

Amendment 7**Date: 29.01.2020****NIT No.** RECTPCL/PIA/JKPDD/SS-03**Name of Works:** Design, Manufacturing, Supply, Erection, Testing & Commissioning of below mentioned Substations and bay on Turnkey Basis associated with Strengthening of Transmission System of JKPDD under PMDP Scheme-15:-

- i) 220/33 kV GIS Substation at Diskit (Nubra)
- ii) 220/33 kV GIS Substation at Padum (Zanskar)
- iii) 220kV Line Bay at PGCIL's existing GIS Substation at Phyang
- iv) 220kV Line Bay at PGCIL's existing GIS Substation at Drass

S. No.	Clause No.	Existing Clause	To be Read as
Technical Specification (Vol II) Section - 1 Project			
220/33kV Diskit GIS			
	4.1.1.1 (Clause No. 2 – vii)	Additional Clause	Three no. 1 phase (isolated) SF6 bus duct including support structure inside GIS Hall along with wall mounted SF6 to Air Bushings (245kV, 1600A, 1-phase) in delta formation and other required accessories for outdoor overhead connection with AIS equipment. The cantilever strength of the 245kV SF ₆ to air bushings shall be of minimum 8kN.
	4.1.1.1 (Clause No. 3 – ix)	Additional Clause	Three no. 1 phase (isolated) SF6 bus duct including support structure inside GIS Hall along with wall mounted SF6 to Air Bushings (245kV, 1600A, 1-phase) in delta formation and other required accessories for outdoor overhead connection with AIS equipment. The cantilever strength of the 245kV SF ₆ to

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			air bushings shall be of minimum 8kN.
4.1.1.1 (Clause No. v)	245kV Gas Insulated SF6 to Air Bushing:- 245kV, 1600A, 1-phase SF6 to air bushings for outdoor overhead connections. The cantilever strength of the 245kV SF6 to air bushings shall be of minimum 8kN.		Deleted
4.1.1.1 (Clause No. vi)	245kV Gas Insulated Bus (GIB) Ducts:- 245kV Gas Insulated Single phase / 3 Phase enclosure Bus Duct (Including support structure, gas monitoring device, gas barrier, UHF PD Sensor etc.) from GIS building (outer edge of GIS Hall Wall) to Centre line of SF6/Air Bushing along with support structure shall be as per BPS. SF6 gas duct inside GIS building are part of respective, GIS Module and deemed to be included in respective module.		Deleted
4.1.1.1 (Clause No. vi)	A tentative layout / GA drawing no. (RECTPCL/LADAKH / DIS / GA / 04) of the switchyard is enclosed with this specification for 220/33kV Diskit (GIS) Substation.		Tentative Layout/GA for proposed Diskit GIS is attached at Annexure A of this Amendment.
4.1.6 (Clause No. iii)	All civil works including foundations associated with SF6 gas insulated metal enclosed switchgear along with its ducts.		All civil works including foundations associated with SF6 gas insulated metal enclosed switchgear along with its ducts and GIS Wall mounted SF6 to Air Bushing.
4.1.6 (Clause No. iv)	Foundation for Bus duct supporting structures, GIS (Wall mounted SF6 to Air) bushing, lighting poles, panels and control cubicles of equipments wherever required.		Foundation for lighting poles, panels and control cubicles of equipments wherever required.
<u>220/33kV Padum GIS</u>			
4.2.1.1 (Clause No. b – vii)	Additional Clause		Three no. 1 phase (isolated) SF6 bus duct including support structure inside GIS Hall along with wall mounted SF6 to Air Bushings (245kV, 1600A, 1-phase) in delta formation and other required accessories for outdoor

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			overhead connection with AIS equipment. The cantilever strength of the 245kV SF6 to air bushings shall be of minimum 8kN
4.2.1.1 (Clause No. c – ix)	Additional Clause		Three no. 1 phase (isolated) SF6 bus duct including support structure inside GIS Hall along with wall mounted SF6 to Air Bushings (245kV, 1600A, 1-phase) in delta formation and other required accessories for outdoor overhead connection with AIS equipment. The cantilever strength of the 245kV SF ₆ to air bushings shall be of minimum 8kN
4.2.1.1 (Clause No. c – vii)	Additional Clause		Three no. 1 phase (isolated) SF6 bus duct including support structure inside GIS Hall along with wall mounted SF6 to Air Bushings (245kV, 1600A, 1-phase) in delta formation and other required accessories for outdoor overhead connection with AIS equipment. The cantilever strength of the 245kV SF ₆ to air bushings shall be of minimum 8kN
4.2.1.1 (Clause No. f)	245kV Gas Insulated Wall mounted SF6 to Air Bushing:- 245kV, 1600A, 1-phase SF6 to air bushings for outdoor overhead connections. The cantilever strength of the 245kV SF6 to air bushings shall be of minimum 8kN.		Deleted
4.2.1.1 (Clause No. g)	245kV Gas Insulated Bus (GIB) Ducts:- 245kV Gas Insulated Single phase / 3 Phase enclosure Bus Duct (Including support structure, gas monitoring device, gas barrier, UHF PD Sensor etc.) from GIS building (outer edge of GIS Hall Wall) to Centre line of SF6/Air Bushing along with support structure shall be as per BPS. SF6 gas duct inside GIS building are part of respective GIS Module and		Deleted

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		deemed to be included in respective module.	
4.2.1.1 (Clause No. g)		A tentative layout / GA drawing no. (RECTPCL/LADAKH / PAD / GA / 04) of the switchyard is enclosed with this specification for 220/33kV Padum (GIS) Substation.	Tentative Layout/GA for proposed Padum GIS is attached at Annexure B of this Amendment.
4.2.3 (Clause No. v)		Lattice structures (galvanized): LM for 220/33 kV S/s, 220kV & 36kV Outdoor Take off Gantry/structure, 220 and 36 kV Equipment support structures. Support structures for H.T Power Cable, Support structure for GIS equipment its ducts and wall mounted SF6 to Air bushing in Delta formation shall be supplied by the GIS manufacturers / Contractor.	Lattice structures (galvanized): LM for 220/33 kV S/s, 220kV & 36kV Outdoor Take off Gantry/structure, 220 and 36 kV Equipment support structures.
4.2.6 (Clause No. a – iv)		Foundation for Bus duct supporting structures, GIS (SF6 to Air) bushing, lighting poles, panels and control cubicles of equipment wherever required.	Foundation for lighting poles, panels and control cubicles of equipment wherever required.
<u>Line Bay Extension at Phyang GIS</u>			
4.3.1.1 (Clause No. a)		Three/Single isolated phase, 2500A, 40kA for 1 second, SF6 gas-insulated metal enclosed bus bar of 245kV for One line bay , each set comprising of the following:-	Three, Single isolated phase, 2500A, 40kA for 1 second, SF ₆ gas-insulated metal enclosed bus bar of 245kV for One line bay , each set comprising of the following:-
4.3.1.1 (Clause No. a – ii)		End Piece module with the test link for Future extension of Bus bar module. The end piece module may be designed in such a way so that future GIS module may be tested without extending voltage to existing bus by removing the test link. In case, 245kV Main Bus bar is offered with 3-ph enclosure, extension piece module shall include Adapter module to convert it to three individual 1-ph bus bar enclosures and same shall be deemed to be included in 245kV Bus Bar module.	End Piece module with the test link for Future extension of Bus bar module. The end piece module may be designed in such a way so that future GIS module may be tested without extending voltage to existing bus by removing the test link.
4.3.1.1 (Clause No. b – ix)		Additional Clause	Three no. 1 phase (isolated) SF6 bus duct including support structure inside GIS Hall

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			along with wall mounted SF6 to Air Bushings (245kV, 1600A, 1-phase) in delta formation and other required accessories for outdoor overhead connection with AIS equipment. The cantilever strength of the 245kV SF6 to air bushings shall be of minimum 8kN.
4.3.1.1 (Clause No. c)	245kV Gas Insulated Wall mounted SF6 to Air Bushing:- 245kV, 1600A, 1-phase Wall mounted SF6 to air bushings in Delta Formation for outdoor overhead connections. The cantilever strength of the 245kV SF6 to air bushings shall be of minimum 8kN.		Deleted
4.3.1.1 (Clause No. d)	245kV Gas Insulated Bus (GIB) Ducts:- 245kV Gas Insulated Single phase Bus Duct (Including support structure, gas monitoring device, gas barrier, UHF PD Sensor etc.) from GIS bay to Centre line of Wall mounted SF6/Air Bushing in Delta Formation along with support structure inside the hall shall be deemed to be included in Line bay module.		Deleted
4.3.2 (Clause No. f)	Lattice structures (galvanized): 220kV Outdoor Take off Gantry/structure, 220 kV Equipment support structures. Support structure for GIS equipment its ducts and wall mounted SF6 to Air bushing in Delta formation shall be supplied by the GIS manufacturers / Contractor.		Lattice structures (galvanized): 220kV Outdoor Take off Gantry/structure, 220 kV Equipment support structures.
4.3.4 (Clause No. a - ii)	Foundation for Bus duct supporting structures, GIS (SF6 to Air) bushing, panels and control cubicles of equipment wherever required.		Foundation for panels and control cubicles of equipment wherever required.
<u>Line Bay Extension at Drass GIS</u>			
4.4.1.1 (Clause No. a)	Three/Single isolated phase, 2500A, 40kA for 1 second, SF6 gas-insulated metal enclosed bus bar of 245kV for One line bay , each set comprising of the		Three, Single isolated phase, 2500A, 40kA for 1 second, SF ₆ gas-insulated metal enclosed bus bar of 245kV for One line bay , each set

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		following:-	comprising of the following:-
	4.4.1.1 (Clause No. a - ii)	End Piece module with the test link for Future extension of Bus bar module. The end piece module may be designed in such a way so that future GIS module may be tested without extending voltage to existing bus by removing the test link. In case, 245kV Main Bus bar is offered with 3-ph enclosure, extension piece module shall include Adapter module to convert it to three individual 1-ph bus bar enclosures and same shall be deemed to be included in 245kV Bus Bar module.	End Piece module with the test link for Future extension of Bus bar module. The end piece module may be designed in such a way so that future GIS module may be tested without extending voltage to existing bus by removing the test link.
	4.4.1.1 (Clause No. b - ix)	Additional Clause	Three no. 1 phase (isolated) SF6 bus duct including support structure inside GIS Hall along with wall mounted SF6 to Air Bushings (245kV, 1600A, 1-phase) in delta formation and other required accessories for outdoor overhead connection with AIS equipment. The cantilever strength of the 245kV SF6 to air bushings shall be of minimum 8kN.
	12.11	The duct connections should be such that it is possible to remove transformer for repair and maintenance conveniently	The connections should be such that it is possible to remove transformer for repair and maintenance conveniently
	12.12	The price of Bus-duct inside the GIS hall shall be integral part of the respective bay module and it will not be paid separately. However, the payment of bus-duct for outside the GIS hall along with support structure shall be paid as per running meters in line with provision of Bid Price schedule. Therefore, bidder is required to quote for 220kV GIB (SF6 Gas insulated Bus Duct) of Transformer, feeder module required outside GIS hall with support structure and SF6/Air bushing for interconnecting with its respective gantry / equipment (Overhead	The price of Bus-duct inside the GIS hall shall be integral part of the respective bay module and it will not be paid separately.

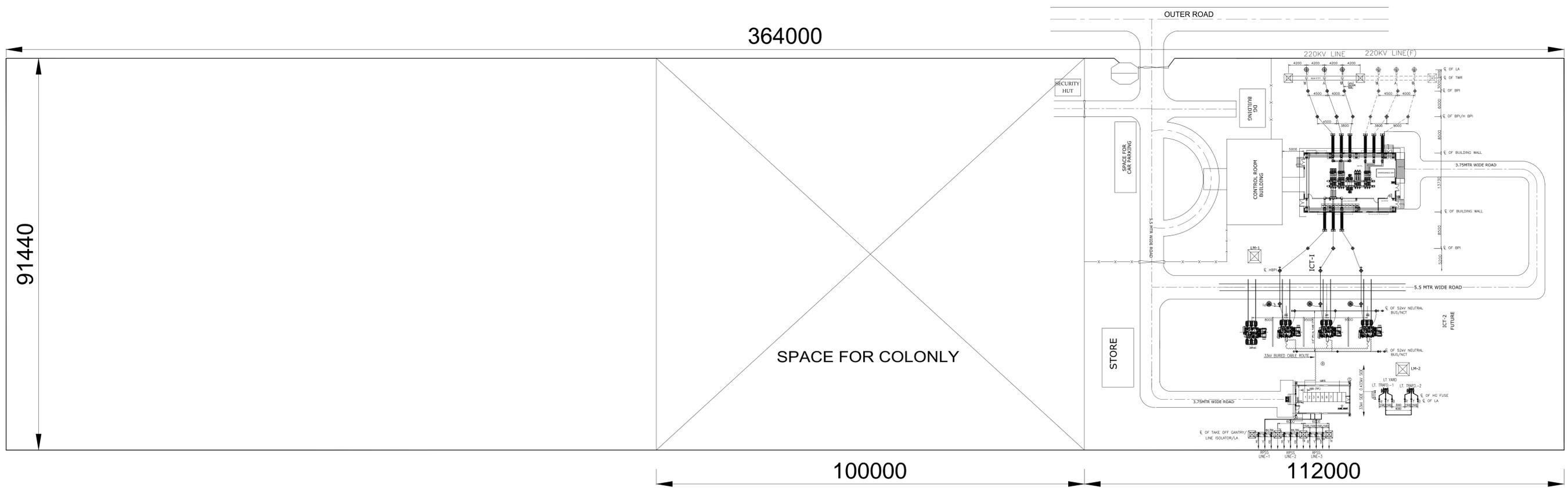
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		connection) separately as per provision of Bid price schedule.			
	Technical Specification VOL-II, SEC-XIII (DG SET) Clause No. 1.4.9.3.1	The tank shall be of MS Construction, horizontal; cylindrical in shape as per IS-10987 for underground installation and shall have (i) Inlet and Outlet connections (ii) Vent Pipes (iii) Dip pipe assembly with calibration chart (iv) Manhole with cover (v) Lifting lugs & (vi) Providing Anti corrosive treatment inside the tank. External Painting shall be provided with Anticorrosive paint protection as per manufacturer specifications/details. The scope shall also include associated Civil works and sand filing for underground tank.			The tank along with piping, joineries shall be of SS (Stainless Steel) Construction (suitable for extreme cold climatic conditions i.e. minus 30 Deg. C) , horizontal; cylindrical in shape as per IS-10987 for underground installation and shall have (i) Inlet and Outlet connections (ii) Vent Pipes (iii) Dip pipe assembly with calibration chart (iv) Manhole with cover (v) Lifting lugs & (vi) Providing Anti corrosive treatment inside the tank. External Painting shall be provided with Anticorrosive paint protection as per manufacturer specifications/details. The scope shall also include associated Civil works and sand filing for underground tank.
	Vol II, Section I (Annexure III)	Meteorological Data			Revised Meteorological Data is attached at Annexure C of this Amendment.
	Vol I, Section IX (Sample Forms & Procedures)	Integrity Pact			Revised Integrity pact is attached at Annexure D of this Amendment.
	Technical Specifications, Vol II, Section 16, Part 1 (Civil Works)	Civil Works			Revised Specifications is attached at Annexure E of this Amendment.
	Technical Specifications, Vol II, Section 16, Part 2 (Civil Works – Residential Staff Quarters)	Civil Works – Residential Staff Quarters			Revised Specifications is attached at Annexure F of this Amendment.
	Vol III	Price Schedule			Revised Price Schedule is attached herewith at Annexure G of this Amendment.
	Vol II, Section I (Annexure II)	Sr. No.	Title of Drawing	Drawing No.	Revised Gas SLD is attached herewith at Annexure H of this Amendment.
			GA for	RECTPCL/LADAKH/GSLD/13	

		Double Bus Bar Arrangement		
	<p>Technical Specification Vol-II, Sec-XIX (Transformer up to 400 KV Class) Clause No.: 3.13.2</p>	<p>For 220 kV Class Transformer:</p> <p>Bidder / Manufacturer should have successfully carried out Dynamic Short Circuit Test on any rating of 220 kV or above voltage class transformer as on the originally scheduled date of bid opening and shall enclose the relevant Test Report / Certificate along with bid. In case bidder has not successfully tested 220 kV or above voltage class transformer for Dynamic Short Circuit Test, their bid shall be considered technically non-responsive. Further design review of offered 220 kV class transformers shall be carried out based on design of short circuit tested 220 kV or above voltage class transformer.</p>		<p>For 220 kV Class Transformer:</p> <p>If the Bidder/Manufacturer has not carried out Dynamic Short Circuit Test on same design* of Transformers which are required to be supplied to the Project, it will be mandatory for the successful Bidder/Manufacturer to conduct the Dynamic Short Circuit Test on one unit from CPRI/Any Govt. NABL accredited Laboratory/CESI Italy or KEMA-Netherlands. The Test shall be conducted without any price implication to RECTPCL.</p> <p>The Dynamic Short Circuit Test shall be witnessed by authorized representative of Employer and/or Owner.</p> <p>*Same Design: Same voltage class i.e. both HV & LV, %impedance, capacity, Single Phase</p>

LIST OF ANNEXURES TO AMENDMENT – 7 Dt. 29.01.2020

Sr. No.	Annexure Ref. No.	Tender Clause No.	Description
1.	Annexure A	Technical Specification (Vol II) Section – 1 Project : Clause No. 4.1.1.1 (vi)	Revised Tentative Layout/GA for proposed Diskit GIS
2.	Annexure B	Technical Specification (Vol II) Section – 1 Project : Clause No. 4.2.1.1 (g)	Revised Tentative Layout/GA for proposed Diskit GIS
3.	Annexure C	Technical Specification (Vol II) Section – 1 Project : Annexure III (Metrological Data)	Revised Metrological Data
4.	Annexure D	Vol I, Section IX (Sample Forms & Procedures) : Integrity pact	Revised Integrity pact
5.	Annexure E	Technical Specifications, Vol II, Section 16, Part 1 (Civil Works)	Revised Technical Specifications for Substation Civil Works
6.	Annexure F	Technical Specifications, Vol II, Section 16, Part 2 (Civil Works – Residential Staff Quarters)	Revised Technical Specifications for Residential Staff Quarters
7.	Annexure G	Technical Specification (Vol II) Section – 1 Project : Annexure II	RECTPCL/LADAKH/GSLD/13 (Revised GAS SLD)
8.	Annexure H	Volume III : Price Schedule	Revised Price Schedule



LEGEND:-

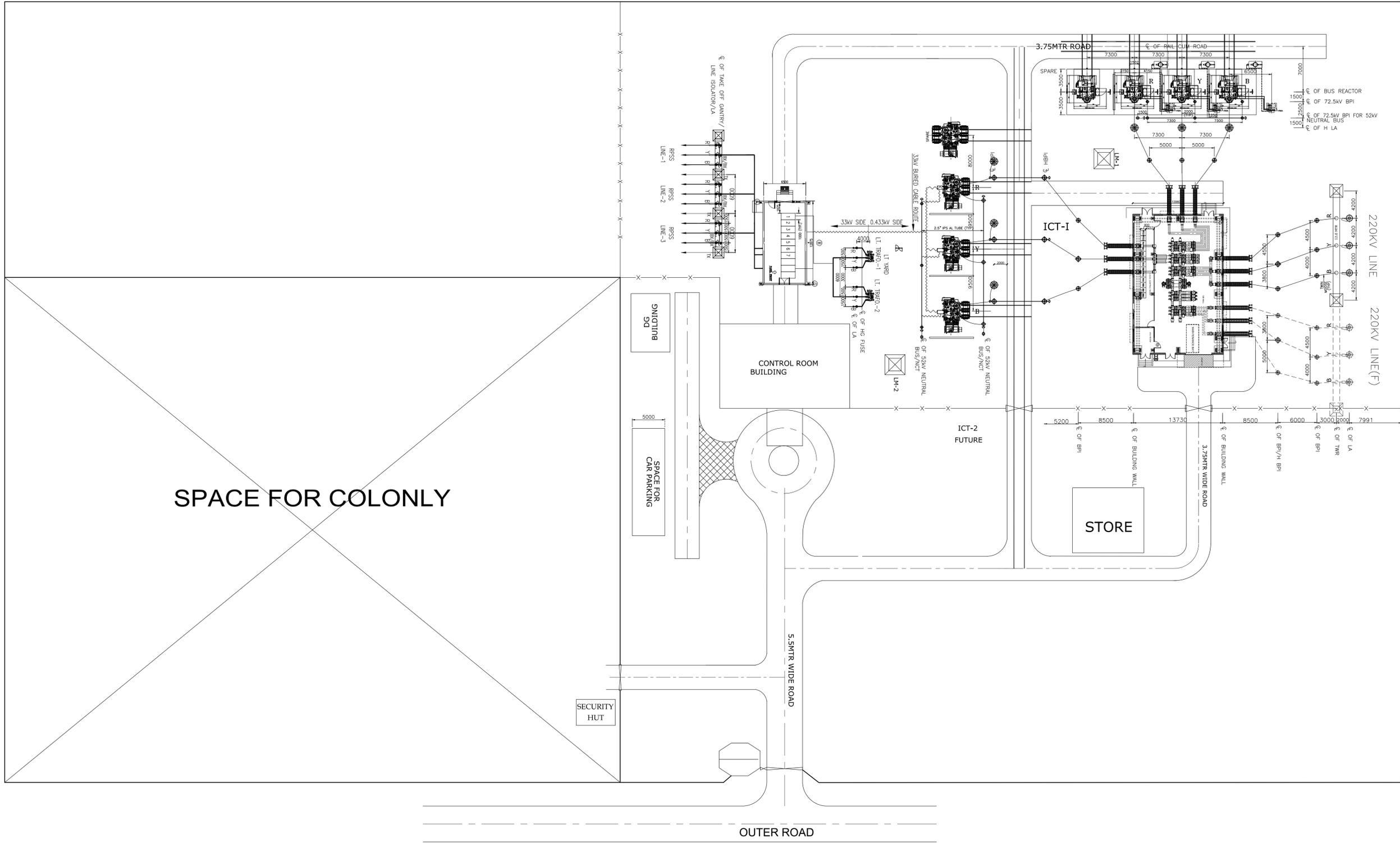
—————	PRESENT SCOPE
- - - - -	FUTURE
- x - x - x - x - x - x -	FENCE

