper lugs, cable ties / straps, Al. tags, markers, GI / PVC wall sleeves with rubber / nylon bushes and flexible steel conduits shall be supplied by bidder. Glands shall be quoted separately.				
17.1		XLPE	<b>Control cables</b>				
17.1.1		XLPE	2Cx2.5 sqmm Cu	m	4100	14	57,400
17.1.2		XLPE	5Cx2.5 sqmm Cu	m	44000	14	6,16,000
17.1.3		XLPE	7Cx2.5 sqmm Cu	m	1500	15	22,500
17.1.4		XLPE	9Cx2.5 sqmm Cu	m	41000	15	6,15,000
17.1.5		XLPE	12Cx2.5 sqmm Cu	m	18000	20	3,60,000
17.1.6		XLPE	20Cx2.5 sqmm Cu	m	18000	22	3,96,000
17.2			<b>Auxiliary Power cables</b>				
17.2.2		XLPE	2Cx16 sqmm Al	m	4000	14	56,000
17.2.3		XLPE	4Cx6 sqmm Al	m	250	14	3,500
17.2.4		XLPE	4Cx16 sqmm Al	m	1000	14	14,000
17.2.5		XLPE	3.5Cx35 sqmm Al	m	800	20	16,000
17.2.6		XLPE	3.5Cx70 sqmm Al	m	9000	29	2,61,000
17.2.7		XLPE	3.5Cx95 sqmm Al	m	1000	29	29,000
17.2.8		XLPE	1Cx70 sqmm Al	m	500	15	7,500
17.2.9		XLPE	1Cx120 sqmm Al	m	500	20	10,000
17.2.10		XLPE	2Cx10 sqmm Al	m	700	14	9,800
17.2.11		XLPE	3.5Cx185 sqmm Al	m	1500	55	82,500

**BOQ for Erection Testing & Commissioning (ETC) Works      Rev 0**

**Project : 400 kV GIS (new switchyard) & 400kV Air Insulated Switchyard Extension for Wanakbori ( already charged switchyard)**

S.No.	Voltage Class (kV)	Type	Description	Unit	400kV switchyard (AIS extn +GIS)	Unit Rate	Total
18			<b>Supply of CABLE GLANDS</b> - Cable glands shall be tinned brass gland, double compression type complete with necessary armour clamp and tapered washer, etc. Cable glands shall match with the sizes of different HT/LT/Control cables.				
18.1.1			2cX2.5 sqmm Cu	Nos.	160	200	32,000
18.1.2			5Cx2.5 sqmm Cu	Nos.	900	200	1,80,000
18.1.3			7Cx2.5 sqmm Cu	Nos.	200	240	48,000
18.1.4			9Cx2.5 sqmm Cu	Nos.	420	270	1,13,400
18.1.5			12Cx2.5 sqmm Cu	Nos.	375	300	1,12,500
18.1.6			20Cx2.5 sqmm Cu	Nos.	400	325	1,30,000
18.2.2			2Cx16 sqmm Al	Nos.	220	150	33,000
18.2.3			4Cx6 sqmm Al	Nos.	20	275	5,500
18.2.4			4Cx16 sqmm Al	Nos.	20	300	6,000
18.2.5			3.5Cx35 sqmm Al	Nos.	20	350	7,000
18.2.6			3.5Cx70 sqmm Al	Nos.	20	400	8,000
18.2.7			3.5Cx95 sqmm Al	Nos.	20	500	10,000
18.2.8			1Cx70 sqmm Al	Nos.	8	200	1,600
18.2.9			1Cx120 sqmm Al	Nos.	8	300	2,400
18.2.10			2Cx10 sqmm Al	Nos.	20	200	4,000
18.2.11			3.5Cx185 sqmm Al	Nos.	14	1,200	16,800
<b>19</b>			<b>11kV cables (3 core, 240 sqmm)</b>				
19.1			<b>Civil works</b> for burying i.e excavation & backfilling including supply of bricks/RCC pipe(half dia) as per <b>sheet 31,32</b> of <b>K9213R-DWG-E-0400</b> - NOTES FOR CABLING	km	1.70	20,00,000	34,00,000
19.2			Laying & installation of 11kV cable alongwith its accessories on trench/trestle/RCC pipe or in buried trench . It includes the fixing and clamping of cables , marking of by route markers or any other method .	km	5.00	80,000	4,00,000
19.3			Jointing of 11kV cable through two sets of cable termination alongwith necessary civil works and erection of two pole support structure alongwith accessories , fixing of clamps etc.	set	4	25,000	1,00,000
19.4			Jointing of 11kV cable by straight through joints including construction of pull pits (if required)	set	4	10,000	40,000
			Termination of 11kV , 3 core cable on MV switchgear / LT transformer.	set	4	10,000	40,000
<b>20</b>			<b>Laying of Cable trays:</b> including bends, tees, elbow, reducers, stiffeners coupler plates, bolting to racks, structure etc. to complete.				
20.1			150 to 750 mm wide, 2.5 M long Ladder type	Nos.	500	43	21,500
20.2			100 to 750 mm wide, 2.5 M long Perforated type	Nos.	1000	53	53,000
<b>21</b>			<b>Cable Rack work</b> includes welding of galvanised steel racks on inserts of trench walls in trenches/ceiling/ floor in switchyard and control room. Cable rack assembly will be of 2/3/4 tier.	MT	40	3,500	1,40,000