NOTES:-

1. ALL DIMENSIONS ARE IN MM OTHERWISE SPECIFIED.

(FOR TENDER PURPOSE ONLY)

	REC TRANSMISSION PROJECTS COMPANY LIMITED
PROJECT	OGA OF 220/33kV DISKIT SUBSTATION
SUBSTATION	220/33kV GIS DISKIT SUBSTATION
DRG. TITLE	TYPICAL LAYOUT PLAN 220/33kV DISKIT S/S
DRG. NO.:	
SCALE:	



SPACE FOR COLONY

NOTES:-

1. ALL DIMENSIONS ARE IN MM OTHERWISE SPECIFIED.

LEGEND:-

—————	PRESENT SCOPE
- - - - -	FUTURE
-X-X-X-	FENCE

(FOR TENDER PURPOSE ONLY)

	REC TRANSMISSION PROJECTS COMPANY LIMITED
PROJECT	OGA OF 220/33KV PADUM SUBSTATION
SUBSTATION	220/33KV GIS PADUM SUBSTATION
DRG. TITLE	TYPICAL LAYOUT PLAN 220/33KV PADUM S/S
DRG. NO.:	
SCALE:	

METEROLOGICAL DATA**(Annexure-1)**

S.No.	Description	Diskit	Padum	Leh Phyang	Drass
i).	a) Max. ambient air temperature (°C)	26.9	21	34.8	33.9
	b) Max. daily average ambient temperature(°C)	19.9	15.4	12.8	8.6
ii)	Minimum ambient air temperature (°C)	-28	-28	-28.3	-45
iii)	Average day temperature (°C)	7.1	4.3	6.32	1.4
iv)	Altitude (above M.S.L.) (mtrs)	3101	3557	3514	3066
v)	Altitude Correction Factor	1.294	1.36	1.36	1.29
vi)	Rainy days in a year (days)	51	49	13	55
vii)	Relative humidity – Maximum	77%	84%	51%	81%
viii)	Relative humidity – Minimum	30%	29%	26%	61%
ix)	Annual Rainfall (maximum) (mm)	109	366	231.	1273
x)	Average no. of thunderstorm days per year	8	6	5.0	4
xi)	Terrain	Hilly	Hilly	Hilly	Hilly
xii)	Climate	Cold Desert	Cold Desert	Cold Desert	Extreme Cold
xiii)	Amount of snow fall (mm)	170	450	50	5230
xiv)	Wind Pressure				
(a)	Average no of days with wind speed (kmph) in a year				
1.	62 or more	0	0	0	0
2.	20-61	3	9	9	0
3.	1-19	320	310	145	13
4.	0	42	45	211	352

PRE-CONTRACT INTEGRITY PACT

General

This pre-bid contract Agreement (hereinafter called the Integrity Pact) is made on _____ day of the month of __ 20____, between, on one hand, the CEO of REC Transmission Projects Company Limited through Shri. _____ Designation of the officer, Ministry, Department, Government of India (hereinafter called the "BUYER", which expression shall mean and include, unless the context otherwise requires, his successors in the office and assigns) of the First Part and M/s. _____ represented by Shri _____, Authorized Signatory (hereinafter called the "BIDDER/Seller" which expression shall mean and include, unless the context otherwise requires, his successors and permitted assigns) of the Second Part.

WHEREAS the BUYER proposes to procure _____ (Name of the stores/equipment/items) and the BIDDER/Seller is willing to offer/has offered the stores and

WHEREAS the BIDDER is a private company/ public company/Government undertaking / partnership / registered export agency, constituted in accordance with the relevant law in the matter and the BUYER is a Ministry/Department of the Government of Indian/PSU performing its functions on behalf of the President of India.

NOW, THEREFORE,

To avoid all forms of corruption by following a system that is fair, transparent and free from any influence/prejudiced dealings prior to, during and subsequent to the currency of the contract to be entered into with a view to:-

Enabling the BUYER to obtain the desired stores/equipment at a competitive price in conformity with the defined specifications by avoiding the high cost and the distortionary impact of corruption on public procurement, and

Enabling BIDDER to abstain from bribing or indulging in any corrupt practice in order to secure the contract by providing assurance to them that their competitors will also abstain from bribing and other practices and the BUYER will commit to prevent corruption, in any form, by its officials by following transparent procedures.

The parties hereto hereby agree to enter into this Integrity Pact and agree as follows:

Commitments of the Buyer

1.1 The Buyer undertakes that no official of the BUYER, connected directly or indirectly with the contract, will demand, take a promise for or accept, directly or through intermediaries, any bribe, consideration, gift, reward, favour or any material or immaterial benefit or any other advantage from the BIDDER, either for themselves or for any person, organization or third party related to the contract in exchange for an advantage in the bidding process, bid evaluation, contracting or implementation process related to the Contract.

1.2 The Buyer will, during the pre-contract stage, treat all Bidders alike, and will provide to all Bidders the same information and will not provide any such information to any particular

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BIDDER which could afford an advantage to that particular BIDDER in comparison to other BIDDERS.

- 1.3 All the officials of the Buyer will report to the appropriate Govt. Office for any attempted or completed breaches of the above commitments as well as any substantial suspicion of such a breach.
2. In case of any such preceding misconduct on the part of such official(s) is reported by the BIDDER to the BUYER with full and verifiable facts and the same is *prima facie* found to be correct by the Buyer, necessary disciplinary proceedings, or any other action as deemed fit, including criminal proceedings may be initiated by the BUYER and such a person shall be debarred from further dealings related to the contract process. In such a case while an enquiry is being conducted by the Buyer the proceedings under the contract would not be stalled.

Commitments of Bidders

3. The BIDDER commits itself to take all measures necessary to prevent corrupt practices, unfair means and illegal activities during any stage of its bid or during any pre contract or post-contract stage in order to secure the contract or in furtherance to secure it and in particular commits itself to the following:-
 - 3.1 The will not offer, directly or through intermediaries, any bribe, gift, consideration, reward, favour, any material or immaterial benefit or other advantage, commission, fees, brokerage or inducement to any official of the Buyer, connected directly or indirectly with the bidding process, or to any person, organization or third party related to the contract in exchange for any advantage in the bidding, evaluation, contracting and implementation of the Contract.
 - 3.2 The BIDDER further undertakes that it has not given, offered or promised to give, directly or indirectly any bribe, gift, consideration, reward, favour, any material or immaterial benefit or other advantage, commission, fees, brokerage or inducement to any official of the Buyer or otherwise in procuring the Contract or for bearing to do or having done any act in relation to the obtaining or execution of the Contract or any other Contract with the Govt for showing or for bearing to show favour or dis-favour to any person in relation to the Contract or any other Contract with the Govt..
 - 3.3 The BIDDERS shall disclose the name and address of agents and representatives and Indian BIDDERS shall disclose their foreign principals or associates.
 - 3.4 The BIDDERS shall disclose the payments to be made by them to agents/brokers or any other intermediary, in connection with this bid/contract.
 - 3.5 The BIDDER further confirms and declares to the BUYER that the BIDDER is the original manufacturer/integrator/authorized govt. sponsored export entity of the defense stores and has not engaged any individual or firm or company whether Indian or foreign to intercede, facilitate or in any way to recommend to the BUYER or any of its functionaries, whether

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officially or unofficially to the award of the contract to the BIDDER, nor has any amount been paid, promised or intended to be paid to any such individual, firm or company in respect of any such intercession, facilitation or recommendation.

- 3.6 The Bidder, either while presenting the bid or during pre-contract negotiations or before signing the contract, shall disclose any payments he has made, is committed to or intends to make to officials of the Buyer or their family members, agents, brokers or any other intermediaries in connection with the contract and the details of services agreed upon for such payments.
- 3.7 The BIDDER will not collude with other parties interested in the contract to impair the transparency, fairness and progress of the bidding process, bid evaluation, contracting and implementation of the contract.
- 3.8 The BIDDER will not accept any advantage in exchange for any corrupt practice, unfair means and illegal activities.
- 3.9 The BIDDER shall not use improperly, for purposes of competition or personal gain, or pass on to others, any information provided by the BUYER as part of the business relationship, regarding plans, technical proposals and business details, including information contained in any electronic data carrier. The BIDDER also undertakes to exercise due and adequate care lest any such information is divulged.
- 3.10 The BIDDER commits to refrain from giving any complaint directly or through any other manner without supporting it with full and verifiable facts.
- 3.11 The BIDDER shall not instigate or cause to instigate any third person to commit any of the actions mentioned above.
- 3.12 The BIDDER shall not lend to or borrow any money from or enter into any monetary dealings or transactions, directly or indirectly, with any employee of the BUYER.

4. Previous Transgression

- 4.1 The BIDDER declares that no previous transgression occurred in the last three years immediately before signing of this Integrity Pact, with any other company in any country in respect of any corrupt practices envisaged hereunder or with any Public Sector Enterprise in India or any Government Department in India that could justify BIDDER exclusion from the tender process.
- 4.2 The BIDDER agrees that if it makes incorrect statement on this subject, BIDDER can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason.

5. Earnest Money (Security Deposit)

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5.1 While submitting commercial bid, the BIDDER deposit an amount _____ (to be specified in the RFP (Request for Proposal) as Earnest Money/Security Deposit, with the BUYER through any of the following instruments :-

- (i) Bank Draft or a Pay Order in favour of _____
- (ii) A confirmed guarantee by an Indian Nationalized Bank, promising payment of the guaranteed sum to the BUYER, on demand within three working days without any demur whatsoever and without seeking any reasons whatsoever. The demand for payment by the BUYER shall be treated as conclusive proof of payment.
- (iii) Any other mode or through any other instrument (to be specified in RFP).

5.2 The Earnest Money/Security Deposit shall be valid & retained by the buyer for such period as specified in the RFP/GTC.

5.3 In the case of successful BIDDER, a clause would also be incorporated in the Article pertaining to Performance Bond in the Purchase Contract that the provisions of Sanctions for Violation shall be applicable for forfeiture of Performance Bond in case of a decision by the BUYER to forfeit the same without assigning any reason for imposing sanction for violation of this pact.

5.4 No interest shall be payable by the BUYER to the BIDDER/SELLER on Earnest Money/Security Deposit for the period of its currency.

6. **Sanctions for Violation**

6.1 Any breach of the aforesaid provisions by the BIDDER or any one employed by it or acting on its behalf (whether with or without the knowledge of the BIDDER/SELLER) shall entitle the BUYER to take all or anyone of the following actions, wherever required:-

- (i) To immediately call off the pre-contract negotiations without assigning any reason or giving any compensation to the BIDDER. However, the proceedings with the other BIDDER(s) would continue.
- (ii) The Earnest Money Deposit (in pre-contract stage) and/or Security Deposit /Performance Bond (after the contract is signed) shall stand forfeited either fully or partially, as decided by the BUYER and the BUYER shall not be required to assign any reason therefore.
- (iii) To immediately cancel the contract, if already signed, without giving any compensation to the BIDDER.
- (iv) To recover all sums already paid by the BUYER, and in case of an Indian BIDDER with interest thereon at 2% higher than the prevailing Prime Lending Rate of State Bank of India, while in case of a BIDDER from a country other than India with interest thereon at 2% higher than the LIBOR. If any outstanding payment is due to the BIDDER from the BUYER in connection with any other contract for any other stores, such outstanding payment could also be utilized to recover the aforesaid sum and interest.

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- (v) To encash the advance bank guarantee and performance bond/warranty bond, if furnished by the BIDDER, in order to recover the payments, already made by the BUYER, along with interest.
- (vi) To cancel all or any other Contracts with the BIDDER. The BIDDER shall be liable to pay compensation for any loss or damage to the BUYER resulting from such cancellation/rescission and the BUYER/principal shall be entitled to deduct the amount so payable from the money(s) due the BIDDER
- (vii) To debar the BIDDER from participating in future bidding processes of the Government of India BUYER/Principal for a minimum period of five years, which may be further extended at the discretion of the BUYER.
- (viii) To recover all sums paid in violation of this Pact by BIDDER to any middleman or agent or broker with a view to securing the contract.
- (ix) In cases where irrevocable Letters of Credit have been received in respect of any contract signed by the BUYER with the BIDDER, the same shall not be opened.
- (x) Forfeiture of Performance Bond in case a decision by the BUYER to forfeit the same without assigning any reason for imposing sanction for violation of this Pact.

6.2 The BUYER will be entitled to take all or any of the actions mentioned at para 6.1 (i) to (x) of this Pact also on the Commission by the BIDDER or anyone employed by it or acting on its behalf (whether with or without the knowledge of the BIDDER), of an offence as defined in Chapter IX of the Indian Penal code, 1860 or Prevention of Corruption Act, 1988 or any other statute enacted for prevention of corruption.

6.3 The decision of the BUYER to the effect that a breach of the provisions of this Pact has been committed by the BIDDER shall be final and conclusive on the BIDDER. However, the BIDDER can approach the Independent monitor(s) appointed for the purposes of this Pact.

7. **Independent Monitors**

7.1 The BUYER has appointed Independent Monitors (hereinafter referred to as Monitors) for this Pact in consultation with the Central Vigilance Commission .

Shri P. V. Rao, IRS
Ex-Chief Commissioner of Income
Tax,
The IEMs' Secretariat,
Procurement and Contract
Management (PCM) Division,
REC LIMITED (Formerly Rural
Electrification Corporation Limited),
Core-IV, SCOPE Complex, 7-Lodhi
Road,
New Delhi- 110003
Email:
pasupuletirao[at]yahoo[dot]co[dot]in

Annexure D to Amendment 7

- 7.2 The task of the Monitors shall be to review independently and objectively, whether and to what extent the parties comply with the obligations under this Pact.
- 7.3 The Monitors shall not be subject to instructions by the representatives of the parties and perform their functions neutrally and independently.
- 7.4 Both the parties accept that the Monitors have the right to access all the documents relating to the project/procurement, including minutes of meetings.
- 7.5 As soon as the Monitors notice, or has reason to believe, a violation of this Pact, he will so inform the authority designated by the BUYER.
- 7.6 The BIDDER(s) accepts that the Monitors has the right to access without restriction to all Project documentation of the BUYER including that provided by the BIDDER. The BIDDER will also grant the Monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his project documentation. The same is applicable to Subcontractors. The Monitor shall be under contractual obligation to treat the information and documents of the BIDDER/Subcontractor(s) with the confidentiality.
- 7.7 The BUYER will provide to the Monitor sufficient information about all meetings among the parties related to the Project provided such meetings could have an impact on the contractual relations between the parties. The parties will offer to the Monitor the option to participate in such meetings.
- 7.8 The Monitors will submit a written report to the Designated Authority of the BUYER/Secretary in the Department/within 8 to 10 weeks from the date of reference or intimation to him by the BUYER / BIDDER and, should the occasion arise, submit proposals for correcting problematic situations.

8. **Facilitation of Investigation**

In case of any allegation of violation of any provisions of this Pact or payment of commission, the BUYER or its agencies shall be entitled to examine all the documents including the Books of Accounts of the BIDDER and the BIDDER shall provide necessary information and documents in English and shall extend all possible help for the purpose of such examination.

9. **Law and Place of Jurisdiction**

This Pact is subject to Indian Law. The place of performance and jurisdiction is the seat of the BUYER.

10. **Other Legal Actions**

The actions stipulated in this Integrity Pact are without prejudice to any other legal action that may follow in accordance with the provisions of the any extent law in force relating to any civil or criminal proceedings.

11. **Validity**

Annexure D to Amendment 7

11.1 The validity of this Integrity Pact shall be from date of its signing and extend up to 5 years or the complete execution of the contract to the satisfaction of both the BUYER and the BIDDER/SELLER, including warranty period, whichever is later. In case BIDDER/SELLER is unsuccessful, this Integrity Pact shall expire after six months from the date of the Signing of the contract.

11.2 Should one or several provisions of this Pact turn out to be invalid, the remainder of this Pact remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

12. The Parties hereby sign this Integrity Pact at ____ on ____

BUYER

BIDDER

Name of the Officer
Designation
/Dept/Ministry/PSU

Name of the Officer
Authorized Signatory

Witness

Witness

1. _____

1. _____

2. _____

2. _____

- Provision of these clauses would need to be amended/deleted in line with the policy of the BUYER in regard to involvement of Indian Agents of foreign Supplies.

TECHNICAL SPECIFICATION
VOL-II, SEC-16
PART-1
CIVIL Works

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SECTION-XVI CIVIL WORKS

1.0 GENERAL

The intent of specification covers the following:

Design, engineering, drawing and construction of all civil works at sub-station. All civil works shall also satisfy the general technical requirements specified in other Sections of Specification and as detailed below. They shall be designed to the required service conditions/loads as specified elsewhere in this Specification or implied as per relevant Indian standard codes (I S Codes)/ equivalent International Standards.

All civil works shall be carried out as per applicable Standards and Codes. All materials shall be of best quality conforming to relevant national/International Standards and Codes. In case of any conflict between Standards/ Code and Technical Specification, the order of precedence shall be as under:

- 1.0.1 Technical specification,
- 1.0.2 BIS codes
- 1.0.3 CPWD specification.

The decision of engineer in charge in this regard shall be final and binding.

The Contractor shall furnish all design, drawings, labour, tools, equipment, materials, temporary works, constructional plant and machinery, fuel supply, transportation and all other incidental items not shown or specified but as may be required for complete performance of the Works in accordance with approved drawings, specifications and direction of Employer.

The work shall be carried out according to the design/drawings to be developed by the Contractor and approved by the Employer. For all buildings, structures, foundations etc. necessary layout and details shall be developed by the Contractor keeping in view the functional requirement of the substation facilities and providing enough space and access for operation, use and maintenance. Certain minimum requirements are indicated in this specification for guidance purposes only. However, the Contractor shall quote according to the complete requirements.

2.0 GEOTECHNICAL INVESTIGATION

The Contractor shall perform a detailed soil investigation to arrive at sufficiently accurate, general as well as specific information about the soil profile and the necessary soil parameters of the Site in order that the foundation of the various structures can be designed and constructed safely and rationally.

A detailed soil report including field data duly certified by site engineers of Employer will be submitted by the Contractor for specific approval of Employer. The report shall contain all soil parameters along with recommendation of soil consultant for type of foundation i.e. pile or open type, soil treatment if any etc. to be used for the design of civil foundations.

The Contractor may visit the site to ascertain the soil parameters. Any variation in soil data shall not constitute a valid reason for any additional cost & shall not affect the terms & conditions of the

contract. Field tests must be conducted covering entire substation area including all the critical locations i.e. Control Room and GIS Building, Lightning Mast. Towers, transformer/Reactor etc.

2.1 SCOPE OF WORK

This specification covers all the work required for detailed soil investigation and preparation of a detailed report. The work shall include mobilisation of necessary equipment, providing necessary engineering supervision and technical personnel, skilled and unskilled labour etc. as required to carry out field investigation as well as, laboratory investigation, analysis and interpretation of data and results, preparation of detailed Geo-technical report including specific recommendations for the type of foundations and the allowable safe bearing capacity for different sizes of foundations at different founding strata for the various structures of the substation. The Contractor shall make his own arrangement for locating the co-ordinates and various test positions in field as per the information supplied to him and also for determining the reduced level of these locations with respect to the benchmark indicated by the Employer.

All the work shall be carried out as per latest edition of the corresponding relevant Indian standard codes (I S Codes)/ equivalent International Standards. The Agency carrying out the soil investigation work must have the experience of carrying out soil investigation successfully in the relevant field. /RECTPCL/PDD, J&K shall assess the capability of the agency for soil investigation before commencement of soil investigation work.

2.1.1 Bore Holes

Bore holes of Minimum 150 mm diameter in accordance with the provisions of relevant international standards/Indian standards(IS) at the rate of minimum one number bore hole per hectare up to 25 meter depth(Minimum) or to refusal which ever occur earlier shall be drilled for new areas (220 kV Yards and 220/132/33 kV yards wherever applicable). In any case number of boreholes shall not be less than five. By refusal it shall mean that a standard penetration blow count (N) of 100 is recorded for 30 cm penetration. Number of boreholes may be increased in case soil strata are varying from borehole to borehole in order to have fair idea of soil profile. In case of deep pile foundations soil investigation is to be carried out up to 30 m depth from ground level or refusal whichever is earlier. In case rock is encountered, coring in all the boreholes shall be carried out up to 3 meter in rock.

Performing Standard Penetration Tests at approximately 0.5 m interval in the borehole starting from 0.5 m below ground level onwards and at every change of stratum. The disturbed samples from the standard penetrometer shall also be collected for necessary tests. Standard Penetration Test shall be performed as per relevant Indian standard codes (I S Codes)/ equivalent International Standards.

Undisturbed samples shall be collected in accordance with the recommendation of relevant Indian standard codes (I S Codes)/ equivalent International Standards. Or an alternative recognize method as agreed by Employer. Undisturbed samples shall be taken in cohesive material or weak cemented granular material where ever possible at 1.0 m interval or at each change in stratum.

The depth of Water Table, if encountered, shall be recorded in each borehole. In case the soil investigation is carried out in winter/summer, the water table for rainy season shall be collected from reliable sources and recorded in the report.

All samples, both disturbed and undisturbed, shall be identified properly with the borehole number and depth from which they have been taken.

The sample shall be sealed at both ends of the sampling tubes with wax immediately after the sampling and shall be packed properly and transported to the Contractor's laboratory without any damage or loss.

The logging of the boreholes shall be compiled immediately after the boring is completed and a copy of the bore log shall be handed over to the Executive Engineer-in-charge.

2.1.2 Trial Pits

Trial pits shall be carried out at minimum one location per hectare as directed by the Employer. In case hard rock is encountered in trial pit, test need not be carried out. Total area of substation plot (including of Switchyard, Township and Future area) shall be considered for arriving at number of Trial Pit to be excavated. Minimum number of trial pits shall be five and maximum number shall be ten. The trial pits shall be 2 m x 2 m in size extending to 4 m depths, or as specified by the Employer. Undisturbed samples shall be taken from the trial pits as per the direction of the Employer.

2.1.3 Electrical Resistivity Test

This test shall be conducted to determine the Electrical resistivity of soil required for designing safety-grounding system for the entire station area. The specifications for the equipment's and other accessories required for performing electrical resistivity test, the test procedure, and reporting of field observations shall confirm to relevant Indian standard codes (I S: 3043)/ equivalent International Standards. The test shall be conducted using Wagner's four electrode method as specified in relevant Indian standard codes (IS: 1892)/ equivalent International Standards. Unless otherwise specified at each test location, the test shall be conducted along two perpendicular lines parallel to the coordinate axis. On each line a minimum of 8 to 10 readings shall be taken by changing the spacing of the electrodes from an initial small value of 0.2 m up to a distance of 50.0 m.

2.1.4 Plate load test

Two number of Plate load tests shall be conducted each at the location of control room / GIS building and Substation area as applicable only to determine the bearing capacity, modulus of sub grade reaction and load/settlement characteristics of soil at shallow depths by loading a plane and level steel plate kept at the desired depth and measuring the settlement under different loads, until a desired settlement takes place or failure occurs. The specification for the equipment and accessories required for conducting the test, the test procedure, field observations and reporting of results shall conform to relevant IS:1888. Plate load test shall be performed at the proposed foundation depth below finished ground level for bearing capacity.

Undisturbed tube samples shall also be collected from the pit at 0.5 m depth and bottom of pit from natural ground level for carrying out laboratory tests.

The size of the pit in plate load test shall not be less than five times the plate size and shall be taken up to the specified depth. All provisions regarding excavation and visual examination of pit shall apply here.

Unless otherwise specified the reaction method of loading shall be adopted. Settlement shall be recorded from dial gauges placed at four diametrically opposite ends of the test plate.

The load shall be increased in stages. Under each loading stage, record of Time vs. Settlement shall be kept as specified in relevant Indian standard codes (I S: 1888)/ equivalent International Standards. Backfilling of the pit shall be carried out as per the directions of the Employer. Unless otherwise specified the excavated soil shall be used for this purpose. In cases of gravel-boulder or rocky strata, respective relevant codes shall be followed for tests.

2.1.5 Water Sample

Representative samples of ground water shall be taken when ground water is first encountered before the addition of water to aid drilling of boreholes. The samples shall be of sufficient quantity for chemical analysis to be carried out and shall be stored in air-tight containers.

2.1.6 Back Filling of Bore Holes

On completion of each hole, the Contractor shall backfill all bore holes as directed by the Employer. The backfill material can be the excavated material.

2.1.7 Laboratory Test

The laboratory tests shall be carried out progressively during the field work after sufficient number of samples has reached the laboratory in order that the test results of the initial bore holes can be made use of in planning the later stages of the field investigation and quantum of laboratory tests.

All samples brought from field, whether disturbed or undisturbed shall be extracted/prepared and examined by competent technical personnel, and the test shall be carried out as per the procedures laid out in the relevant Indian standard codes (I S Codes)/ equivalent International Standards.

The following laboratory tests shall be carried out

- a) Visual and Engineering Classification
- b) Liquid limit, plastic limit and Shrinkage limits for C- Φ soils.
- c) Natural moisture content, bulk density and specific gravity.
- d) Grain size distribution analysis.
- e) Swell pressure and free swell index determination.
- f) California bearing ratio.
- g) Consolidated drained test with pore pressure measurement.
- h) Chemical tests on soil and water to determine the carbonates, sulphates, nitrates, chlorides, Ph value, and organic matter and any other chemical harmful to the concrete foundation.
- i) In case rock is encountered, the soil test required for rock as per relevant Indian standard codes (I S Codes)/ equivalent International Standards including following tests shall also be conducted.
 - (i) UCC test.

- (ii) Point load index test.
- (iii) RQD / RMR tests shall be carried out in case of Rocky Strata.

2.1.8 Test Results and Reports

The Contractor shall submit the detailed report in two (2) copies wherein information regarding the geological detail of the site, summarised observations and test data, bore logs, and conclusions and recommendations on the type of foundations with supporting calculations for the recommendations. The contractor shall also submit the bearing capacity calculation in editable soft copy to Employer. Initially the contractor shall submit draft report and after the draft report is approved, the final report in four (4) copies shall be submitted. The field and laboratory test data shall bear the signatures of the Investigation Agency, Contractor and also site representative of Employer.

The report shall include, but not limited to the following: -

- a) A plan showing the locations of the exploration work i.e. bore holes, trial pits. Plate load test, electrical resistivity test, CBR sample location etc.
- b) Bore Logs: Bore logs of each bore holes clearly identifying the stratification and the type of soil stratum with depth. The values of Standard Penetration Test (SPT) at the depths where the tests were conducted on the samples collected at various depths shall be clearly shown against that particular stratum.

Test results of field and laboratory tests shall be summarised strata wise as well in combined tabular form. All relevant graphs, charts tables, diagrams and photographs, if any, shall be submitted along with report. Sample illustrative reference calculations for settlement, bearing capacity, pile capacity shall be enclosed.

Recommendations:

The report should contain specific recommendations for the type of foundation for the various structures envisaged at site. The Contractor shall acquaint himself about the type of structures and their functions from the Employer. The observations and recommendations shall include but not limited to the following:

- a) Geological formation of the area, past observations or historical data, if available, for the area and for the structures in the nearby area, fluctuations of water table etc.
- b) Recommended type of foundations for various structures. If piles are recommended the type, size and capacity of pile and groups of piles shall be given after comparing different types and sizes of piles and pile groups.
- c) Allowable bearing pressure on the soil at various depths for different sizes of the foundations based on shear strength and settlement characteristics of soil with supporting calculations. Minimum factor of safety for calculating net safe bearing capacity shall be taken as 2.5 (Two & Half). Recommendation of liquefaction characteristics of soil if applicable shall be provided.
- d) Recommendations regarding slope of excavations and dewatering schemes, if required.
- e) Comments on the Chemical nature of soil and ground water with due regard to deleterious effects of the same on concrete and steel and recommendations for protective measures.

f) If expansive soil is met with, recommendations on removal or detainment of the same under the structure, road, drains, etc. and thickness of treatment shall be given. In the latter case detailed specification of any special treatment required including specification or materials to be used, construction method, equipment's to be deployed etc. shall be furnished. Illustrative diagram of a symbolic foundation showing details shall be furnished.

g) Recommendations for additional investigations beyond the scope of the present work, if considered such investigation as necessary.

f) In case of foundation in rocky strata, type of foundation and recommendation regarding rock anchoring etc. should also be given.

g) Geological Investigation reports shall be signed and stamped by qualified Geotechnical engineers.

3.0 CONTOUR SURVEY, SITE LEVELLING

3.1 CONTOUR SURVEY & SITE LEVELLING:

The land for construction of substation will be handed over to the successful bidder as on where basis progressively after award of work. The contractor shall carry out survey work by taking spot level at 05 m x 05 m grid interval with respect to temporary bench mark transferred from permanent bench mark in the locality if available either on bridge, government buildings of local authorities or any other permanent structure. The contractor shall submit the spot levels (in grid format) in editable soft copy in excel format and contour map with contour interval of 0.5 m in editable auto cad soft drawing.

The contractor will level the area required for construction of substation work either at single level, multi-level or gradual slope with the finished ground level as approved by Employer during detailed engineering based on highest flood level. The levelling area shall be decided by Employer during detailed Engineering stage.

The layout and levels of all structure etc. shall be made by the Contractor at his own cost from the general grids of the plot and benchmarks set by the Contractor and approved by Employer. The Contractor shall provide all assistance in instruments, materials and personnel to Employer for checking the detailed layout and shall be solely responsible for the correctness of the layout and levels.

3.2 SCOPE

This clause covers clearance of site, contour survey, site levelling, maintaining finished ground level by cutting/filling in all types of soil and soft/ disintegrated rock, supplying and compaction of fill material if required. Cutting/felling of trees and their disposal has not been envisaged under the present scope.

3.3 GENERAL

Site shall be cleared, surveyed and levelled/sloped by the contractor as per approved general arrangement drawing or levelling area decided during detailed engineering after award of work.

Work covered under this clause comprises the site clearance, survey work/setting out and making profiles (preparation of plot plan, setting up Bench Mark and taking spot levels at 05m x 05 m interval, preparation of contour plan with contour interval of 0.50 m), Earth work in Excavation & filling in

specified area with all lifts and leads and earth work in filling with borrowed earth with all leads and lifts (Borrow areas including payment of royalty for borrowed earth shall be arranged by the contractor at his own cost). During detailed engineering stage, the contractor will prepare the levelling proposal for optimum levelling and submit to Employer for approval. Contractor shall submit the hard copy and editable soft copy of levelling proposal (levelling quantity calculation in Excel form and levelling drawing in Auto CAD) to Employer for approval.

Filling material shall conform to relevant Indian standard codes (IS Codes)/ equivalent International Standards. Unsuitable filling material if any shall be removed and replaced by suitable fill material. The filling shall be compacted in layers to achieve 95% of standard Proctor's density at Optimum moisture contents (OMC). Cohesion less material shall be compacted to 70% relative density (minimum). Levelling/Filling shall be carried out as per relevant Indian standard codes (I S Codes)/ equivalent International Standards.

All materials involved in excavation shall be classified by Employer in the following groups:

All kinds of soils and soft/disintegrated rocks (Not requiring blasting): The material which can be quarried/excavated with pick, shovel, jumpers, scarifiers, crowbars and mechanical implements and will include various types of soils, plain cement concrete, shingle, river/nallah boulders, soling of road/foot path, stone masonry, soft conglomerate and laterite stone, lime stone and hard conglomerate etc.

Hard Rocks: All kinds of rocks which can only be excavated by machines and requires blasting, chiselling in edging or in another agreed method and will also include reinforcement cement concrete.

The quantity of excavation in all types of soils and soft/disintegrated rock shall be worked out by using initial and final level and no void deduction shall be made to calculate net quantity of earth work with 95% compaction.

The volume of hard rock shall be computed on the basis of stack of excavated rubble after making 50 % deduction for voids.

The surface of excavation or filling shall be neatly dressed to the required formation level with tolerance of (\pm) 100 mm.

4.0 SITE PREPERATION, EXCAVATION, BACKFILL & DISPOSAL OF SURPLUS EARTH.

4.1 SITE PREPERATION

The layout and levels of all structure etc. shall be made by the Contractor at his own cost from the general grids of the plot and benchmarks set by the Contractor and approved by the Employer. The Contractor shall give all help in instruments, materials and personnel to the Employer for checking the detailed layout and shall be solely responsible for the correctness of the layout and levels.

4.2 SCOPE

This clause covers clearing of the site, maintaining the finished ground level with available surplus excavated suitable back fill material generated from foundation works etc.

4.3 GENERAL

- 1) The Contractor shall develop the site area to meet the requirement of the intended purpose. The site preparation shall conform to the requirements of relevant sections of this specification or as per stipulations of relevant Indian standard codes (I S Codes)/ equivalent International Standards.
- 2) The fill material shall be suitable for the above requirement. The fill shall be with such a material that the site so designed shall not be affected by erosion from wind and water from its final compacted position or the in-situ position of undisturbed soil.
- 3) Material unsuitable for founding of foundations shall be removed and replaced by suitable fill material to be approved by the Employer.
- 4) Backfill material around foundations or other works shall be suitable for the purpose for which it is used and compacted to the density described under Compaction. Excavated material not suitable or not required for backfill shall be disposed off in areas as directed by purchaser up to a maximum lead of 2 km.

4.4 EXCAVATION AND BACKFILL

SCOPE

This clause covers excavation for foundation works of Towers, Equipment support structures, Transformer/Reactor foundations, External Lighting poles, Cable trenches, Buildings, Car parking shed, Fire Wall, DG set, Water tanks, etc. backfilling of Foundations Works.

1. Excavation and backfill for foundations shall be in accordance with the relevant Indian standard codes (I S Codes)/ equivalent International Standards.
2. Whenever water table is met during the excavation, it shall be dewatered and water table shall be maintained below the bottom of the excavation level during excavation, concreting and backfilling.
3. When embankments are to be constructed on slopes of 15% or greater, benches or steps with horizontal and vertical faces shall be cut in the original slope prior to placement of embankment material. Vertical faces shall measure not more than 1 m in height.
4. Embankments adjacent to abutments, culverts, retaining walls and similar structures shall be constructed by compacting the material in successive uniform horizontal layers not exceeding 15 cm in thickness. (of loose material before compaction). Each layer shall be compacted as required by means of mechanical tampers approved by the Purchaser. Rocks larger than 10 cm in any direction shall not be placed in embankment adjacent to structures.
5. Earth embankments of roadways and site areas adjacent to buildings shall be placed in successive uniform horizontal layers not exceeding 20 cm in thickness in loose stage measurement and compacted to the full width specified. The upper surface of the embankment shall be shaped so as to provide complete drainage of surface water at all times.

4.5 **COMPACTION**

1. The density to which fill materials shall be compacted shall be as per relevant IS and as per direction of Employer. All compacted sand filling shall be confined as far as practicable. Backfilled earth shall be compacted to minimum 95% of the Standard Proctor's density at OMC. The sub grade for the roads and embankment filling shall be compacted to minimum 95% of the Standard Proctor's density at OMC. Cohesion less material sub grade shall be compacted to 70% relative density (minimum).
2. At all times unfinished construction shall have adequate drainage upon completion of the road's surface course, adjacent shoulders shall be given a final shaping, true alignment and grade.
3. Each layer of earth embankment when compacted shall be as close to optimum moisture content as practicable. Embankment material which does not contain sufficient moisture to obtain proper compaction shall be wetted. If the material contains any excess moisture, then it shall be allowed to dry before rolling. The rolling shall begin at the edges overlapping half the width of the roller each time and progress to the centre of the road or towards the building as applicable. Rolling will also be required on rock fills. No compaction shall be carried out in rainy weather.

4.6 **REQUIREMENT FOR FILL MATERIAL UNDER FOUNDATION**

The thickness of fill material under the foundations shall be such that the maximum pressure from the footing, transferred through the fill material and distributed onto the original undisturbed soil will not exceed the allowable soil bearing pressure of the original undisturbed soil. For expansive soils, the fill materials and other protections etc. to be used under the foundation is to be got approved by the Employer.

4.7 **DISPOSAL OF SURPLUS EARTH**

The surplus earth generated from foundation work shall be disposed away from levelling area boundary at low lying areas within 2Km lead. The surplus earth if disposed within substation main boundary, the same shall be spread in uniform layers and compacted with suitable compacting equipment to achieve 95% compaction at O.M.C.

5.0 **STONE SPREADING AND ANTI-WEED TREATMENT**

The layout of the area, where anti-weed treatment and stone spreading is to be done, shall be developed by the Contractor during detailed engineering and the same shall be submitted to the employer for approval. The Contractor shall arrange all labour, equipment and materials required for complete performance of the work in accordance with the drawings, specification and direction of the Employer.

Stone spreading over cement concrete layer shall be done in the areas of the switchyard under present scope of work. The cement concrete layer shall also be provided in future areas within the fenced area. However the stone spreading in future areas shall be provided in case step potential without stone layer is not well within safe limits.

The material required for site surfacing/stone filling shall be free from all types of organic materials and shall be of standard quality, and as approved by the Employer.

The material to be used for stone filling/site surfacing shall be stone aggregate of 40mm nominal size (ungraded single size) conforming to Table 2 of IS:383 – 1970. Hardness, flakiness shall be as required for wearing courses are given below:

- i) Sieve Analysis limits (Gradation) (IS : 383 – Table – 2)

Sieve Size	% passing by weight
63mm	100
40mm	85-100
20mm	0-20
10mm	0-5

- ii) Hardness: Abrasion value (IS:2386 Part-IV) – not more than 40% Impact value (IS: 2386 Part-IV) – not more than 30%.
- iii) Flakiness Index: As per IS: 2386 Part – I maximum value is 25%.
- iv) Frequency of test shall be conducted for sieve analysis, Hardness & Flakiness index as per latest SFQP available on POWERGRID website.

After all the structures/equipments are erected, antiweed treatment shall be applied in the switchyard where ever cement concrete is to be done and the area shall be thoroughly de-weeded including removal of roots. The recommendation of local agriculture or horticulture department may be sought where ever feasible while choosing the type of chemical to be used.

The antiweed chemical shall be procured from reputed manufacturers. The doses and application of chemical shall be strictly done as per manufacturer’s recommendation. Nevertheless the effectiveness of the chemical shall be demonstrated by the Contractor in a test area of 10MX10M (appx) and shall be sprinkled with water at least once in the afternoon every day after forty eight hours of application of chemical. The treated area shall be monitored over a period of two to three weeks for any growth of weeds by the Engineer – in- charge. The final approval shall be given by Engineer – in –charge based on the results.

Engineer-in-charge shall decide final formation level so as to ensure that the site appears uniform devoid of undulations. The final formation level shall however be very close to the formation level indicated in the approved drawing.

After antiweed treatment is complete, the surface of the switchyard area shall be maintained, rolled/compacted to the lines and grades as decided by Engineer-in-charge. The sub grade shall be consolidated by using half ton roller/surface vibrator with suitable water sprinkling arrangement to form a smooth and compact surface. The roller shall run over the sub grade till the soil is evenly and densely consolidated and behaves as an elastic mass.

In areas that are considered by the Engineer-in-Charge to be too congested with foundations and structures for proper rolling of the site surfacing material by normal rolling equipments, the material shall be compacted by hand rammer, if necessary. Due care shall be exercised so as not to damage any foundation structures or equipment during rolling / compaction.

The sub grade shall be in moist condition at the time the cement concrete is placed. If necessary, it should be saturated with water for not less than 6 hours but not exceeding 20 hours before placing of cement concrete. If it becomes dry prior to the actual placing of cement concrete, it shall be sprinkled with water and it shall be ensured that no pools of water or soft patches are formed on the surface.

Over the prepared sub grade, 75mm thick base layer of cement concrete in 1:5:10 (1 cement: 5 fine aggregate: 10 stone aggregate 40mm nominal size) shall be provided in the area excluding roads, drains, cable trenches as per detailed engineering drawing. The Contractor shall have option to use graded stone aggregate 40mm nominal size in place of brick aggregate without any extra cost to employer. For easy drainage of water, the slope of 1:1000 is to be provided from the ridge to the nearest drain.

The ridge shall be suitably located at the centre of the area between the nearest drains. The above slope shall be provided at the top of base layer of cement concrete in 1:5:10. A layer of cement slurry of mix 1:6 (1cement: 6 fine aggregate) shall be laid uniformly over cement concrete layer. The cement consumption for cement slurry shall not be less than 150 kg for every 100 sq.m.

A final layer of 100mm thickness of stone aggregate of 40mm nominal size (conforming to relevant clause) shall be spread uniformly over cement concrete layer after curing is complete.