**BOQ for Erection Testing & Commissioning (ETC) Works      Rev 0**

**Project : 400 kV GIS (new switchyard) & 400kV Air Insulated Switchyard Extension for Wanakbori ( already charged switchyard)**

S.No.	Voltage Class (kV)	Type	Description	Unit	400kV switchyard (AIS extn +GIS)	Unit Rate	Total
22			<b>Laying of GI conduits</b> at a depth of 300mm including excavation, backfilling, making and repairing of walls in trenches, cutting, threading, fixing of sockets/ bends where required etc. complete. <u>Both ends of GI conduits shall be closed by plastering.</u> (Payment will be made for the as erected pipe length)				
21.1			GI pipe, 50 NB	m	500	77	38,500
21.2			GI Pipe, 100 NB	m	2000	92	1,84,000
22			<b>Fixing of GI Pipes on Lattice/ Pipe Structure</b> including clamping, fixing of sockets/ bends as required etc. complete. Both ends of GI Pipes shall be closed by plastering. (Payment will be made for the as erected pipe length).				
22.1			50 mm dia	m	100	77	7,700
22.2			100 mm dia	m	100	92	9,200
23			The <b>Fire proof sealing</b> / fire stop system / fire protection coating system required to prevent spreading of fire from one place to other place (or one zone to other zone) through the openings in wall / floor, cables laid in trays / racks and openings below Electrical Switchgear / MCC / Distribution boards /Cabinets / Panels, etc.as per clause 3.00.00 of GSECL specification VOLUME : IIF/2, SECTION-IX, TECHNICAL SPECIFICATION FOR ERECTION - CABLING, GROUNDING AND LIGHTNING PROTECTION SYSTEM Customer approval to be taken for vendor	sq.m	40	3,000	1,20,000
24			Panel Supporting Angles / Channel etc on cable trench in Control Room (Including Supply).	MT	5	72,000	3,60,000
25			<b>Structural Steel Work</b> welded in built up sections like angles, channels & framed work etc including providing cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete	MT	2	72,000	1,44,000
26			Galvanised steel Lattice Structures including hardwares for Towers, beams & equipment support	MT	253	4,500	11,38,500
27			Galvanised steel Pipe Structures including hardwares for equipment support	MT	90	3,800	3,42,000
28			<b>Earthing material-</b> The earthing includes earthing of all switchyard equipment, towers, pipe structure, cable trenches, fence, pipe electrode for LA, CVT, neutral of transformer & at interconnections of other grids, Control room equipments using necessary connectors for earthing flats. Earthing clamping shall be carried out by ETC contractor. GS strip including cutting, bending, welding with 40 mm dia MS rod riser/earth strip, applying zinc rich paint, clamping to structure/building wall etc. to complete. Hardware required for connecting flat on pads of structure & equipment included in scope. The Earthing of equipments, Auxiliary Earthmats under Iso/ ES/ CB MOM boxes shall be carried out as per equipment earthing drg				
28.1			75 x 12 mm GI Flat	m	3250	71	2,30,750
28.2			50 x 6 mm GI Flat	m	2400	56	1,34,400