6.0 SITE DRAINAGE

Preparation of overall drainage layout, design, drawing and providing rain water drainage system within the substation boundary under the present scope including connection at one or more points to the outfall point located outside the substation boundary wall is in the scope of contractor. Invert level of drainage system at outfall point shall be decided in such a way that the water can easily be discharged outside the substation boundary wall. In case outfall point is more than 50M away from boundary wall, only 50 metre drain outside the boundary wall is in the scope of contractor. Outfall point shall be got approved from Employer before commencement of construction. While designing the drainage system following points shall be taken care of:

- (a) The surface of the switchyard shall be sloped to prevent accumulation of water.
- (b) Drain shall be constructed at suitable locations in such a way that substation is not flooded and roads are not affected with ponding of surface water. In the switchyard maximum spacing between two drains shall not be more than 100 meter. It will be ensured that no area is left undrained.
- (c) The typical construction drawing for the section of drain is enclosed with the tender documents.
- (d) Longitudinal slope shall not be less than 1 in 1000.
- (e) The maximum velocity for pipe drains and open drains shall be limited to 2.4m/sec and 1.8m/sec respectively. However, minimum non-silting velocity of 0.6m/sec shall be ensured.
- (f) Pipe drains shall be provided in areas of switchyard where movement of crane will be necessary in operating phase of the substation.
- (g) For pipe drains, concrete pipe of class NP2 shall be used. However, for road crossings etc. higher strength pipe of class NP3 shall be provided. For rail crossings, RCC pipes of class NP4 shall be provided. For design of RCC pipes for drains and culverts, relevant Indian standard codes (I S Codes)/ equivalent International Standards. shall be followed.

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- (h) Two Nos. of portable pumps of 3 / 5 HP capacity for drainage of water shall be provided by the Contractor.
- (i) Pipe drains shall be connected through manholes at an interval of max. 30m.
- (j) If the invert level of outfall point is above the last drain point in the substation boundary, sump of suitable size has to be constructed within the substation boundary.
- (k) The drainage scheme and associated drawings shall be got approved from Employer before commencement of construction.

6.1 RAINWATER HARVESTING:

In addition to drainage of rainwater, the Contractor shall make arrangement for rainwater harvesting also. A drawing showing details of recharge structure for rainwater harvesting is enclosed with tender document and is also available on RECTPCL website.

Rainwater harvesting shall be done by providing recharge structures with bore wells. The contractor shall propose location of recharge structures within the sub-station considering the site conditions which is to be approved by RECTPCL before execution. Branch drains from the main drain carrying rainwater from entire switchyard shall be connected to the recharge structures.

7.0 ROADS

The typical construction drawings showing section detail for road, culverts as well as rail cum road are enclosed with the tender documents. The layout of roads shall be as per approved general arrangement drawing. Types of the roads in the scope of contract shall be either of RCC or as indicated in the GA drawing or in Bid Price Schedule.

The width of the road shall be either 5.5m wide or 3.75m as indicated in the GA drawing. Type of pavement either rigid pavement (RCC Road) or shall be as per tender documents.

The type & location of culverts i.e. the number and diameter of Hume pipes shall be as decided during detailed engineering. The invert level of Hume pipes of culverts shall match with the invert level of drain meeting the culvert.

100mm diameter RCC Hume pipe (NP-3) shall be provided across the road at every 100M interval along the road. In case NP3 pipe is not available, vendor may provide 100 dia UPVC pipe encased with 75 mm thk. concrete 1:2:4 around without any financial implication to RECTPCL.

Road within the switchyard area should have shoulder of 600mm wide on either sides of road. Shoulder shall be smooth finished with well compacted 75mm thick PCC 1:4:8. The road leading to control room building and the roads outside switchyard fence area shall be provided with kerb stone and interlocking tiles on shoulder. Width of shoulder shall be 1.75m in case of 5.5m wide road and 1.3m in case of 3.75m wide road.

The shoulder of the road in case of substation extension shall match with the shoulder of the existing road in all respect.

Road leading towards the area of Autotransformer/Reactor shall be as short as possible. Road layouts

shall be prepared with adequate turning radius, so that easy movement of vehicles is possible. Roads which are to be used for carrying transformers / reactors shall be provided with turning radius preferably 19.5M or more but not less than 16.5M. Turning radius of other roads may be decided at site depending on layout constraints

Contractor may use WMM instead of WBM with prior approval of employer without any additional financial implication to RECTPCL. Guidelines of IRC: 109-1997 shall be followed for Wet Mix Macadam (WMM) only. However, measurement of road shall be done as specified elsewhere in this specification.

In case of rigid pavements, RCC shall be laid and finished with screed board, vibration, vacuum dewatering process etc.

8.0 TRANSFORMERS/REACTOR FOUNDATION, RAIL TRACK/ RAIL CUM ROAD TRACK

The foundations of Transformer & Reactor shall be of block type foundation. Minimum reinforcement shall be governed by IS: 2974 and IS: 456. In case of Reactor Plan dimension of block should not be less than size of base of reactor.

The Contractor shall provide a RCC Rail cum road system integrated with the Autotransformer / Reactor foundation to enable installation and the replacement of any failed unit. The transfer track system shall be suitable to permit the movement of any failed unit fully assembled (including OLTC, bushings) with oil.

This system shall enable the removal of any failed unit from its foundation to the nearest road. If trench/drain crossings are required then suitable R.C.C. culverts shall be provided in accordance with I.R.C. standard / relevant IS.

The Contractor shall provide a pylon support system for supporting the firefighting system.

Each Autotransformer/Reactor including oil conservator tank and cooler banks etc. shall be placed in a self-sufficient pit surrounded by retaining walls (Pit walls). The clear distance of the retaining wall of the pit from the Autotransformer/Reactor shall be 20% of the Autotransformer/Reactor/ cooler bank height or 0.8m whichever is higher. The oil collection pit thus formed shall have a void volume equal to 200% volume of total oil in the Autotransformer/Reactor. In case of transformers of 132kV and below, where hydrant system for firefighting is not provided, volume of pit may be reduced to 130% of total oil volume. However, in case common oil pit is envisaged during detailed engineering, the individual oil collection pit thus formed shall have a void volume equal to 33% volume of total oil in the Autotransformer/Reactor. The common oil collection pit shall have a void volume equal to 200% volume of maximum total oil of either Autotransformer or Reactor.

The minimum height of the retaining walls of pit shall be 20 cm above the finished level of the ground to avoid outside water pouring inside the pit. The bottom of the pit shall have a uniform slope towards the sump pit. While designing the oil collection pit, the movement of the autotransformer / reactor must be taken into account.

The grating shall be made of MS flat of size 30mm x 5mm placed at 30mm centre to centre and 6mm dia MS bar at spacing of 150mm at right angle to each other.

Maximum length of grating shall be 2000mm and width shall not be more than 500mm. The gratings, supported on ISMB 150 mm, shall be placed at the formation level and will be covered with 100mm thick layer of stone aggregate having size 40mm to 60mm. All steel work used for grating and supports shall be painted with epoxy based zinc phosphate primer (two packs) confirming to IS: 13238- 1991, thereafter with two or more coat of bituminous paint of approved quality shall be applied. Contractor shall have option to provide factory made electro forged MS grating made of specified size MS flat and round bars without any extra cost to employer.

Each oil collection pit shall be drained towards a sump pit of size 1000X750mm and 500mm deep below the floor level within the collection pit whose role is to drain water and oil due to leakage within the collection pit so that collection pit remains dry.

8.1 MATERIALS

Complete foundation shall be made of reinforced cement concrete and shall be designed as per guidelines for design of foundations given in clause 10.0 in the specification.

8.2 DRAINAGE

One 0.5/1.0 H.P pump for each pit shall be supplied and installed by the Contractor to evacuate the fire fighting & rain water from the sump pit in to the nearest drain.

9.0 FIRE PROTECTION WALLS

9.1 GENERAL

Fire protection walls shall be provided, if required, in accordance with Local Advisory Committee (LAC) recommendations. The scope of works covers design, preparation of drawing and construction of RCC fire protection walls. While designing the wall, following points may be taken care of:

9.2 FIRE RESISTANCE

The firewall shall have a minimum fire resistance of 4 hours. The partitions, which are made to reduce the noise level, shall have the same fire resistance. The walls of the building, which are used as firewalls, shall also have a minimum fire resistance of 4 hours.

The firewall shall be designed to protect against the effect of radiant heat and flying debris from an adjacent fire.

9.3 DIMENSIONS

The firewall shall extend 600 mm on each side of the Transformer /Reactors and 600 mm above the conservator tank or safety vent.

These dimensions might be reduced in special cases, as per the approval of owner where there is lack of space. A minimum of 2.0meter clearance shall be provided between the equipment's e.g. Transformer /Reactors and firewalls.

The building walls, which act as firewalls, shall extend at least 1 m above the roof in order to protect it.

9.4 MATERIALS

The firewall will be made of reinforced cement concrete as per the relevant Indian standard codes (I S Codes)/ equivalent International Standards.

10.0 CABLE TRENCHES AND CABLE TRENCH CROSSINGS

The typical construction drawings of cable trenches, cable trench crossing road and sump are enclosed with tender documents. The work covered under this clause comprises of design, drawing and construction of cable trenches and cable trench crossings. While designing, following points may be taken care of:

- a). The cable trenches and pre-cast removable RCC cover (with lifting arrangement) shall be constructed using RCC of M30 (Minimum) grade as per relevant Indian standard codes (I S Codes)/ equivalent International Standards.
- b). The cable trench walls shall be designed for the following loads.
 - (i) Dead load of 155 kg/m length of cable support + 75 Kg on one tier at the outer edge of tier.
 - (ii) Earth pressure + uniform surcharge pressure of 2T/m².
- c). Cable trench covers shall be designed for self-weight of top slab + concentrated load of 150 kg at centre of span on each panel
- d). Necessary sumps shall be provided and each sump shall be provided with pumps of 5 / 3 HP capacity, shall be supplied for pumping out water collected in cable trench. Cable trenches shall not be used as storm water drains.
- e). The top of trenches shall be kept at least 100 mm above the finished ground level. The top of cable trench shall be such that the surface rainwater does not enter the trench.
- f). All metal parts inside the trench shall be connected to the earthing system.
- g). Trench wall shall not foul with the foundation. Suitable clear gap shall be provided.
- h). The trench bed shall have a slope of 1/500 along the run & 1/250 perpendicular to the run.
- i). Cable trenches shall be blocked at the ends if required with brick masonry in cement sand mortar 1:6 and plaster with 12mm thick 1:6 cement sand mortar.

- J) Cable trench crossings shall be designed for critical load likely to be passed over the crossing. The cable trench crossing may be of either RCC box culvert type or RCC hume pipes embedded in plain concrete as per design of contractor.

11.0 FOUNDATION / RCC CONSTRUCTION

11.1 GENERAL

Work covered under this Clause of the Specification comprises the design ,drawing and construction of foundations and other RCC constructions for switchyard tower structures, bus supports, equipment supports, cable trenches, Transformer /Reactors, jacking pad, pulling blocks, fire protection walls, control cubicles, marshalling kiosks, auxiliary equipment's, Control Room Cum Administrative building, GIS hall, Panel room, ,Security room, Parking shed ,RCC retaining wall, or for any other equipment or service and any other foundation required to complete the work. This clause is as well applicable to the other RCC constructions.

All foundation shall be of reinforced cement concrete. The design and construction of RCC structures shall be carried out as per IS: 456. Minimum 75mm thick lean concrete (1:4:8) shall be provided below all underground structures, foundations, trenches etc. to provide a base for construction

The switchyard foundation's plinths shall be minimum 300mm and buildings plinth shall be minimum 600 mm above finished ground level respectively. If the site is sloping, the foundation height will be adjusted to maintain the exact level of the top of structures to compensate such slopes.

The tower and equipment foundations shall be checked for a partial factor of safety of 2.2 for normal condition and 1.65 for short circuit condition.

The design and detailing of foundations shall be done based on the approved soil data and sub-soil conditions as well as for all possible critical loads and the combinations thereof. The Isolated/ Combined/ Strip footings / Raft or pile foundation as may be required based on soil/sub-soil conditions and superimposed loads shall be provided

The procedure used for the design of the foundations shall be the most critical loading combination of the steel structure and or equipment and/or superstructure and other conditions which produces the maximum stresses in the foundation or the foundation component and as per the relevant BIS Codes of foundation design. Detailed design calculations shall be submitted by the bidder showing complete details.

Necessary protection to the foundation work, if required shall be provided to take care of any special requirements for aggressive alkaline soil, black cotton soil or any other type of soil which is detrimental/harmful to the concrete foundations.

If pile foundations are adopted, the same shall be cast-in-situ bored or pre-cast or under reamed type as per relevant parts of IS: 2911. Only RCC piles shall be provided. Necessary initial load test shall be carried out by the Contractor to establish the pile design capacity. Only after the design capacity of pile has been established, the Contractor shall take up the job of piling. Routine tests for the pile shall also

be conducted as per IS: 2911/IS :10262. All the testing work shall be planned in such a way that these shall not cause any delay in project completion. RCC for pile works shall be Design Mix of minimum grade M-30.

The foundations shall be proportioned so that the estimated total and differential movements of the foundations are not greater than the movements that the structure or equipment is designed to accommodate.

11.2 DESIGN

While designing foundations, following may be taken care of:

All foundations except for external lighting poles shall be of reinforced cement concrete. The external lighting pole shall be embedded in plain cement concrete (1:2:4) foundation. The design and construction of RCC structures shall be carried out as per relevant IS: 456 and minimum grade of concrete shall be M-30 (Design Mix). Higher grade of concrete than specified above may be used at the discretion of Contractor without any additional financial implication to the Employer.

Limit state method or any other method as per relevant Indian standard codes (I S Codes)/ equivalent International Standards of design shall be adopted unless specified otherwise in the specification.

For detailing of reinforcement IS: 2502 and SP 34 shall be followed. Cold twisted deformed bars (Fe D = 500 N/mm²) conforming to relevant Indian standard codes (I S Codes)/ equivalent International Standards shall be used as reinforcement. Two layers of reinforcement (on inner and outer face) shall be provided for wall & slab sections having thickness of 150 mm and above. Clear cover to reinforcement shall be as per relevant Indian standard codes (I S: 456)/ equivalent International Standards.

RCC water retaining structures like storage tanks, etc. shall be designed as uncracked section in accordance with relevant Indian standard codes (I S: 3370 Part I to IV)/ equivalent International Standards. However, water channels shall be designed as cracked section with limited steel stresses as per relevant IS.

The procedure used for the design of the foundations shall be the most critical loading combination of the steel structure and or equipment and/or superstructure and other conditions which produces the maximum stresses in the foundation or the foundation component and as per the relevant Indian standard codes (I S Codes)/ equivalent International Standards of foundation design. Detailed design calculations shall be submitted by the bidder showing complete details of piles/pile groups proposed to be used.

Design shall consider any sub-soil water pressure that may be encountered following relevant standard strictly.

Necessary protection to the foundation work, if required shall be provided to take care of any special requirements for aggressive alkaline soil, black cotton soil or any other type of soil which is detrimental/harmful to the concrete foundations.

RCC columns shall be provided with rigid connection at the base.

All sub-structures shall be checked for sliding and overturning stability during both construction and operating conditions for various combinations of loads. Factors of safety for these cases shall be taken as mentioned in relevant Indian standard codes (I S Codes)/ equivalent International Standards or as stipulated elsewhere in the Specifications. For checking against overturning, weight of soil vertically above footing shall be taken and inverted frustum of pyramid of earth on the foundation should not be considered.

Earth pressure for all underground structures shall be calculated using co-efficient of earth pressure at rest, co-efficient of active or passive earth pressure (whichever is applicable). However, for the design of substructures of any underground enclosures, earth pressure at rest shall be considered.

In addition to earth pressure and ground water pressure etc., a surcharge load of 2T/Sq.m shall also be considered for the design of all underground structures including channels, sumps, tanks, trenches, substructure of any underground hollow enclosure etc., for the vehicular traffic in the vicinity of the structure.

Following conditions shall be considered for the design of water tank in pumps house, channels, sumps, trenches and other underground structures:

- a) Full water pressure from inside and no earth pressure & ground water pressure & surcharge pressure from outside (application only to structures which are liable to be filled up with water or any other liquid).
- b) Full earth pressure, surcharge pressure and ground water pressure from outside and no water pressure from inside.
- c) Design shall also be checked against buoyancy due to the ground water during construction and maintenance stages. Minimum factor of safety of 1.5 against buoyancy shall be ensured ignoring the superimposed loadings.

Base slab of any underground enclosure shall also be designed for empty condition during construction and maintenance stages with maximum ground water table (GWT). Minimum factor of safety of 1.5 against buoyancy shall be ensured ignoring the super-imposed loadings.

Base slab of any underground enclosure like water storage tank shall also be designed for the condition of different combination of pump sumps being empty during maintenance stages with maximum GWT. Intermediate dividing piers of such enclosures shall be designed considering water in one pump sump only and the other pumps sump being empty for maintenance.

The foundations shall be proportioned so that the estimated total and differential movements of the foundations are not greater than the movements that the structure or equipment is designed to accommodate.

The foundations of transformer/reactor and circuit breaker shall be of lock type foundation. Minimum reinforcement shall be governed by relevant Indian standard codes (I S Codes)/ equivalent International Standards.

The tower and equipment foundations shall be checked for a factor of safety as per relevant Indian standard codes (I S Codes)/ equivalent International Standards for two conditions i.e. Normal condition and short circuit condition against sliding, overturning and pull-out. The same factors shall be used as partial safety factor over loads in limit state design also.

11.3 ADMIXTURES & ADDITIVES

Only approved admixtures shall be used in the concrete for the Works. When more than one admixture is to be used, each admixture shall be batched in its own batch and added to the mixing water separately before discharging into the mixer. Admixtures shall be delivered in suitably labelled containers to enable identification.

Admixtures in concrete shall conform to relevant Indian standard codes (I S Codes)/ equivalent International Standards. The water proofing cement additives shall conform to relevant IS. Concrete Admixtures/ Additives shall be approved by Employer.

The Contractor may propose and the Employer may approve the use of a water-reducing set-retarding admixture in some of the concrete. The use of such an admixture will not be approved to overcome problems associated with inadequate concrete plant capacity or improperly planned placing operations and shall only be approved as an aid to overcoming unusual circumstances and placing conditions.

The water-reducing setting-retarding admixture shall be an approved brand as per relevant Indian standard codes (I S Codes)/ equivalent International Standards.

The water proofing cement additives shall be used as required/advised by Employer.

12.0 CHAINLINK FENCING AND GATE

12.1 General

Work covered under this clause comprises of design, drawing, supply, fabrication, erection, painting or galvanisation as specified etc. of switch yard Fencing and gate, construction of foundation of steel posts and toe wall. While providing switch yard fencing and gate, following points may be taken care of:

12.2 Areas requiring Fencing

Fencing shall be provided for complete switchyard as per drawing. Separate gate shall be provided for men and equipment.

Internal fence surrounding the various equipment's (if) mounted on ground or a height lower than 2.5m. Necessary gates shall be provided for each area so surrounded.

12.3 Product materials

The minimum requirements are as follows:

Chain link fence fabric (galvanization) in accordance to relevant Indian standard codes (I S: 2721)/ equivalent International Standards.

14.4 Posts

The posts shall be of medium M.S. tubes of 50mm diameter conforming to grade as per relevant international /IS Standard. The tubes shall also conform to relevant Indian standard codes (I S: 1161 / IS 806)/ equivalent International Standards. The length of tubular post shall be 2600 mm.

An M.S. base plate of size 160 X 160 X 6mm thick shall be welded with the tubular post. The post shall be provided on the top with M S plate.

The tubular post shall be welded with 8 number of M S flat of size 50 x 6mm – 75mm long at suitable locations. Two number of 13.5 mm diameter holes on each cleats shall be provided to bolt the fence fabric panel. The cleats shall be welded at equal spacing in such a way that 4 numbers of cleats are on one side and remaining 4 cleats are on the opposite side of the post. The cleats on the corner posts shall be welded in such a way that it suits the site requirement.

The whole assembly of tubular post shall be hot dip galvanized. The zinc coating shall be minimum 610 gram per sq. meter. The purity of zinc shall be 99.95% as per relevant IS.

12.5 Fence Fabric & Fence Panel

Chain link fencing shall be made of 3.15 mm diameter wire with 75 X 75 mm mesh size. Fence fabric shall be galvanised. Chain link fencing shall be fabricated in the form of panel 1300 X 2928 mm. An M.S. flat of at least 50x6 mm size shall be welded all-round fence fabric to form a panel. Four pairs of 13.5mm diameter holes on the vertical M S flat matching the spacing of holes in cleats fixed with pipe shall be provided to fix the fence panel with the tubular posts. A washer shall also be provided below each nut. The contractor, for fixing the panels, shall supply the 12mm diameter bolts including nuts and washers. All nuts, bolts and washers shall be hot dip galvanized.

The fence panel shall be provided with two or more coats of approved standard Zinc paint over approved standard steel primer.

12.6 Installation

1. Fence shall be installed along the switchyard line as shown in the approved drawings.
2. Post holes shall be excavated by approved method.
3. All posts shall be 3.0m apart measured parallel to ground surface.
4. Posts shall be set in 1:2:4 Plain Cement Concrete block of minimum 0.40x0.40x1.2m depth. 75mm thick plain cement concrete 1:4:8 shall be provided below concrete blocks. Posts shall be braced and held in plumb position and true alignment and elevation until concrete has set.
5. Fence fabric shall not be installed until concrete has cured a minimum of 7 days.
6. Fence fabric panel shall be fixed to the post at 4 nos. MS flat each of 50x6, 75 long through 2 nos. of bolts (12mm diameter) on each flat.

12.7 Gate

1. The gate shall be made of medium duty M.S. pipe conforming to relevant I.S. with welded joints. The main frame (outer frame) of the gate shall be made of 40mm dia. pipe and vertical pipes of 15mm dia. @ 125mm spacing (maximum) shall be welded with the main frame. Two number of 1.25 mm thick and 125 mm wide MS plates (Horizontal) @ 500 mm centre to centre distance shall be welded on each gate leaf. Gate leaves shall be fixed with a vertical post of 2700 mm long two steel channels-150 welded together. A 8 mm thick 200X 200 mm size MS plate shall be welded at the bottom of channel frame.
2. The gates shall be fabricated with welded joints to achieve rigid connections. The gate frames shall be painted with one coat of approved steel primer and two coats of synthetic enamel paint.
3. The gates shall be provided with suitable locking arrangement welded on 4 mm thick MS plate on the gate leaf.
4. The main gate shall be 5.0m wide and shall be of double leaf type (as shown in the drawing). Next to the main gate, a men gate (1.25m wide single leaf) shall also be provided.
5. Steel roller shall be provided with the gate.
6. Gate shall be installed in location as shown in approved G.A. drawing.
7. The vertical post of gate shall be embedded in PCC foundation of 500 X500X1250 mm deep size (1:2:4).

13.0 BUILDINGS

13.1 GENERAL

The scope includes the design, drawing, engineering and construction including anti-termite treatment, plinth protection, DPC of Building including sanitary, water supply, electrification, false ceiling etc. as applicable ,complete of control room building, fire fighting building, Auxiliary building, Store and Security room. Electrification and air conditioning of building shall be provided as detailed in other sections of electrical portion.

13.2 CONTROL ROOM CUM ADMINISTRATIVE BUILDING

GENERAL

The scope includes design, engineering and construction, including anti-termite treatment, plinth protection, DPC, peripheral drains, water supply, plumbing, sanitation, fire-fighting, electrification etc. of Control Room Building.

The Control Room Building shall be of size 20 m X 25 m approximately. It will be a double storeyed RCC Framed structure if constructed separately away from GIS hall. It shall be so designed that most of the area of switchyard is visible from the Control Room.

The building auxiliary services like air conditioning systems, fire protection and detection systems and all other miscellaneous services shall be designed in accordance with the requirements as specified in relevant section or elsewhere in this Specification. The building shall be constructed as per the design and drawings to be developed by the contractor. **Additional Roof with MS profile sheet (0.5 mm) and MS pipe truss with suitable slopes shall be provided as the substation is in rain/snow bound terrain.** Tentative carpet area requirement for different rooms of control room cum administrative building is given as below for guidance to the contractor:

AREA REQUIREMENTS

- Control Room 75 sq.m. approx.
- ACDB & DCDB Room 145 Sq.M or As per requirement.
- Battery Room 45 Sq. M or As per requirement.
- Electrical Lab 23 sq.m.
- Conference Room with attached Toilet 33 sq.m.
- Telecom Room As per requirement
- S/S-In-charge office with attached Toilet 24 sq.m.
- Room for executives 40 sq.m.
- Room for non-executives 30 sq.m.
- Lobby -Reception 25 sq.m.
- Corridor width Minimum width of corridor shall be 1800 mm.
- Portico 25 sq.m. (approx.).
- Common Toilet-Men 07 sq.m.
- Toilet for Women 4 sq.m.
- Janitor Room 3 sq.m.
- Pantry 7 sq.m.
- Provision of shaft for electrical, sanitary, water supply facilities shall also be kept.

However, the areas of different rooms/utilities may change/deleted as per owner's decision.

13.3 DESIGN CRITERIA

The Building shall be designed:

1. To the requirements of the International standards/Indian Standards.
2. for the specified climatic and loading conditions.
3. To adequately suit the requirements of the equipment's and apparatus contained in the buildings and in all respects to be compatible with the intended use and occupancy.
4. with a functional and economical space arrangement.
5. To be aesthetically pleasing. Different buildings shall show a uniformity and consistency in architectural design, as far as possible.
6. To allow for easy access to the equipment's as well as maintenance of the equipment's.
7. Wherever access to the roof is required, RCC stair case shall be provided.

8. Fire retarding materials for walls, ceilings doors etc., which would prevent supporting or spreading of fire and wherever required, shall be decided by the bidder.
9. Suitable Expansion joints, wherever required, shall be provided as per Codal Provisions.
10. All the members of the buildings frame shall be designed for the worst combination of loads as per relevant Indian standard codes (I S Codes)/ equivalent International Standards.
11. Permissible stresses for different load combinations shall be taken as per relevant Indian standard codes (I S Codes) / equivalent International Standards.
12. Seismic coefficient Method or Response spectrum method shall be used for seismic analysis of the building for Earthquake forces, as per relevant Indian standard codes (IS 1893)/equivalent International Standards.

13.4 DESIGN LOADS

1. Building structure shall be designed for the most critical combinations of dead loads, super-imposed loads, equipment loads, erection loads, wind loads, seismic loads, snow loading, if required etc. Any other incidental load, if anticipated, shall be duly accounted for in the design, and shall be clearly mentioned by the bidder.
2. Dead loads shall include the weight of structures complete with finishes, fixtures and partitions, and shall be taken as per relevant Indian standard codes (I S Codes)/ equivalent International Standards.
3. Super-imposed loads in different areas shall include live loads, minor equipment loads, cable trays, small pipe racks/hangers and erection, operation and maintenance loads, wherever these loads are expected. Equipment loads shall constitute, if applicable, all load of equipment's to be supported on the building frame.

AREA	Load
1. For Offices.	5.0 kN/m ²
If higher than 5.0 kN/m ² .	As per actual Requirement.
2. For Equipment Floors.	10.0 kN/m ²
If higher than 10 kN/m ² (Based on Equipment weight and layout plans).	As per actual Requirement.
3. Staircases & Balconies.	5.0 kN/m ²
4. Toilets.	2.0 kN/m ²
5. Chequered Plate.	4.0 kN/m ²
6. Corridors/Walkways.	3.0 kN/m ²
7. Accessible Roofs.	1.5 kN/m ²
8. Non-accessible Roofs.	0.75 kN/m ²

4. Wind loads shall be calculated as per relevant Indian standard codes (I S Codes)/ equivalent International Standards. The Factors affecting the wind speed shall be taken based on the site conditions.
5. Earthquake loads shall be calculated as per relevant Indian standard codes (I S Codes)/ equivalent International Standards.

6. Wind forces and Seismic forces shall not be considered to act simultaneously.
7. Snow load shall be computed as per IS:875 part 4 (latest). When snow load is present in roofs, replace imposed load by snow loads in respective load combinations.
8. All the load combinations to create worst combinations of loads shall be as per relevant International standards/Indian Standards.
9. Floors/ Slabs shall be designed to carry loads imposed by equipment's, cables, piping, movement of maintenance trucks (if required) and any other load associated with the building. In general, floors shall be designed for live loads as per relevant Indian standard codes (I S Codes)/ equivalent International Standards. Cable and piping loads shall also be considered in addition to the live loads for floors where these loads are expected.

13.5 FLOORS, WALLS & ROOFS

1. All walls shall be non-load bearing in filled panel walls, in brickwork as per the specification. Minimum thickness of external walls shall be 230 mm with 1:6 cement sand mortar. Partition walls if any shall be of 115 mm thick brick masonry in cement sand mortar (1:4).
All external walls shall be provided with insulation of 80 mm puff panels (wood look paint) as per specifications of GIS puff panels with an air gap of 40mm fixed with suitable tie members, opening for windows/ventilators/exhaust fans shall be maintained and sealed on sides.
2. All Floor/Roof slabs shall be regular beam slab construction. However, sunken RCC slab shall be provided in toilet areas as per the requirement.
3. False ceiling as per requirement shall be provided as detailed in Table-1 (Detailed Finish Schedule).
4. Minimum height of skirting above finished floor level shall be 150 mm. The skirting material shall match with the floor finish.
5. Minimum height of the parapet walls shall be 750 mm.
6. Ground floor finish shall be laid over 20 mm thick cement sand mortar, 100 mm thick plain cement concrete (PCC) 1:4:8 (1 cement: 4 sand : 8 stone aggregates), 100 mm thick local sand filling. The earth below ground floor shall be well rammed before laying sand filling.
7. First floor details shall comprise of finish as per schedule, 20 mm cement sand mortar and 50 mm thick PCC(1:4:8) over RCC slab.

13.6 DETAILS OF ROOF

Roof of the Building shall consist of Cast-in-situ RCC slab treated with a water proofing system which shall be an integral cement based treatment conforming to relevant Indian standard codes (I S Codes)/ equivalent International Standards. The water proofing treatment shall be of following operations:

- (a) Applying and grouting a slurry coat of neat cement using 2.75 kg/m² of cement admixed with proprietary water proofing compounds conforming to relevant Indian standard codes (I S Codes)/ equivalent International Standards. Over the RCC slab including cleaning the surface before treatment.
- (b) Laying cement concrete using broken stone of size from 25mm to 100mm size with 50% of cement mortar 1:5 (1 cement: 5 coarse sand) admixed with proprietary water proofing compound conforming to relevant Indian standard codes (I S Codes)/ equivalent International Standards over 20mm thick layer of cement mortar of min 1:5 (Cement: 5 coarse sand) admixed with proprietary water proofing compound conforming to relevant Indian standard codes (I S Codes)/ equivalent International Standards to required slope and treating similarly the adjoining walls up to 300mm height including rounding of junctions of walls and slabs.

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- (c) After two days of proper curing applying a second coat of cement slurry admixed with proprietary water proofing compound conforming relevant Indian standard codes (I S Codes)/ equivalent International Standards.
- (d) Finishing the surface with 20mm thick joint less cement mortar of mix 1:4 (1 cement 4 course sand) admixed with proprietary water proofing compound conforming to relevant Indian standard codes (I S Codes)/ equivalent International Standards and finally finishing the surface with trowel with neat cement slurry and making of 300 x 300 mm square.
- (e) The whole terrace so finished shall be flooded with water for a minimum period of two weeks for curing and for final test. All above operations to be done in order and as directed and specified by the Executive Engineer In charge.
- (f) Average thickness of water proofing shall be 120 mm and minimum thickness at khurra shall be 65 mm.

13.7 PARTITIONS

Partitions wherever provided, shall be made of powder coated aluminium frame provided with 5.5 mm thick clear glass or pre-laminated board depending upon the location of partition.

13.8 PLASTERING

External surfaces of buildings shall have 18 mm thick plaster in two layers, with the under layer 12mm thick 1:5 cement sand plaster and the top layer 6 mm thick 1:6 cement sand plaster. Inside wall surfaces shall have 12/15 mm thick 1:6 cement sand plaster. Rough surfaces shall have 15mm and smooth surface shall have 12 mm thick cement sand plaster.

All RCC ceilings shall be provided with 6 mm thick cement sand (fine) plaster (1:3) except for areas with false ceiling.

13.9 EXTERNAL PAINTING

External surfaces of the Control Room Building shall be painted with acrylic exterior flat paint as per manufacturer's specification and approval of Employer.

13.10 DOORS, WINDOWS AND VENTILATORS

The schedule of doors, windows and ventilators of the Control Room Building shall be as per the detailed finish schedule given in Table-1 (Detailed Finish Schedule), and shall conform to the relevant Indian standard codes (I S Codes)/ equivalent International Standards. Rolling Steel shutters shall be provided as per the layout and requirements of the building. Main entrance door to control room building shall be made of powder coated aluminium frame with 5.5 mm thick glazing double hermetically door shall be provided with hydraulic door closer of approved make.

13.11 CABLE TRENCH INSIDE CONTROL ROOM BUILDING

All cable trenches inside the Control Room Building shall be covered with minimum 6mm thick steel chequered plate with suitable stiffeners.

13.12 PLINTH PROTECTION

750 mm wide and 50 mm thick plain cement concrete 1:2:4 (1 cement:2 sand:4 graded 20 mm nominal size stone aggregate) shall be laid over 75 mm thick dry stone aggregates well rammed and consolidated with interstices filled with local sand including smooth finishing top.

13.13 PLUMBING & SANITATION

1. All plumbing and sanitation works shall be executed to comply with the requirements of the appropriate bye-laws, rules and regulations of the Local Authority having jurisdiction over such matters. The Contractor shall arrange for all necessary formalities to be met with regards to the inspection, testing, obtaining approval and giving notices etc.
2. **Three Layered** 'SINTEX' or an equivalent make PVC Roof water tank(s) of adequate capacity depending on the number of users for 24 hours storage shall be provided. However, a minimum of 2 nos. 1500 litre capacity shall be provided.
3. Chlorinated Polyvinyl chloride (CPVC) pipes having thermal stability for hot and cold water supply including all CPVC plain and brass threading conforming to relevant Indian standard codes (I S Codes)/ equivalent International Standards shall be used for internal piping works for water supply.
4. Sand C.I. pipes with lead joints conforming to relevant Indian standard codes (I S Codes)/ equivalent International Standards shall be used for sanitary works above ground level and RCC pipes shall be used for sanitary works below ground.
5. Each toilet shall have the following minimum fittings:
 - (i) WC (Western type) 390 mm high along with toilet paper roll holder and all other fittings, in toilets attached to conference room and S/S In-charge office; and WC (Indian Type) Orissa Pattern (580 x 440 mm) with all fittings shall be provided in common toilets.
 - (ii) Urinal (430 x 260 x 350 mm size) with all fittings and built-in-sensor for automatic flush after use.
 - (iii) Wash basin (550 x 400 mm) with all fittings.
 - (iv) Bathroom mirror (600 x 450 x 6 mm thick) with hard board backing.
 - (v) CP brass towel rail (600 x 20 mm) with CP brass brackets.
 - (vi) Soap holder and liquid soap dispenser.
 - (vii) Automatic Hand Dryer.
6. Water cooler for drinking water with adequate water storage facility shall be provided which shall preferably be located near pantry and away from the toilet block.
7. One no. stainless steel kitchen sink with Drain board (510 x 1040 x 178 mm bowl depth) for pantry shall be provided.
8. All fittings, fasteners, gratings shall be chromium plated.
9. All sanitary fixtures and fittings shall be of approved quality and type, manufactured by reputed manufacturers. All items brought to site must bear identification marks of the Manufacturer.
10. Contractor shall provide necessary nos. of septic tank and soak pit of adequate capacity to treat the sewage/sullage from the buildings.
11. Contractor shall undertake all other activities required to complete and commission the building.

13.14 BUILDING STORM WATER DRAINAGE

1. The building design shall provide for the collection of storm water from the roof. This water shall be drained to the main drainage system of the Sub-station.

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2. uPVC Rainwater down comer pipes conforming to relevant International standards/Indian Standards with water tight lead joints or medium class galvanized mild steel pipes conforms to relevant Indian standard codes (I S Codes)/ equivalent International Standards shall be provided to drain off the rain water from the roofs. These pipes shall be suitably concealed with masonry work or cement concrete or cladding material. The number and size of down comer pipes shall be governed by relevant Indian standard codes (I S Codes)/ equivalent International Standards.
3. All drains inside the buildings shall have minimum 40 mm thick grating covers; and in areas where heavy equipment loads are envisaged, Pre-Cast RCC covers shall be provided in place of steel grating.
4. Suitable arrangements for draining out water collected from equipment blow downs, leakages, floor washings, firefighting etc. shall be provided for each floor.

13.15 DETAILED FINISH SCHEDULE

The detailed finish schedule for all buildings is given below:

Table- 1: DETAILED FINISH SCHEDULE

Sl No.	LOCATION	FLOORING & SKIRTING 150 MM HIGH	WALL (INTERNAL)	CEILING	DOOR, WINDOWS & VENTILATOR
1.	Control Room	Vitrified tiles 8mm thick size 600 x 600mm	Premium acrylic emulsion paint on smooth surface applied with plaster of Paris (2 mm thick)	White wash above False Ceiling*	Windows shall be powder coated aluminium frames of 5.5 mm double glass, hermetically sealed with air gap of 40 mm by using suitable patch fittings/spider fittings. The glass shall extend horizontally from column to column and vertically from sill level of 0.75 m to bottom of lintel/roof beam. All doors shall be glazed powder coated aluminium doors and frames with 5.5mm Thick double glazing & hermetically sealed.
2.	Conference Room	Vitrified tiles 8mm thick size 600 x 600mm	Premium acrylic emulsion paint on smooth surface applied with plaster of Paris (2 mm thick)	White wash above False Ceiling*	Windows shall be of powder coated aluminium frames with 5.5 mm Thick double glazing & hermetically sealed. All doors shall be glazed powder coated aluminium doors with 5.5mm Thick double glazing & hermetically sealed.
3.	S/S In-charge Room.	Vitrified tiles 8mm thick size 600 x 600mm	Premium acrylic emulsion paint on smooth surface applied with plaster	White wash above False Ceiling*	Windows shall be of powder coated aluminium with 5.5mm Thick double glazing & hermetically sealed. All doors shall

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Sl No.	LOCATION	FLOORING & SKIRTING 150 MM HIGH	WALL (INTERNAL)	CEILING	DOOR, WINDOWS & VENTILATOR
			of Paris (2 mm thick)		be glazed powder coated aluminium doors with 5.5mm Thick double glazing & hermetically sealed.
4	Office Rooms	Vitrified tiles 8mm thick size 600 x 600mm	Premium acrylic emulsion paint on smooth surface applied with plaster of Paris (2 mm thick)	White wash above False Ceiling*	Windows shall be of powder coated aluminium with 5.5mm Thick double glazing & hermetically sealed. All doors shall be glazed powder coated aluminium doors with 5.5mm Thick double glazing & hermetically sealed.
5.	Electrical/ Electronic Test Lab./Telecom Room	Vitrified tiles 8mm thick size 600 x 600mm	Premium acrylic emulsion paint on smooth surface applied with plaster of Paris (2 mm thick)	White wash above False Ceiling*	Windows shall be of powder coated aluminium with 5.5mm Thick double glazing & hermetically sealed. All doors shall be glazed powder coated aluminium doors with 5.5mm Thick double glazing & hermetically sealed.
6.	ACDB & DCDB Room	62mm thick cement concrete flooring with metallic hardener topping. Skirting shall be of cement sand plaster.	Oil bound washable distemper on smooth surface applied with plaster of Paris putty	Oil bound washable distemper on smooth surface applied with plaster of Paris putty	Steel door 45mm thick double sheet 18 gauge MS steel suitably reinforced and filled with mineral wool. Windows/ventilator shall be of powder coated aluminium with 4mm glazing.
7.	Battery Room	Vitrified tiles 8mm thick size 600 x 600mm	Premium acrylic emulsion paint on smooth surface applied with plaster of Paris (2 mm thick)	White wash above False Ceiling*	Steel door 45mm thick double sheet 18 gauge MS steel suitably reinforced and filled with mineral wool. Windows/ventilator shall be of powder coated aluminium with 4mm glazing.
8.	Reception /Lobby	Vitrified tiles 8mm thick size 600 x 600mm	Premium acrylic emulsion paint on smooth surface applied with plaster of Paris (2 mm thick)	Oil bound washable distemper on smooth surface applied	Windows shall be of powder coated aluminium with 5.5mm Thick double glazing & hermetically sealed. All doors shall be glazed powder coated aluminium doors with 5.5mm

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Sl No.	LOCATION	FLOORING & SKIRTING 150 MM HIGH	WALL (INTERNAL)	CEILING	DOOR, WINDOWS & VENTILATOR
				with plaster of Paris putty	Thick double glazing & hermetically sealed.
9.	Corridor	Vitrified tiles 8mm thick size 600 x 600mm	Premium acrylic emulsion paint on smooth surface applied with plaster of Paris (2 mm thick)	Oil bound washable distemper on smooth surface applied with plaster of Paris putty	Windows shall be of powder coated aluminium with 5.5mm Thick double glazing & hermetically sealed. All doors shall be glazed powder coated aluminium doors with 5.5mm Thick double glazing & hermetically sealed.
10.	Portico	Cast-in-situ 40 mm thick Cement concrete (1:2:4) with 18mm granite flooring	Granite cladding	Oil bound washable distemper on smooth surface applied with plaster of Paris putty	All doors shall be glazed powder coated aluminium doors with 5.5mm Thick double glazing & hermetically sealed.
11.	Toilet	Ceramic tiles	Vitrified tiles 8mm thick size 600 x 600mm	Oil bound washable distemper	Windows/ ventilator shall be of powder coated aluminium with 5.5mm Thick double glazing & hermetically sealed. All doors shall be flush door shutters made of pre-laminated particle board with powder coated aluminium frame.
12.	Janitor room	Ceramic tiles with white cement	DADO glazed tile 2100mm high, oil bound washable distemper above DADO	Oil bound washable distemper	Windows/ ventilator shall be of powder coated aluminium with 5.5mm Thick double glazing & hermetically sealed. All doors shall be flush door shutters made of pre-laminated particle board with powder coated aluminium frame.
13.	GIS Hall	62mm thick cement concrete flooring with hardener.	Non VOC acrylic emulsion paint over 2mm POP putty up to false ceiling over	In case of RCC roof, ceiling shall be finished	All doors, windows, ventilators shall be of uPVC with minimum 5.5mm thick double glazing & hermetically sealed.