**BOQ for Erection Testing & Commissioning (ETC) Works      Rev 0**

**Project : 400 kV GIS (new switchyard) & 400kV Air Insulated Switchyard Extension for Wanakbori ( already charged switchyard)**

S.No.	Voltage Class (kV)	Type	Description	Unit	400kV switchyard (AIS extn +GIS)	Unit Rate	Total
28.3			40 mm Dia MS Rod	MT	1	12,300	12,300
29			Unloading, storage & handing over of Essential/ Mandatory spares to Customer as per Annexure-A	Lot	1	1,00,000	1,00,000
20			<b>Supply &amp; ETC</b> of GSECL approved make 2 HP Automatic Start/ Stop type <b>Centrifugal pump</b> and accessories for sump pit	nos.	1	15,000	15,000
31			<b>Supply &amp; ETC</b> of GSECL approved make 0.5 HP Automatic Start/ Stop type <b>Centrifugal pump</b> and accessories for sump pit	nos.	1	9,000	9,000
32			Supply & Mounting of Phase Color Discs, Danger Plate and Identification Plates for bays & Equipments as per IS:2551; 1982 & IS:5; 1978.	Lot	1	1,50,000	1,50,000
33			<b>Supply of equipment fixing hardware as per specification TB-XXX-618-002a</b>	kg	185	67.85	12,551
33.1			Equipment Fixing Hardware - M20 x 80 LG Bolts (Full Threaded) with nut (Quantity=105 nos.)				
33.2			Equipment Fixing Hardware - M30 x 150 LG Bolts (Full Threaded) with nut (Quantity=105 nos.)				
33.3			Equipment Fixing Hardware - Plain washer suitable for M20 Bolts (Quantity=210 nos.)				
33.4			Equipment Fixing Hardware - Plain washer suitable for M30 Bolts (Quantity=210 nos.)				
33.5			Equipment Fixing Hardware - Spring washer suitable for M20 Bolts (Quantity=105 nos.)				
33.6			Equipment Fixing Hardware - Spring washer suitable for M30 Bolts (Quantity=105 nos.)				
			<b>Watch and Ward- Material supply</b>				-
34			Watch & ward of stored / erected material at project site and storage area or any other locations as per instruction of site in charge. (round the clock security by authorised service agency consisting of armed guard)	months	12	40,000	4,80,000
35			<b>ETC Work for Remote End</b>				
a	400 kV		1 Ph, <b>CVT</b> complete with terminal connector without support structure.	Nos.	6	17,000	1,02,000
b	400 kV	Pedestal type	1 phase, <b>Wave Trap</b> complete with 3 nos. post insulators per WT with terminal connectors without support structure.	Nos.	6	20,000	1,20,000
c			VT Junction Box (on foundation/structure)	Nos.	2	4,600	9,200
d			<b>PLCC</b>				
i			Coupling device(Phase to Phase) 650W	Nos.	2	15,000	30,000
ii			HF Cable	m	2000	24	48,000
iii			PLCC Panels	Nos.	5	15,000	75,000
36			<b>Transportation to remote end for following equipments :(Items at S.no.-35) CVT including JB Wave trap PLCC items</b>	lot	1	1,76,000	1,76,000
						<b>Total</b>	<b>189,10,701</b>

**BOQ for Erection Testing & Commissioning (ETC) Works      Rev 0**

**Project : 400 kV GIS (new switchyard) & 400kV Air Insulated Switchyard Extension for Wanakbori ( already charged switchyard)**