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Sl No.	LOCATION	FLOORING & SKIRTING 150 MM HIGH	WALL (INTERNAL)	CEILING	DOOR, WINDOWS & VENTILATOR
		Two coats of PU coating over the Floor shall be provided. over the total area (Present + Future). The final coat of PU shall be applied after Installation of equipments. Total thickness of PU coats Shall be minimum 300 microns.	approved primer coat over plastered surface	with Non VOC acrylic emulsion paint over approved primer coat.	
14.	Panel/ Relay Room/ Communication Room	Vitrified tiles 8mm thick size 600 x 600mm	Non VOC acrylic emulsion paint over 2mm POP putty upto false ceiling over approved primer coat	False ceiling Painted with Non VOC acrylic emulsion paint to give an even shade.	All doors, windows, ventilators shall be of uPVC with minimum 5.5mm Thick double glazing & hermetically sealed.
15.	AHU Room	62 mm thick cement concrete flooring with hardner	Non VOC acrylic emulsion paint over 2 mm POP Putty up to false ceiling over approved primer coat over plastered surface.	RCC ceiling with Non-VOC acrylic emulsion paint over approved primer coat.	All windows, ventilators shall be of uPVC with minimum 5.5mm Thick double glazing & hermetically sealed. All doors shall be flush door shutters (35mm thick block board with commercial veneer on both sides with lipping) with powder coated aluminium frame.

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13.16 SUBMISSIONS

The following information/documents/drawings shall be submitted for review and approval:

1. Architectural Structural design calculations, Structural drawings (including construction/ fabrication), both in hard and soft copies, for all reinforced concrete and structural steel structures.

2. Fully dimensioned and detailed floor plans, cross-sections, longitudinal sections and elevations identifying the major building components.
3. Product information of building components and materials, including walls, partitions, flooring, ceilings, roofing, doors, wall panelling and windows and building finishes along with BOQ.
5. A detailed schedule of building finishes including colours schemes along with item description.
6. A door & window schedule showing door & window types and locations, lock sets and latch sets and other door hardware along with item details.

Approval of the above information shall be obtained before ordering materials or starting construction/fabrication, as applicable.

13.17 FALSE CEILING

*For all the buildings except GIS Halls, as Control room & Conference room, Panel room, administration room, battery Room, complete CRB etc. false ceiling shall be provided with aluminium linear ceiling system C84. For rest of the places false ceiling required shall be 15mm thick approximately 600 X 600mm Mineral fiber board panel false ceiling and making cut-outs for electrical fixtures, AC diffusers, open able access etc. complete with silhouette profile system with 15mm wide flange incorporating 6mm central recess white / black main runners at 1200mm centre-centre and not greater than 600mm from the adjacent wall. The cross tees shall be provided to make a module of approximately 600mm X 600mm by fitting 600 mm long cross tees centrally placed between 1200 mm long cross tees. Cross tees also have 15mm wide flange incorporating 6mm central recess white/black. The module formed above shall be anchored to the slab with channels or angles, suspenders as per manufacturer's specifications.

13.18 ELECTRIFICATION

All electrification shall be executed as per details specified elsewhere in the technical specification. All details shall be as per relevant Indian standard codes (I S Codes)/ equivalent International Standards.

14.0 FIRE FIGHTING PUMP HOUSE BUILDING (if required)

GENERAL

The scope includes design, engineering and construction, including anti-termite treatment, plinth protection, DPC, peripheral drains, fire-fighting, electrification etc. of fire fighting pump house building.

The fire fighting pump house building shall be essentially single storied reinforced cement concrete (RCC) framed Building. The building auxiliary services like internal electrification, fire protection systems shall be designed in accordance with the requirements as specified in relevant section of technical Specification. The design and layout of foundation of various pumps and cable trenches inside building shall be prepared by the contractor as per requirement of proposed fire fighting system.

AREA REQUIREMENTS

Dimensions of the Building shall be decided by the bidder depending upon the requirement. The approximate size of building is 12.3m X 7.9mX 4.3 m high. The height of building shall be measured from finished floor level to top of roof slab.

DESIGN CRITERIA

The Building shall be designed:

1. To the requirements of the relevant /Indian standards/ equivalent International standards quoted therein, and as specified in this specification.
2. for the specified climatic and loading conditions.
3. To adequately suit the requirements of the pumps and firefighting system contained in the buildings and in all respects to be compatible with the intended use and occupancy.
4. with a functional and economical space arrangement.
5. To be aesthetically pleasing. Different buildings shall show a uniformity and consistency in architectural design, as far as possible.
6. To allow for easy access to the equipment's as well as maintenance of the equipment's.
7. G.I. ladder with cage shall be provided for access to the roof.
8. With, wherever required, fire retarding materials for walls, ceilings doors etc., which would prevent supporting or spreading of fire and shall be decided by the bidder.
9. Suitable Expansion joints, wherever required, shall be provided as per Codal Provisions.
10. All the members of the buildings frame shall be designed for the worst combination of Loads as per relevant International standards/Indian Standards.
11. Permissible stresses for different load combinations shall be taken as per relevant International standards/Indian Standards.
12. Seismic analysis of the building for Earthquake forces shall be carried out as per relevant International standards/Indian Standards (IS 1893).

DESIGN LOADS

1. Building structure shall be designed for the most critical combinations of dead loads, super-imposed loads, equipment loads, wind loads, seismic loads etc. Any other incidental load, if anticipated, shall be duly accounted for in the design, and shall be clearly mentioned by the bidder.
2. Dead loads shall include the weight of structures complete with finishes, fixtures and partitions, and shall be taken as per relevant International standards/Indian Standards.
3. Super-imposed loads in different areas shall include live loads, cable trays, and small pipe racks/hangers, piping system and erection, operation and maintenance loads wherever these loads are expected.
 - 1) Non-accessible Roof – 0.75 kN/m².
 - 2) Accessible Roof – 1.50 kN/m²
4. Wind loads shall be calculated as per relevant International standards/Indian Standards. The Factors affecting the wind speed shall be taken based on the site conditions.
5. Earthquake loads shall be calculated as per relevant International standards/Indian Standards.
6. Wind forces and Seismic forces shall not be considered to act simultaneously.
7. All the load combinations to create worst combinations of loads shall be as per relevant International standards/Indian Standards.
8. Floors shall be designed to carry loads imposed by Pumps, cables, piping, movement of maintenance trucks (if required) and any other load associated with the building. In general, floors shall be designed for live loads as per relevant International standards/Indian Standards. Cable and piping loads shall also be considered in addition to the live loads for floors where these loads are expected.

FLOORS, WALLS & ROOFS

The floor shall be constructed with 52 mm thick cement concrete finished with iron saw dust hardener topping, 150 mm thick base plain cement concrete layer, 100 mm thick compacted local sand filling and 200 mm thick hard core of stone ballast with interstices filled with local sand shall be laid below cement concrete flooring top. The earth filling below floor shall be well rammed.

PLASTERING

External surfaces of building shall have 18 mm thick plaster in two layers, with the under layer 12mm thick 1:5 cement sand (coarse) plaster and the top layer 6 mm thick 1:6 cement sand (coarse) plaster. Inside wall surfaces shall have 12/15 mm thick 1:6 cement sand (coarse) plaster. Rough surfaces shall have 15mm and smooth surface shall have 12 mm thick cement sand plaster. Ceiling shall be plastered with 6 mm thick cement sand plaster (1 Cement : 3 Sand).

EXTERNAL PAINTING

External surfaces of the Building shall be painted with acrylic exterior flat paint as per manufacturer's specification and approval of Employer.

DOORS, WINDOWS AND VENTILATORS

The schedule of doors, roller shutter, windows and ventilators of the Building shall be of steel as per relevant International standards/Indian Standards. Rolling Steel shutters shall be provided as per the layout and requirements of the building. Main entrance door to the Building shall be MS door frame with M.S. sheet double shutter. Windows and ventilators shall be of steel made of hot rolled sections windows and ventilators shall be provided with 5.5 mm thick glazing.

CABLE TRENCH INSIDE FIRE FIGHTING PUMP HOUSE BUILDING

All cable trenches inside the building shall be covered with minimum 6 mm thick steel chequered plate with suitable stiffeners. The structural steel used for cable tray support, earthing cleat, chequered plates for internal cable trenches of fire fighting pump house building shall be measured and paid under miscellaneous steel item of BPS

PLINTH PROTECTION

750 mm wide plinth protection all-around the building shall be provided. Plinth protection shall comprise of 50 mm thick PCC (1:2:4) laid over 75 mm thick well compacted stone aggregates with interstices filled with local sand including smooth finishing top.

PARAPET

230 mm thick and 500 mm high brick parapet shall be provided. The parapet shall be plastered with cement sand plaster (1:6).

BUILDING STORM WATER DRAINAGE

1. The building design shall provide for the collection of storm water from the roof. This water shall be drained to the main drainage system of the Sub-station.
2. Cast Iron Rainwater down comers pipes conforming to relevant International standards/Indian Standards with water tight lead joints or medium class galvanized mild steel pipes conforms to relevant

International standards/Indian Standards shall be provided to drain off the rain water from the roofs. These pipes shall be suitably concealed with masonry work or cement concrete or cladding material

3. Suitable arrangements for draining out water collected from equipment blow downs, leakages, floor washings, fire fighting etc. shall be provided, if found necessary.

DETAILS OF ROOF

Roof of the Building shall consist of Cast-in-situ RCC slab treated with a water proofing system which shall be an integral cement based treatment conforming to relevant International standards/Indian Standards. The water proofing treatment shall be of following operations:

- (a) Applying and grouting a slurry coat of neat cement using 2.75 kg/m² of cement admixed with proprietary water proofing compounds conforming to relevant International standards/Indian Standards over the RCC slab including cleaning the surface before treatment.
- (b) Laying cement concrete using broken stones 25mm to 100mm size with 50% of cement mortar 1:5 (1 cement: 5 coarse sand) admixed with proprietary water proofing compound conforming to relevant International standards/Indian Standards over 20mm thick layer of cement mortar of min 1:5 (Cement: 5 coarse sand) admixed with proprietary water proofing compound conforming to relevant International standards/Indian Standards to required slope and treating similarly the adjoining walls up to 300mm height including rounding of junctions of walls and slabs.
- (c) After two days of proper curing applying a second coat of cement slurry admixed with proprietary water proofing compound conforming to relevant Indian standard codes (I S Codes) / equivalent International Standards.
- (d) Finishing the surface with 20mm thick joint less cement mortar of mix 1:4 (1 cement: 4 coarse sand) admixed with proprietary water proofing compound conforming to relevant International standards/Indian Standards and finally finishing the surface with trowel with neat cement slurry and making of 300 x 300 mm square.
- (e) The whole terrace so finished shall be flooded with water for a minimum period of two weeks for curing and for final test. All above operations to be done in order and as directed and specified by the Executive Engineer In charge.
- (f) Average thickness of water proofing shall be 120 mm and minimum thickness at khurra shall be 65 mm.

DETAILED FINISH SCHEDULE

The detailed finish schedule for Fire Fighting Pump House Building is given below:

Table- 2 : DETAILED FINISH SCHEDULE

S.N	LOCATION	FLOORING & SKIRTING 150 MM HIGH	WALL (Internal)	CEILING	ROLLER SHUTTER,DOOR, WINDOWS & VENTILATOR

1.	Fire Fighting Pump House	62mm thick cement concrete flooring with metallic hardener topping .skirting shall be of cement sand plaster.	Oil bound washable distemper on masonry portion.	As per Manufacturer details.	Windows/ ventilator shall be hot rolled steel section with 5.5mm thick glazing. Entry door shall be of M.S. Sheet double shutter and rolling shutter shall be of steel.
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ELECTRIFICATION

All electrification shall be executed as per details specified elsewhere in the technical specification. All details shall be as per relevant Indian standard codes (I S Codes)/ equivalent International Standards.

ELECTRIFICATION

All electrification shall be executed as per details specified elsewhere in the technical specification. All details shall be as per relevant Indian standard codes (I S Codes)/ equivalent International Standards.

15.0 CAR PARKING SHED

Aesthetically pleasant RCC car parking shed as per design and drawings as developed by the contractor and suitable to park 05 cars shall be constructed at suitable location to be decided during detailed engineering stage

16.0 WATER SUPPLY

(i) Water shall be made available by Employer at any feasible point within substation boundary at single point to the contractor if water is available. Contractor shall state the total water requirement both in terms of quantity and head to Employer. However, if water is not available, the contractor shall make its own arrangement.

(ii) The contractor shall carry out all the plumbing/erection works required for supply of water in control room cum administrative building beyond the single point as at (i) above.

(iii) The contractor shall carry out all the plumbing/erection works required for supply of water to Fire Fighting pump house, Security room beyond the single point as at (i) above.

(iv) The details of tanks, pipes, fittings, fixtures etc. for water supply are given elsewhere in the specification under respective sections.

(v) A scheme shall be prepared by the contractor indicating the layout and details of water supply which shall be got approved by Employer before actual start of work including all other incidental items not shown or specified but as may be required for complete performance of the works. All drawings shall be prepared by the contractor for approval of Employer.

20.0 SEWERAGE SYSTEM

- (i) Sewerage system shall be provided for all buildings wherever applicable.
- (ii) The Contractor shall construct septic tank and soak pit suitable for 50 users each for control room building and transit camp, if constructed. If septic and soak pit system is not acceptable by local Authority, contractor will have to install suitable sewerage system as per local statutory requirement.
- (iii) The system shall be designed as per relevant Indian standard codes (I S Codes)/ equivalent International Standards. All drawings shall be prepared by the contractor for approval of Employer.

All shop connections shall be welded with appropriate arc welding process and welding shall be in accordance with relevant standard, AWS D 1.1. as appropriate. The Webs should be welded on to the flanges at both the faces at top and bottom for columns, beams and crane girders. Weld material should have strength more than the parent metal.

21.0 GIS HALL & CONTROL ROOM BUILDING

21.1 Control Room Building GIS Hall, 33kV panel hall

The 220kV GIS Hall shall be pre-engineered steel structure type and Control room cum administrative building shall be RCC Framed Structure type, 33kV GIS Hall/room shall also be RCC Framed Structure type.

Material specification and other details for construction of Pre-engineered steel building shall be as described in subsequent paragraphs. The base plate of steel columns shall be mounted on the RCC foundation by means of hot dip galvanised foundation bolts (Galvanisation of 610gms/Sq. M). In order to facilitate inspection and maintenance, the structures shall be provided with climbing devices. Separate fire escape doors shall also be provided in the GIS Building.

Panels shall be kept in an air-conditioned enclosure. A glazed partition made of aluminium frame and 5.5mm thick glass shall be provided between GIS hall and panel room. The glazing shall be kept at a still level of 0.9 m above floor level. The height of glazing shall be minimum 2.1 m above sill level.

Walkway of width not less than 1.0m shall be provided at gantry girder level on the two longer side of GIS hall along with climbing arrangement to facilitate maintenance of crane.

All the material required for Pre-engineered (steel) building shall be procured from reputed manufacturer for which prior approval shall be obtained. Manufacturing of various parts of the building shall start only after approval of "Manufacturing Quality Plan to be prepared by the bidder during detailed engineering stage". Complete material shall be offered for inspection to RECTPCL/PDD, J&K before dispatch. Inspection shall be carried out based on assembly (fabrication) drawings approved by Employer and "BILL OF MATERIAL" & Shop drawing prepared by the Manufacturer and certified by the Contractor for its correctness. Approval of BOM and shop drawing from employer is not required.

21.1 Design Criteria and Design Loads

Design criteria and design loads shall be same as defined for Control room cum administrative building at clause no. 13.3 and 13.4 respectively except in case of design loads for GIS building wherein an impact factor of 30% and lateral crane surge of 10% (lifted weight + trolley) shall be considered in the analysis of frame according to provision of IS: 875. The horizontal surge shall be 5% of static wheel load. Crane load shall be applied as per requirement of building.

21.2 Material Specification

21.2.1 Primary members fabricated from plates and sections with minimum yield strength of 345 Mpa or to suit design by continuous welding.

21.2.2 Secondary members for Purlins and Girts shall conform to the physical specification of ASTM A570 (Grade 50) or equivalent IS/equivalent international standards (IS 277 with latest amendments) having a minimum yield strength of 345 MPa. The minimum thickness of secondary members shall be 2.5mm.

21.2.3 Rod / ANGLE/pipe bracing shall conform to the physical specification of relevant IS/equivalent international standards of minimum 245Mpa Yield Strength

21.2.4 All hot rolled sections shall conform to the physical specifications of IS/equivalent international standards. All other miscellaneous secondary members shall have minimum yield strength of 250 MPa.

21.3 DESCRIPTION

21.3.1 PRIMARY MEMBERS:

Primary structural framing shall include the transverse rigid frames, columns, corner columns, end wall wind columns and crane gantry girders and Frames at Door openings.

21.3.2 SECONDARY MEMBERS:

Secondary structural framing shall include the purlins, girts, eave struts, wind bracing, flange bracing, base angles, clips, flashings and other miscellaneous structural parts. Suitable wind bracings sag rods to be reckoned while designing the structure.

21.3.3 PURLINS, GIRTS, CLIPS:

Purlins, girts and clips should be of Pre Galvanised steel of 345 Mpa having a coating thickness of 275 gms/sq. M inclusive of both sides.

21.3.4 ROOF SHEETING

Factory assembled 80 mm thick puff (density 40kg/cu.m. +2 Kg/cu m as per IS/equivalent International Standards) sandwiched panels shall be provided. These panels shall be made of puff insulation sandwiched between two high tensile steel sheets each of 0.5 mm thickness. The material of sheets shall confirm to ASTM 792 M Grade 345B with minimum yield strength of 345 Mpa. The steel sheets shall be provided with hot dip coating of Zinc aluminium alloy (approximately 55% Al , 43.5% Zn and 1.5 % silicon) . Total mass of zinc aluminium alloy coating shall be minimum 200

gm/Sq. m inclusive of both sides. The tolerance of base metal thickness (BMT) of steel sheet shall be as per IS/equivalent International Standards . After hot dip coating of Zinc aluminium alloy , the sheet shall be provided with steel primer and silicon modified polyester (SMP) paint. The total thickness of primer and paint shall be 40 microns inclusive of both sides (TCT) comprising of 20 microns of SMP paint on top surface and 10 microns of backer coat (polyester coat) on back surface over 5 microns thick primer each on both surfaces with inorganic pigments coated free from heavy metals. Painting shall conform to IS/equivalent International Standards. In case SMP paint is not available, Super Durable Polyester paint (SDP) can also be used by the bidder without cost implication to Employer.

21.3.5 Wall Panels

Wall panel material specifications shall be same as roof panels. However, the thickness of the Panel shall be 80 mm.

21.3.6 SHEETING FASTENERS:

Standard fasteners shall be self-tapping zinc plated metal screws with EPDM bonded zinc plated washers. All screws shall be colour coated to match roof and wall sheeting.

21.3.7 SEALER:

This is to be applied at all side laps and end laps of roof panels and around self-flashing windows. Sealer shall be pressure sensitive elastomeric Butyl tapes. The sealer shall be non-asphaltic, non-shrinking and nontoxic and shall be superior adhesive metals, plastics and painted at temperatures from 51°C to +104°C.

21.3.8 CLOSURES:

Solid or closed cell closures matching the profiles of the panel shall be installed along the eaves, rake and other locations specified on drawings.

21.3.9 FLASHING AND TRIM:

Flashing and / or trim shall be furnished at the rake, corners, eaves, and framed openings and wherever necessary to provide weather tightness and finished appearance. Colour shall be matching with the colour of wall. Material shall be 26 gauge thick conforming to the physical specifications of sheeting.

21.3.10 WALL LIGHTS:

For day lighting purpose of GIS hall, minimum 2 mm thick double sheet arrangement with air gap to match with the side panels, of approved translucent polycarbonate sheet shall be provided for wall lighting in addition to windows for at least 10% of wall area on upper portion of both long walls. The polycarbonate sheet shall be fixed with necessary EPDM, rubber gasket, Silicon Sealant, cold forged fastener, aluminium profile etc. including MS supporting structural steel (conforming to relevant IS/equivalent International Standards) frame to ensure water tight arrangement.

21.3.11 GUTTERS AND DOWN SPOUTS:

Gutters and downspouts shall be adequately designed to ensure proper roof drainage system. Material shall be same as that of sheeting with matching colour snow fall retarders barrier shall be provide on roof slopes.

21.3.12 PAINTING OF BUILT UP STEEL FRAMES, CRANE GANTRY GIRDERS, FRAMES AT DOOR OPENINGS, WALK WAY STEEL AND LADDER:

The built up frame ,Crane gantry girders, frames for door openings and steel for walk way shall be applied with a priming coat of standard steel primer followed by one coat coating of epoxy paint and final coating of PU (Minimum 100 Micron) . The steel work for aforesaid members shall be provided with suitable treatment of shot blasting before application of steel primer. The steel material of ladder shall be galvanized.

21.3.13 COLOUR SCHEME:

Colour Scheme matching with local aesthetic and best industry practices shall be submitted by vendors for approval of Employer. Three alternatives of coloured isometric views with colour codes shall be submitted for approval. The monotony of external colour of sheet shall be avoided by providing vertical bands of different coloured sheet. The colour of roof sheet shall be light coloured to minimize heat absorption. External and internal masonry walls shall be painted with suitable colour matching with colour of steel sheet.

21.4 CONNECTIONS:

21.4.1 SITE CONNECTIONS

- a) All primary bolted connections shall be provided with galvanized high strength bolts, washers, nuts conforming to specifications of relevant standard.
- b) All secondary bolted connections shall be furnished with bolts, nuts, washers conforming to the specifications of grade 4.6 of relevant standard or ASTM-A307.

21.4.2 SHOP CONNECTIONS

All shop connections shall be welded with appropriate arc welding process and welding shall be in accordance with relevant standard, AWS D 1.1. as appropriate. The Webs should be welded on to the flanges at both the faces at top and bottom for columns, beams and crane girders. Weld material should have strength more than the parent metal.

21.4.3 ROOF & WALL BRACINGS

Roof and wall bracings shall have minimum yield strength of 250 Mpa and shall conform to the specifications of relevant standard.

21.5 INTERNAL FINISH SCHEDULE

The finishing schedule is given in subsequent clauses and table-1. Areas not specified in finish schedule shall be provided with vitrified tile flooring, and Premium Acrylic emulsion paint oil bound washable distemper over two mm thick putty. Paints used in the work shall be of best quality specified in relevant standard.

21.6 CABLE TRENCH IN GIS HALL

All cable trenches in GIS hall shall be covered with minimum 6mm thick steel chequered plate with suitable stiffeners. Chequered plate shall be painted with two or more coats of Epoxy paint as per relevant standards.

21.7 EXTERNAL PLASTER AND PAINTING

External plaster 18mm thick shall be of 1:6 cement sand plaster in two layers. External surface of the control room building and GIS building (brick wall portion) shall be painted with Premium acrylic smooth exterior paint with silicon additives over and including priming coat of exterior primer as per relevant standards.

21.9 DOORS AND WINDOWS

The details of doors and windows of the control room building shall be as per finish schedule Table-1 conforming to relevant IS/equivalent International Standards. Rolling steel shutters shall be provided as per layout and requirement of buildings. Main entrance door to control room building shall be made of powder coated aluminium frame with 5.5 mm thick double hermetically sealed glass.

21.10 PARTITION

Partitions, if required, shall be made of powder coated aluminium frame provided with 5.5 mm thick clear glass or pre- laminated board depending upon the location of partition.

22.0 Boundary wall, Main Gate, Security Room and septic tank and soak pit

22.1 Boundary Wall :

Boundary wall shall be brick masonry wall with RCC frame. The typical construction drawing of the boundary wall applicable is enclosed with tender document. All walls shall have adequate weep holes/ gratings as per drawing/ as per site conditions for the drainage of water. The layout shall be as per approved layout drawing during detail engineering.

RCC framed with brick masonry/concrete block in fill between columns shall be provided along periphery of substation. The brief description of boundary wall is given below:

- (a) Height of boundary wall (Masonry portion) above Natural ground level (NGL) = 2.5 m
- (b) 0.5 m High of Y shaped angle supports (50x50x6 mm) above each column with about 0.5 m deep grouted in column shall be provided as grill on the boundary wall
- (c) C/c distance of RCC Column (230 X 230 mm size) = 2.5 m
- (d) 8 rows of galvanised barbed wire with concertina coil a top of boundary wall shall be provided. 4 rows of barbed wire on each arm of Y-shaped angle are to be provided.
- (e) Grade of Concrete for RCC works = M30
- (f) Mix of masonry works = 1 Cement: 6 Sand
- (g) 12 mm thick Cement sand plaster (1 cement: 6 Sand) over exposed portion of boundary wall along with 50mm thk. CC(1:2:4) coping on the top of wall.
- (h) Two coats of oil bound distemper with one coat of cement primer of approved make shall be applied over exposed portion of boundary wall.
- (i) A RCC plinth beam (230 X 300 mm deep) shall be provided at ground level. A lintel beam of 230 X 230 mm shall be provided over gratings.

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- (j) Suitable steel grating made of 20 mm square bars shall be provided at suitable locations preferably @ 100 m to allow the flow of surface water.
- (k) Suitable foundation of about 1.5 depth shall be provided for each RCC column. 75 mm thick PCC (1:4:8) layer shall be provided below all RCC works.
- (l) All steel works shall be provided with two coats of synthetic enamel paint over a coat of steel primer of approved make.
- (m) Twin columns with 25 mm expansion gap at every 45 meter length shall be provided.
- (n) Suitable design of boundary wall shall be developed by the contractor.

The boundary wall shall be measured and paid on running meter length basis.

22.2 Main Gate

A steel gate of 2.1 m high and 6 m wide along with 1.5 m wide site gate shall be provided at entry location of substation. The gate shall be supported on steel columns. The steel support columns shall be encased with suitable RCC foundations. Suitable wheel mounting arrangement shall be provided at the bottom of gate for smooth opening of gate. All steel works shall be provided with two coats of synthetic enamel paint over a coat of steel primer of approved make.

The item shall be measured and paid on Lump sum basis. Typical drawing of the gate is also enclosed herewith for reference, however, suitable design and drawing for pillars and foundations shall be prepared by the contractor.

22.3 Security Room:

Typical drawing of the Security Room is enclosed herewith for reference, however, suitable design and drawing for pillars and foundations shall be prepared by the contractor.

An attached toilet of 1.5 m x 1.5 m size shall be provided. Suitable septic tank and soak pit for 10 users with cleaning interval of 3 years shall also be provided. A RCC platform (600 mm wide) at window sill level along with wardrobe shall be provided. All sanitary works and a PVC water tank of 1000 litre capacity shall also be provided. All finish details shall match with other buildings mentioned elsewhere in the technical specification.

All external walls shall be provided with insulation of 80 mm puff panels (wood look paint) as per specifications of GIS puff panels with an air gap of 40mm fixed with suitable tie members, opening for windows/ventilators/exhaust fans shall be maintained and sealed in the sides.

The item shall be measured and paid on square meter area basis.

23.0 MODE OF MEASUREMENT

23.1 Geotechnical investigation

This shall include carrying out field tests, laboratory tests, compilation of results and preparation of soil report with recommendations for type of foundations shallow or pile type, suitability of soil for

construction of substation etc. The geotechnical investigation work shall be measured on lump sum basis.

23.2 Contour survey and site leveling.

The Contour survey work shall not be measured and paid separately and shall be deemed to be included in the item of site levelling work.

Measurement of Earth work in all kind of soil including soft/disintegrated rock in the item of cutting and filling and item of earth work in the filling with borrowed earth shall be made in Cubic meters. No void deduction for 95% compaction.

23.3 Earthwork

This shall include excavation in all kinds of soil including rock, all leads and lifts including back filling with suitable earth, compacting, dewatering (if required) and disposal of surplus earth or rock to a suitable location within a lead up to 2 km. The surplus earth if disposed within substation boundary shall be spread in uniform layers each compacted with two passes of suitable compacting equipment. The quantity of excavation for foundations of towers, equipment support structures, all transformers/Reactors, DG Set, firewall, cable trenches, fire fighting water tank, buildings and underground water tanks, covered car parking, External lighting poles, control cubicles, marshalling box as well as quantity of excavation for roads, rail cum road, drains, culverts, rainwater harvesting, septic tank, soak pit, external water supply system, site surfacing, chain link fencing (including gate) shall not be measured separately and shall be deemed to be included in the composite rates quoted by the bidder for the respective works. All other excavation required for the completion of the work including plinth protection, flooring, sewerage system, manholes, pipes, earth mat etc. shall also not be paid for seperately.

23.4 PCC

Providing and laying Plain Cement Concrete of all types and at all locations including all leads and lifts. All PCC required for

- i) PCC 1:2:4 (1 cement : 2 sand : 4 coarse aggregate 20 mm nominal size) - Flooring of buildings, plinth protection, fencing, transformer/reactor foundation, rail track, drain, culverts, septic tank, chain link fencing, fencing gate ,external lighting poles etc.
- ii) PCC 1:4:8 (1 cement : 4 coarse sand : 8 stone aggregate, 40mm nominal size) - All foundations of towers, equipment support structures, buildings, fire fighting water tanks, covered car parking, cable trench, roads, under flooring, rail-cum-road, transformer foundation, reactor foundation, drain, cable trench crossings, culverts, fence, gate etc.
- iii) PCC 1:5:10 (1 Cement: 5 sand: 10 Stone aggregate, 40mm nominal size) for site surfacing in switchyard, roof water proofing etc.

and for the completion of the work including hold fasts of doors/windows/rolling shutters, fixing of plumbing pipes, bedding concrete for sewer lines, embedment of electrical conduits etc. shall not be

measured and deemed included in the composite rates quoted by the bidder for respective works. Water proofing compound wherever specified shall be added without any extra cost.

23.5 RCC

Reinforced cement concrete shall include all leads, lifts, formwork, grouting of pockets and underpinning, (but shall exclude reinforcement & miscellaneous structural steel like inserts etc.), of M30 design mix (Minimum). This shall also include pre-cast RCC work and addition of water proofing compound wherever required for which no additional payment shall be made. RCC quantity shall not be measured separately in cubic meters as this shall be deemed to be covered in respective items of BPS.

23.6 Steel Reinforcement

Reinforcement steel shall not be measured separately as this shall be deemed to be covered in respective items of BPS.

23.7 Stone filling over grating in Transformer/Reactor foundation

Measurement of stone (40mm nominal size) filling over gratings of transformer/reactor foundations shall **not** be made as per theoretical volume of the space to be filled in the transformer foundation as per approved drawings as this shall be deemed to be covered in item no. 3 (i) of Civil works in BPS.

23.8 Miscellaneous structural steel

Measurement for Supply, fabrication, transportation and erection of all miscellaneous structural steel work for rails alongwith rail fixing details and gratings with supports for transformers/reactors, Cable trenches with covers (Chequered plate covers, cable supports, earthing cleats and edge protection angles etc.), all other steel fittings and fixtures, inserts and embedment in concrete of transformer/reactor foundation and cable trenches shall be made as per approved drawings. The unit rate for this item shall be inclusive of cutting, grinding, drilling, bolting, welding, pre- heating of the welded joints, applying a priming coat of steel primer and anti-corrosive bitumastic paint/ synthetic enamel paint in general but with Zinc Phosphate Primer (Two packs) for grating and support for grating in Transformer foundation. (Wherever specified), setting of all types of embedment in concrete, etc. Steel required for foundation bolts, nuts and bolt, doors, windows, ventilators, louvers, rolling shutters, chain link fencing, gratings in drains, soil pipes, plumbing pipes, floor traps, embedment's required for rainwater harvesting, septic tank, soak pit, roof truss and purlins required for fire water tank, etc. shall not be considered for payment and measurements. Quantity shall be measured in metric tonnes.

23.9 Roads

- A). The measurement for the concrete road shall be made on the basis of area in square meter (M2) of top concrete completed surface of the road and shall be deemed to include all items such as excavation, Concreting, reinforcement, compaction, rolling, watering, WBM, shoulder, etc. complete as per approved drawing.
- B) The measurement of bituminous road shall be made on the basis of area in square meter (M2), of the top bituminous completed surface of the road and shall include all items such as excavation,

compaction, rolling, watering, sub base course, WBM, shoulder, premix carpet etc. complete as per approved drawing.

23.10 Anti-weed Treatment, 75mm thick PCC and Stone Spreading

The measurement shall be done for the actual area in square metres of stone spreading provided in the switchyard .It includes providing and spreading of 100mm thickness of uncrushed/crushed/broken stone of 40mm nominal size as per relevant IS codes/equivalent International standards for the specified area. Application of anti-weed treatment including material shall be measured in Square meter based on actual area and it will be same area as of stone spreading in switchyard. The measurement of 75mm thick PCC shall also be done in Sq. meter based on actual area of PCC.

23.11 Chain Link Fencing and gate

The measurement shall be made in running metres of the fence provided as per approved drawing. The rate shall be including the post, fencing, MS Flat, painting, brick work, concrete and plaster of toe wall etc. complete. The Fencing gate shall also be measured as part of chain link fencing.

23.12 Cable Trenches and Cable trench Crossings

All items like Excavation, earthwork, PCC, RCC, reinforcement steel except RCC hume pipes and miscellaneous steel required for construction of Cable Trenches of various sizes and cable trench crossings shall be measured in route meter. . However, RCC hume pipes used in culverts and miscellaneous steel required for cable trench shall be measured under respective item of Bid price schedule (BPS) as described in clause of hume pipes and Miscellaneous steel. Please note that No additional payment for brick work, plaster and PVC pipes used for cable trench crossings and sealing of trench mouth shall be admissible.

23.13 Drains & Culverts

All items like excavation, PCC, brick work, plaster and stone pitching except RCC hume pipes required for completion of drains and culverts shall be deemed to be included in the quoted rate of drain. The quantity for drain section shall be measured in running meters irrespective of size. However, RCC hume pipes used in culverts shall be measured under respective item of Bid price schedule (BPS) as described in clause of hume pipes.

23.14 External Finishing of RCC Framed Buildings/structures:

The item shall be measured per square meter area basis. Contractor has to assess the quantity as per requirement of Control room cum administrative building, Fire Fighting Pump House, fire fighting water tank, switchyard panel room, other buildings, covered car parking and quote for the same separately. This shall include following items.

- 1) External plastering/cement wash : 18mm Cement plaster in two coats under layer 12 mm thick cement plaster 1:5 (1 cement: 5 coarse Sand) finished with a top layer of 6 mm thick cement plaster 1:6 (1 cement: 6 fine Sand) for all buildings and fire fighting water tank .

- 2) Providing and applying two or more coats of Acrylic smooth exterior paint over an under coat of suitable primer on new cement plaster surfaces of the control room building, auxiliary building, fire fighting pump house building, fire fighting water tank, panel room , other buildings and covered car parking. It shall be inclusive of required tools, scaffolding, materials and other painting accessories etc. as per recommendations of manufacturer.

23.15 Hume Pipe

Hume pipe shall be measured diameter-wise and laid as per approved drawings and shall be measured in running meters. The item shall be inclusive of excavation, concreting, reinforcement, laying, back filling, jointing etc.

23.16 Building

The measurement of all items of each type of buildings shall be made on area in Square Meter basis. The structural steel used for cable tray support, earthing cleat, chequered plates for internal cable trenches of building and panel room wherever applicable shall be measured and paid under miscellaneous steel item of BPS and described above paras. The structural steel and foundation bolts for fixing equipments with foundations/raft within buildings shall not be measured separately which shall be deemed to be included in the quoted rates per square meter of buildings. External Finishing shall not be measured separately as it shall be deemed to be included in the item No. 6 of Civil works in BPS i.e. Design, Engineering and Construction of Buildings. The rest of the entire work required to complete the building in all respect as per drawings prepared by contractor and approved by Employer shall be deemed to be included in this item rate per square meter area basis.

23.17 Rain Water Harvesting

This is a lump sum item. The contractor shall be required to complete the work in all respect as per drawings prepared by contractor and approved by Employer. All the items including excavation, miscellaneous steel, brick work, fillings of boulders, gravel, sand, pipes etc. shall be deemed to be included in this lump sum rate.

23.21 External water supply from Bore-well/ other source of water supply arrangement to Fire water tank, Control Room building, Security Room etc.

The external water supply from Bore-well shall be measured diameter-wise in running meters. It shall include all the items such as excavation, piping, pipe fittings, painting, brickwork, sand filling, concrete, valves, chambers cutting chases in walls, openings in RCC and repairs, etc. required to complete the job.

23.22 External Sewage System of Control Room Building and other Buildings.

All the items such as excavation, piping, pipe fittings, manholes, gali trap, gali chamber casing in concrete and repairs etc. required to complete the job shall be deemed to be included in the item No. 6 of Civil works in BPS i.e. Design, Engineering and Construction of Buildings. Any modification in the existing sewage system, if required, shall be done by the Contractor without any extra cost implication to Employer.

24.0 MISCELLANEOUS GENERAL REQUIREMENTS

- 24.1 Dense concrete with controlled water cement ratio as per IS-code shall be used for all underground concrete structures such as pump-house, tanks, water retaining structures, cable and pipe trenches etc. for achieving water-tightness.
- 24.2 All joints including construction and expansion joints for the water retaining structures shall be made water tight by using PVC ribbed water stops with central bulb. However, kicker type (externally placed) PVC water stops shall be used for the base slab and in other areas where it is required to facilitate concreting. The minimum thickness of PVC water stops shall be 5 mm and minimum width shall be 230 mm.
- 24.3 All steel sections and fabricated structures which are required to be transported on sea shall be provided with anti-corrosive paint to take care of sea worthiness.
- 24.4 All mild steel parts used in the water retaining structures shall be hot-double dip galvanised. The minimum coating of the zinc shall be 750 gm/sq. m. for galvanised structures and shall comply with relevant IS. Galvanizing shall be checked and tested in accordance with relevant IS. The galvanizing shall be followed by the application of an etching primer and dipping in black bitumen in accordance with BS: 3416.
- 24.5 A screed concrete layer not less than 100 mm thick and of grade not weaker than M10 conforming to relevant IS shall be provided below all water retaining structures. A sliding layer of bitumen paper or craft paper shall be provided over the screed layer to destroy the bond between the screed and the base slab concrete of the water retaining structures.
- 24.6 Bricks having minimum 75 kg/cm² compressive strength can only be used for masonry work. Contractor shall ascertain himself at site regarding the availability of bricks of minimum 75 kg/cm² compressive strength before submitting his offer. The contractor may use concrete blocks of equivalent compressive strength in place of brick work.
- 24.7 Doors and windows on external walls of the buildings (other than areas provided, with insulated metal claddings) shall be provided with RCC sun-shade over the openings with 300 mm projection on either side of the openings. Projection of sunshade from the wall shall be minimum 450 mm over window openings and 750 mm over door openings.
- 24.8 All stairs shall have maximum riser height of 150 mm and a minimum tread width of 300 mm. Minimum width of stairs shall be 1500 mm. Service ladder shall be provided for access to all roofs. RCC fire escape staircase if required as per local bye laws, shall be provided in control buildings.
- 24.9 Angles 50x50x6 mm (minimum) with lugs shall be provided for edge protection all round cut outs/openings in floor slab, edges of drains supporting grating covers, edges of RCC cable/pipe trenches supporting covers, edges of manholes supporting covers, supporting edges of manhole precast cover and any other place where breakage of corners of concrete is expected.

24.10 Anti termite chemical treatment for buildings shall be given to all column pits, wall trenches, foundations, filling below the floors etc. as per relevant International/IS .

24.11 Hand-railing minimum 900mm high shall be provided around all floor/roof openings, projections/balconies, walk ways, platforms, steel stairs etc. All handrails and ladder pipes shall be 32 mm nominal bore MS pipes (medium class) and shall be galvanised (medium-class as per relevant BS). All rungs for ladder shall also be galvanised as per relevant BS.

For RCC stairs, hand railing with 20 mm square MS bars, balustrades with suitable MS flats & aluminium handrails shall be provided.

24.12 For all civil works covered under this specification, design Mix of Minimum M30 grade as per relevant International /IS shall be used. Reinforcement steel shall be of minimum Fe D 500 .

The material specification, workmanship and acceptance criteria shall be as per relevant clauses of applicable International/IS standard.

24.13 Items/components of buildings not explicitly covered in the specification and BPS but required for completion of the project shall be deemed to be included in the scope.

24.14 Requirement of sulphate resistant cement (SRC) for sub structural works shall be decided in accordance with the International/IS Standards based on the findings of the detailed soil investigation to be carried out by the Bidder.

24.15 Foundation system adopted by Bidder shall ensure that relative settlement and other criteria shall be as per provision in relevant IS and other International Standards.

24.16 All water retaining structures designed as uncracked section shall also be tested for water tightness at full water level in accordance with relevant international/ IS standards.

24.17 Construction joints shall be as per International/IS standard.

24.18 All underground concrete structures like basements, pumps houses, water retaining structures etc. shall have plasticizer cum water proofing cement additive conforming to relevant IS. The concrete surface of these structures in contact with earth shall also be provided with two coat of bituminous painting for water/damp proofing.

In case of water leakage in the above structures, The Method shall be applied as per relevant international standard/IS standard for repairing the leakage.

24.19 All building/construction materials shall conform to the best quality specified in relevant International /IS standard.

25.0 INTERFACING

The proper coordination & execution of all interfacing civil works activities like fixing of conduits in roofs/walls/floors, fixing of foundation bolts, fixing of lighting fixtures, fixing of supports/embedment's, provision of cut outs etc. shall be the sole responsibility of the Contractor. He shall plan all such activities in advance and execute in such a manner that interfacing activities do not become bottlenecks and dismantling, breakage etc. is reduced to minimum.

26.0 STATUTORY RULES

- 26.1 Contractor shall comply with all the applicable statutory rules pertaining to factories act (as applicable for the State). Fire Safety Rules of Tariff Advisory- Committee and Water and sewerage Act for pollution control etc.
- 26.2 Provisions for fire proof doors, no. of staircases, fire escape stairs ,fire separation wall, plastering on structural members (in fire prone areas) etc. shall be made according to the recommendations of Local Advisory Committee.
- 26.3 Statutory clearance and norms of Local Pollution Control Board shall be followed as per Water Act for effluent quality from plant.