S.No.	Voltage Class (kV)	Type	Description	Unit	400kV switchyard (AIS extn +GIS)	Unit Rate	Total
<b>Notes</b>							
1			Loading / Unloading, handling, shifting to & from stores, proper storage, assembly, installation, pre-commissioning test and commissioning tests (as per BHEL FQP) are included in the scope. Shifting of the material from store to site with truck/trailor (within plant boundary).The scope of work includes loading of material with hydra on truck/trailor at store, unloading of the material from truck/trailor at site with Hydra (in case EOT crane is available in GIS hall then unloading of the same by EOT crane, it may be noted the EOT crane is in BHEL scope).				
2			(Distance between two switchyard is 1.7 km approx. and distance between store to each switchyard is 700m/1000m)				
3			Equipments for remote end will be stored at wanakbori and transported for erection at remote end when required for erection. Distance between wanakbori s/s and remote end s/s - 107 km.				
4			HV test kit is in scope of GIS Supplier				
5			All ETC works shall be done as per GSECL/DCPL Specification (enclosed).				
6			All the drawings and documents enclosed as per note-16 or refered elsewhere shall be followed for ETC work.				
7			Minor Civil works such as modification of civil foundations, making holes in the trenches/ control room building, grouting, fixing of trench material will be in the scope of ETC contractor.				
8			Removal of gravel, if gravelling is done, for connection of Equipment earthing strip to the existing mat (wherever earthing mat is already laid), and after completion of earthing , contractor should place the gravel to bring it in original shape.				
9			The quantities given in items mentioned above may undergo a change to any extent.				
10			Quoted rates are deemed to be inclusive of miscellaneous works viz erection of clamps and connectors.				
11			All paint , welding electrodes & other consumable by contract supplies shall be part of ETC works. Paint /welding electrode make etc. is subject to BHEL/CUSTOMER site incharge approval.				
12			Equipment erection (say Isolator ) means complete erection, metallics, post insulator, connectors (expansion/rigid tubular for Al.Tube / single/double/quadruple conductor), connection to the next in line (if connected to overhead busbar or droppers) including PG clamps/Tee connectors etc. This will be clear from the enclosed electrical layout drawings.				
13			Equipment and tower erection would include supply and erection of miscellaneous items , viz Phase colour discs , labels painting of equipments , phase colour painting , phase marking , bay identification board , danger plates , rubber mats , device number marking on the equipment, keyboard etc as per site requirements. Supply & Mounting of phase color discs & Danger plates shall be as per IS-2551; 1982 & IS 5; 1978.				
14			Welding of Aluminium tubes ( supply of welding sleeve excluded) as per <b>Annexure-C</b> is in ETC contractor's scope and joints shall be tested by radiography & dye penetration test. Welding and Bending machines and any other equipment will be in ETC Contractor scope.				
15			Compleete ETC package is under the scope of bidder. All TNP including oil filtering machine, cranes etc. required to complete the job shall be provided by bidder only.				
16			Supervision of erection, Testing & commissioning of one no. Isolator of each type shall be done by supplier, M/s GR Power. Necessary manpower support, tools, tackles etc shall be in the scope of ETC contractor.				
17			Testing instruments (dully calibrated) have to be arranged by ETC Contractor at it's own cost ( List is only provided for information , if any other instrument not mentioned below but required for sucessful completion of ETC work shall be in ETC contractor's scope) , (However OMICRON or equivalent kit for Numerical relay testing shall be arranged by BHEL.)				
a			DCRM (OPERATIONAL ANALYZER )				
b			Contact Resistance Measurement kit (CRM)				
c			Capacitance and Tan delta measurement Kit				
d			Dew Point Measurement kit				
e			5kV/1kV Megger				
f			Primary current Injection Kit				
g			Secondary current/Voltgae Injection kit				
h			1Ph Variac				
i			Multimeters				
j			Clamp on meter				
k			Relay test kit				

**BOQ for Erection Testing & Commissioning (ETC) Works      Rev 0**

**Project : 400 kV GIS (new switchyard) & 400kV Air Insulated Switchyard Extension for Wanakbori ( already charged switchyard)**

S.No.	Voltage Class (kV)	Type	Description	Unit	400kV switchyard (AIS extn +GIS)	Unit Rate	Total	
18			Gas leak detector					
			General Tools and Tackles to be arranged by ETC Contractor on returnable basis. (based on general requirement of requirement for erection, testing and commissioning of GIS under scope): The following is the list of Items which may be extended further depending upon the site timely requirements					
a			14/16 ton Hydra with lifting tools (Shackle, slings etc) for GIS Bay & accessories shifting from store to GIS room					
b			Hand Pallet Trolley Qty-2 for GIS modules & accessories boxes shifting					
d			Power supply sockets with extension board inside GIS room Qty-2 nos.					
e			Vacuum cleaner machine for GIS room cleaning Qty-2 nos.					
g			Necessary numbers of fire extinguisher					
19			Supply items no 10,2, 33 to be supplied from approved vendors as per list enclosed					
20			Quantity of supply items may vary by -30% to +30%.					
21			Following documents are required for billing purpose 1. LR 2. Tax Invoice 3. Packing list/ Challan					
22			<b>Enclosures:</b>					
a			Mandatory spares			ANNEXURE-A		
b			Tools for GIS erection (to be supplied by GIS supplier)			ANNEXURE-B		
c			PROCEDURE FOR WELDING OF ALUMINIUM BUSES			ANNEXURE-C		
d			TECHNICAL SPECIFICATION FOR ERECTION - CABLING , GROUNDING AND LIGHTENING PROTECTION SYSTEM			K9213-EPC-SPC-001, VOL-II F/2, SECTION -IX		
e			NOTES AND DETAILS CABLING			K9213R-DWG-E-0400		
f			TECHNICAL SPECIFICATION FOR ERECTION INDOOR AND OUTDOOR ELECTRICAL EQUIPMENT			K9213R-EPC-SPC-001, VOL -II F/2, SECTION-X		
g			Single line diagram of 400kV GIS			TB-3-375-510-001		
h			Single line diagram of 400kV Switchyard EXTENSION			TB-3-375-510-001A		
i			Layout Plan and Section drawing of 400kV Switchyard Extension			TB-3-375-510-060		
j			Layout Plan and Section drawing of 400kV Switchyard for GIS			TB-0-375-316-002		
k			Equipment earthing details			TB-4-375-509-019		
l			CABLE TRENCH LAYOUT OF Control Building of 400kV Switchyard for GIS			TB-2-375-316-005		
m			Trench Layout outdoor drawing of 400kV Switchyard Extension			TB-3-375-316-065		
n			Trench Layout outdoor drawing of 400kV GIS			TB-3-375-316-065A		
o			Single line diagram of LT AC/DC DB of 400kV Switchyard Extension			TB-2-375-316-064		
p			Single line diagram of LT AC/DC DB of 400kV for GIS			TB-3-375-316-006		
q			Plot Plan			408_100_M001		
r			Technical specification for GI shield wire			TB-375-316-013		
s			Technical specification for Hardware			TB-XXX-618-002a		
t			Approved vendor list for supply items			ANNEXURE-I		

**(ANNEXURE-II)**

**TRANSMISSION BUSINESS GROUP  
(SUB- CONTRACTS MANAGEMENT)  
TBG - NOIDA**

**PRICE SCHEDULE FORMAT**

**SUB: RECEIPT OF EQUIPMENT/ MATERIAL AT SITE, UNLOADING, INSPECTION, VERIFICATION, STORAGE, UP-KEEPING DURING STORAGE, ERECTION, TESTING, COMMISSIONING AND HANDING OVER OF 400KV GIS & 400KV SUBSTATION EXTENSION AT WANAKBORI IN GUJARAT**

I/ We hereby agree to execute the above work at ----- % (in figure) -----  
Percentage (in words) Above / Below/ at Par the rates of items given in BOQ for erection testing and commissioning work (Annexure-I) of subject tender.

**NOTE:**

1. The percentage quoted shall be clearly written both in words and figures In case of discrepancy in rates in figure and words, the minimum will be taken into account by BHEL.
2. The quoted percentage will apply to the individual items unit rate uniformly.

Date:

Place

Signature of tenderer

Name & Designation of authorized person(s) with seal

### ANNEXURE-III

**SUMMARY OF PRICES FOR RECEIPT OF EQUIPMENT/ MATERIAL AT SITE, UNLOADING, INSPECTION, VERIFICATION, STORAGE, UP-KEEPING DURING STORAGE, ERECTION, TESTING, COMMISSIONING AND HANDING OVER OF 400KV GIS & 400KV SUBSTATION EXTENSION AT WANAKBORI IN GUJARAT**

<b>SI No.</b>	<b>Description</b>	<b>Amount (Rs.)</b>
1	Total amount as per the rates in BOQ for subject ETC works (Annexure-I)	189,10,701.00
2	Applicable percentage above/below/ at Par to the total amount in BOQ for subject ETC works (As indicated in Price Schedule Format, Annexure -II).	.....% above/below/ at par
3	<b>Total amount for subject ETC works after consideration of percentage above/below/ at par.</b>	