27.0 FIELD QUALITY PLAN

All tests as required in accordance to IS codes or equivalent International standards have to be carried out. The contractor shall prepare field quality plan for civil works as per relevant IS codes/equivalent International Standards during detailed engineering stage and submit to Employer for approval within ONE month after award of work.

28.0 INDIAN STANDARD CODES

For design and engineering relevant IS codes or equivalent International standards shall be referred by the contractor. Relevant portion of IS codes or equivalent international standards referred by the contractor for the design shall be made available to Employer if necessary during detailed engineering stage.

**TECHNICAL SPECIFICATION
VOL-II, SEC-16
PART-2**

**CIVIL Works
(Residential Staff Quarter)**

TECHNICAL SPECIFICATION FOR CIVIL WORKS

Scope of Work:

The broad scope of work shall include Design, Engineering, Supply & Construction of Residential staff Quarters, associated Plumbing & Sanitary works, Water supply, Internal and External Electrical works, Road Work, and associated allied works etc

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

- a) Construction of Residential staff quarters & other buildings including boundary wall.
- b) Contouring and site leveling (if required)
- c) External water supply arrangement for colony & other buildings etc.
- d) External sewerage system
- e) Supply, Erection, testing & commissioning for lighting poles, panels and control cubicles of equipment (as required in complete).
- f) Construction of underground water storage tank for colony & other buildings
- g) Construction of septic tank & soak pit for control room and residential building
- h) Supply, Erection, Testing & Commissioning of 1 x 100 KVA, 11/0.433 kV Distribution transformer along with 11kV isolator, horn gap fuse , Bus Post Insulator and Surge arrestors for LT Station.
- i) External lighting and illumination for the Colony Area under present scope including Street Lighting with RCC htp poles with Led Lightning
- j) Internal Electrification of the buildings.
- k) LT Sub-station, cable connection to the distribution box shall be provided by the Contractor as per Bid Price Schedule.
- l) Any other item required for completion of scope of works

The work to be performed under this specification shall include providing all labour, supervision, materials, storages, inventories, all enabling works like scaffolding, watch and ward for the works, power, fuel, construction equipment, water, tools and plants, supplies, transportation, all taxes and duties, all labour welfare and safety measures, complete and all other incidental items not shown or specified, but reasonably implied or necessary for successful completion of the work including Contractor's supervision and in strict accordance with the drawings and specifications, inspection and testing standards and field quality control and testing as given in the tender documents and the complete execution of the works.

The scope shall also include preparation of reinforcement placement drawings, fabrication drawings and bar bending schedules, based on the drawings released for construction and getting the same approved by the Engineer-in-Charge.

The contractor shall have sole responsibility of co-ordination for construction activities, though he may employ separate sub- contractors. All co-ordination and interfacing with all the sub-contractors shall be done by the contractor.

Details of Buildings:-

Sr. No.	Particulars	Qty.	Area	Configuration
1.	Ornamental Works such as development of lawns and landscaping	L/S	Job	
2.	LT Distribution and Street Lighting	L/S	Job	
3.	Residential Quarters			

3.1	Xen's Quarter	1 No.	1500 Sq.Ft.	Single Storey
3.2	AEE/AE's Quarter	1 No.	1300 Sq.Ft.	Single Storey
3.3	JE's Quarter	4 x 2 Sets	2500 Sq.Ft.	Double Storey
3.4	SBA's Quarter	12 x 2 Sets	3600 Sq.Ft.	Double Storey
4.	Roads for colony	L/S	7500 Sq. Ft.	
5.	Water supply incl. tube-well reservoirs etc.	Job	Job	
6.	Santry/Security Post	L/S	Job	

1. SPECIFICATION FOR WORK, QUALITY AND WORKMANSHIP

Work shall be carried out as per RECTPCL Specification. If any items are not covered in RECTPCL specification, CPWD specifications are to be followed for Civil/Electrical works for all the scheduled/DSR Items. For non-scheduled items the work shall be executed according to the specifications given herein or in its absence the relevant CPWD Specifications, or the best practice recommended by reputed manufacturers, or the best Public Works Department practices or to the recommendations of relevant Indian Standard/ International Practice or according to the instructions of the Engineer-in-Charge. The specifications are intended for the general descriptions of the work, quality and workmanship. The specifications are not, however, intended to cover the minute details and the work shall be executed according to the best Central Public Works Department Practices or to the recommendations of relevant Indian Standard/International Codes like ASTM/DIN or according to the instructions of the Engineer-in-Charge.

All the materials of the project shall be from the approved makes of materials specified in this specification and as approved by RECTPCL. Materials for which approved makes are not available in above, the same shall be decided by the Engineer-in-charge. The procurement of various materials shall be either from the manufacturer or their main authorized dealers to ensure that no duplicate/spurious makes are used in the works. The Contractors are required to submit manufacturer's test certificates for the lots supplied at site with due endorsements by the actual dealers/vendors/sellers. Notwithstanding all the above, the contractor shall be held responsible for the execution of works and use of proper materials as per the tender specifications. Any material shall be approved by the Engineer-in-charge before put to use.

Wherever reference to CPWD/Indian Standard Codes and Practices is made, it shall be to the latest edition/revision of the same, issued up to 7 days prior to the date of opening of this tender.

The tenderer must obtain clarifications, if any, regarding the specifications and all other tender documents before submission of the tender in writing with the Employer in respect of interpretation of any portions of these documents.

2. TESTS OF MATERIALS/WORKMANSHIP

All mandatory tests shall be carried out as per RECTPCL Standard field quality plan. Test mentioned in individual items/specifications shall also be carried. All tests required for all materials shall be at the Contractor's cost. In case of items not covered in the CPWD specifications and IS code contractor shall arrange testing as per practice of the industry without any additional cost. Manufacture's test certificate of the relevant batch of material procured shall also be submitted for all measure items. However, the contractor shall prepare field quality plan for civil works as per relevant IS codes/equivalent International Standards during detailed engineering stage and submit to Employer for approval within ONE month after award of work.

3. LAYOUT AND LEVELS

The layout and levels of all buildings, structures etc. shall be made by the Contractor at his own cost from the general grid of the plot and bench marks as approved by the Engineer-in-Charge. The Contractor shall also assist in the form of instruments, materials and men to Engineer-in-Charge for checking the detailed layout and correctness of the layout and levels, at his own cost. But the Contractor shall be solely responsible for correctness of layout and levels. The levels and heights mentioned in the tender drawings are only tentative. The works shall be carried out as per Construction drawings issued after the award of the works.

4. CONSTRUCTION METHOD

The tenderer shall submit construction schedule, names of specialized agencies/products, list of construction equipment to be deployed and write-up to indicate in a broad outline how he intends to execute the work with the best co-ordination among various sub- packages (or sub-heads). These shall form part of this Tender.

5. DRAWINGS:

The vendor shall finalize the layout plan of the township as per available land and take approval of RECTPCL.

The Contractor is required to furnish a schedule indicating their requirements of 'Release for Construction' drawings compatible with the approved detailed construction program within 10 days of award of the work for scrutiny and approval and subsequent finalization of the Employers. 'Good for Construction' drawings shall be issued to the contractor progressively during the execution of the contract as per actual progress achieved and requirements at site. Based on the 'Released for Construction' drawings, contractor will prepare reinforcement placement drawings including the Bar Bending Schedule, Steel Fabrication Drawings, all other shop drawings etc. and get the same approved by the Engineer-in-Charge before execution of the work.

Any technical clarifications required regarding the drawings/specifications during the progress of works shall be obtained from the Engineer-in-Charge allowing a minimum of four working days for processing. Such "Requests for Information" (RFI) shall be in approved format which can be obtained from Engineer-in-Charge.

The actual terminal point of scope of works under this contract shall be as shown in 'Good for Construction' drawings.

Regarding conduit layout drawings, Point wiring drawing, Plumbing, water supply and sewerage layout drawings, the Contractor will submit the shop drawings (in hard copy and in AutoCAD format) for the approval from RECTPCL.

As Built Drawings should be submitted by the Contractor to Site and at RECTPCL (in hard copy and in AutoCAD format) at the time of Final Bill.

6. APPROVED VENDORS AND MAKES:

The Items which are available in enclosed "Compendium of Vendors", shall be sourced from approved manufacturers. For items which are not available in the "Compendium of Vendors", the decision of Engineer-in-charge shall be final. However, to facilitate procurement, the list of Indicative makes shall be treated as indicative list.

7. Miscellaneous

The contractor shall be responsible for watch and ward of all the works, equipment's and various materials till complete handing over the works and all necessary arrangements to co-ordinate with watch and ward of other contractors working simultaneously and also of the Employers shall be made to the complete satisfaction of the Engineer-in-Charge.

The list of deliverables which are to be submitted to the Employer shall be discussed and finalized by the Employer at the time of award. The Contractor shall necessarily submit all the drawings/documents/other deliverables unless anything is waived. The contractor shall submit 4 (four) sets of drawings/design documents/test reports as may be required for the approval of the Employer.

The contractor shall co-operate with the representatives of the Employer for due verifications of various compliances of various statutory regulations and tax compliances as and when required. All the documents of record shall be made available to the Employers and copies, wherever required, shall be submitted.

Employer reserves the right to inspect all the material before dispatch. However, depending upon nature of material, waiver of inspection may be granted for which the Contractor shall take prior approval of the Employer. This will be done on case to case basis.

The work is located in the premises of existing sub-station. The Contractor shall make arrangements for regulation of traffic by engaging security staff. They shall also make necessary arrangements to prevent unauthorized entry in the premises.

Contractor shall comply with all regulations of local authorities without any financial implication to RECTPCL.

8. Completion Certificate

On completion of the work the Contractor shall obtain completion certificate from local bodies or statutory body for and on behalf of the Owner for the construction as contemplated in this contract. However, the Owner may also help contractor to the extent of writing letters to Local bodies for expediting approval, if required. Further if any fee is required to be paid to the local/statutory bodies, the same shall be reimbursed to contractor by the owner against documentary evidence.

9. ROADS

- a) All the roads as required for the Township area as per approved General Arrangement drawing for the Township area are in the present scope. Adequate turning space for vehicles shall be provided and bend radii shall be set accordingly.
- b) All concrete roads within substation boundary wall shall be with 3.75 m RCC concrete pavement of suitable thickness and 1.3 m wide earthen shoulder on either side of the road. Below RCC concrete pavement, water bound macadam of adequate thickness as per design (WBM) shall be laid.
- c) All roads shall be designed as per relevant Indian standard codes (I S Codes)/ equivalent International Standards. All drawings of road and culverts shall be prepared by the contractor.
- d) All the culverts and allied structures (required for road/rail, drain, trench crossings etc.) shall be designed as per relevant Indian standard codes (IS Codes)/ equivalent International Standards

10. SITE PREPERATION, EXCAVATION, BACKFILL & DISPOSAL OF SURPLUS EARTH.

10.1. SITE PREPERATION

The layout and levels of all structure etc. shall be made by the Contractor at his own cost from the general grids of the plot and benchmarks set by the Contractor and approved by

the Employer. The Contractor shall give all help in instruments, materials and personnel to the Employer for checking the detailed layout and shall be solely responsible for the correctness of the layout and levels.

10.2. SCOPE

This clause covers clearing of the site, maintaining the finished ground level with available surplus excavated suitable back fill material generated from foundation works etc.

10.3. GENERAL

1. The Contractor shall develop the site area to meet the requirement of the intended purpose. The site preparation shall conform to the requirements of relevant sections of this specification or as per stipulations of relevant Indian standard codes (IS Codes)/ equivalent International Standards.
2. The fill material shall be suitable for the above requirement. The fill shall be with such a material that the site so designed shall not be affected by erosion from wind and water from its final compacted position or the in-situ position of undisturbed soil.
3. Material unsuitable for founding of foundations shall be removed and replaced by suitable fill material to be approved by the Employer.
4. Backfill material around foundations or other works shall be suitable for the purpose for which it is used and compacted to the density described under Compaction. Excavated material not suitable or not required for backfill shall be disposed off in areas as directed by engineer- in Charge up to a maximum lead of 2 km.

10.4. EXCAVATION AND BACKFILL SCOPE

This clause covers excavation for foundation works of Buildings/ Staff Quarter etc. backfilling of Foundations Works.

1. Excavation and backfill for foundations shall be in accordance with the relevant Indian standard codes (IS Codes)/ equivalent International Standards.
2. Whenever water table is met during the excavation, it shall be dewatered and water table shall be maintained below the bottom of the excavation level during excavation, concreting and backfilling.
3. When embankments are to be constructed on slopes of 15% or greater, benches or steps with horizontal and vertical faces shall be cut in the original slope prior to placement of embankment material. Vertical faces shall measure not more than 1 m in height.
4. Embankments adjacent to abutments, culverts, retaining walls and similar structures shall be constructed by compacting the material in successive uniform horizontal layers not exceeding 15 cm in thickness. (of loose material before compaction). Each layer shall be compacted as required by means of mechanical tampers approved by the Purchaser. Rocks larger than 10 cm in any direction shall not be placed in embankment adjacent to structures.
5. Earth embankments of roadways and site areas adjacent to buildings shall be placed in successive uniform horizontal layers not exceeding 20 cm in thickness in loose stage measurement and compacted to the full width specified. The upper surface of the embankment shall be shaped so as to provide complete drainage of surface water at all times.

10.5. COMPACTION

1. The density to which fill materials shall be compacted shall be as per relevant IS and as per

direction of Employer. All compacted sand filling shall be confined as far as practicable. Backfilled earth shall be compacted to minimum 95% of the Standard Proctor's density at OMC. The sub grade for the roads and embankment filling shall be compacted to minimum 95% of the Standard Proctor's density at OMC. Cohesion less material sub grade shall be compacted to 70% relative density (minimum).

2. At all times unfinished construction shall have adequate drainage upon completion of the road's surface course, adjacent shoulders shall be given a final shaping, true alignment and grade.
3. Each layer of earth embankment when compacted shall be as close to optimum moisture content as practicable. Embankment material which does not contain sufficient moisture to obtain proper compaction shall be wetted. If the material contains any excess moisture, then it shall be allowed to dry before rolling. The rolling shall begin at the edges overlapping half the width of the roller each time and progress to the centre of the road or towards the building as applicable. Rolling will also be required on rock fills. No compaction shall be carried out in rainy weather.

10.6. REQUIREMENT FOR FILL MATERIAL UNDER FOUNDATION

The thickness of fill material under the foundations shall be such that the maximum pressure from the footing, transferred through the fill material and distributed onto the original undisturbed soil will not exceed the allowable soil bearing pressure of the original undisturbed soil. For expansive soils, the fill materials and other protections etc. to be used under the foundation is to be got approved by the Employer.

10.7. DISPOSAL OF SURPLUS EARTH

The surplus earth generated from foundation work shall be disposed away from levelling area boundary at low lying areas within 2Km lead. The surplus earth if disposed within substation main boundary, the same shall be spread in uniform layers and compacted with suitable compacting equipment to achieve 95% compaction at O.M.C.

11. SITE DRAINAGE

Preparation of overall drainage layout, design, drawing and providing rain water drainage system within the Residential Staff Quarter Colony under the present scope including connection at one or more points to the outfall point located outside the substation boundary wall is in the scope of contractor. Invert level of drainage system at outfall point shall be decided in such a way that the water can easily be discharged outside the substation boundary wall. In case outfall point is more than 50M away from boundary wall, only 50 meter drain outside the boundary wall is in the scope of contractor. Outfall point shall be got approved from Employer before commencement of construction. While designing the drainage system following points shall be taken care of:

- a) The surface of the Residential Staff Quarter Colony shall be sloped to prevent accumulation of water.
- b) Drain shall be constructed at suitable locations in such a way that Residential Staff Quarter Colony is not flooded and roads are not affected with ponding of surface water. In the Residential Staff Quarter Colony maximum spacing between two drains shall not be more than 100 meter. It will be ensured that no area is left undrained.
- c) Open surface drains having 300mm bottom width and 300mm depth at starting point of drain shall be provided. The depth of drain shall be measured with respect to finished ground level of switch yard i.e. from bottom of switch yard stone filling.
- d) Longitudinal slope shall not be less than 1 in 1000.
- e) Open surface drains shall be constructed with brick masonry or concrete blocks. As per design of contractor. PCC (1:2:4) shall be laid over 40mm thick layer of PCC 1:4:8 (1 cement: 4 coarse sand: 8 stone aggregate 20mm nominal size.)
- f) The side wall of the drains shall be 25 mm above the gravel level to prevent falling of gravel into drain. Groove of 125 mm width shall be provided at 2000 mm spacing with

- suitable mild steel grating.
- g) The maximum velocity for pipe drains and open drains shall be limited to 2.4m/sec and 1.8m/sec respectively. However, minimum non-silting velocity of 0.6m/sec shall be ensured.
 - h) Pipe drains shall be provided in areas of switchyard where movement of crane will be necessary in operating phase of the substation.
 - i) For pipe drains, concrete pipe of class NP2 shall be used. However, for road crossings etc. higher strength pipe of class NP3 shall be provided. For rail crossings, RCC pipes of class NP4 shall be provided. For design of RCC pipes for drains and culverts, relevant Indian standard codes (I S Codes)/ equivalent International Standards. shall be followed.
 - j) Two Nos. of portable pumps of 3 / 5 HP capacity for drainage of water shall be provided by the Contractor.
 - k) Pipe drains shall be connected through manholes at an interval of max. 30m.
 - l) If the invert level of outfall point is above the last drain point in the substation boundary, sump of suitable size has to be constructed with in the substation boundary.
 - m) The drainage scheme and associated drawings shall be got approved from Employer before commencement of construction.

12. FOUNDATION / RCC CONSTRUCTION

12.1. GENERAL

1. Work covered under this Clause of the Specification comprises the design, drawing and construction of foundations and other RCC constructions for Residential Staff Quarter Colony, or for any other equipment or service and any other foundation required to complete the work. This clause is as well applicable to the other RCC constructions.
2. Concrete shall conform to the requirements mentioned in relevant Indian standard codes (IS Codes)/ equivalent International Standards. And all the tests shall be conducted as per relevant Indian standard codes (IS Codes)/ equivalent International Standards. However, a minimum grade of M-30 (design Mix) concrete shall be used for all foundations and structural/load bearing members as per relevant Indian standard codes (IS Codes)/ equivalent International Standards.
3. If the site is sloppy, the foundation height will be adjusted to maintain the exact level of the top of structures to compensate such slopes.
4. Minimum 75mm thick lean concrete (1:4:8) shall be provided below all underground structures, foundations, trenches etc. to provide a base for construction.
5. Concrete made with Portland slag cement shall be carefully cured and special importance shall be given during the placing of concrete and removal of shuttering.
6. The design and detailing of foundations shall be done based on the approved soil data and sub-soil conditions as well as for all possible critical loads and the combinations thereof. The Spread footings foundation or pile foundation as may be required based on soil/sub-soil conditions and superimposed loads shall be provided.
7. If pile foundations are adopted, the same shall be cast-in-situ driven/bored or pre-cast or under reamed type as per relevant parts of relevant Indian standard codes (IS Codes)/ equivalent International Standards. Only RCC piles shall be provided. Suitability of the adopted pile foundations shall be justified by way of full design calculations. Detailed design calculations shall be submitted by the contractor showing complete details of piles/pile groups proposed to be used. Necessary initial load test shall also be carried out by the bidder at their cost to establish the piles design capacity. Only after the design capacity of piles has been established, the Contractor shall take up the job of piling. Routine tests for the piles shall also be conducted. All the work (design & testing) shall be planned in such a way that these shall not cause any delay in project completion.

12.2. DESIGN

While designing foundations, following may be taken care of:

- 12.2.1.** All foundations except for external lighting poles shall be of reinforced cement concrete. The external lighting pole shall be embedded in plain cement concrete (1:2:4) foundation. The design and construction of RCC structures shall be carried out as per relevant IS: 456 and minimum grade of concrete shall be M-25 (design Mix). Higher grade of concrete than specified above may be used at the discretion of Contractor without any additional financial implication to the Employer.
- 12.2.2.** Limit state method or any other method as per relevant Indian standard codes (IS Codes)/ equivalent International Standards of design shall be adopted unless specified otherwise in the specification.
- 12.2.3.** For detailing of reinforcement IS: 2502 and SP 34 shall be followed. Cold twisted deformed bars ($F_e=500\text{N/mm}^2$) conforming to relevant Indian standard codes (IS Codes)/ equivalent International Standards shall be used as reinforcement. Two layers of reinforcement (on inner and outer face) shall be provided for wall & slab sections having thickness of 150 mm and above. Clear cover to reinforcement shall be as per relevant Indian standard codes (I S: 456)/ equivalent International Standards.
- 12.2.4.** RCC water retaining structures like storage tanks, etc. shall be designed as un cracked section in accordance with relevant Indian standard codes (IS: 3370 Part I to IV)/ equivalent International Standards. However, water channels shall be designed as cracked section with limited steel stresses as per relevant IS.
- 12.2.5.** The procedure used for the design of the foundations shall be the most critical loading combination of the steel structure and or equipment and/or superstructure and other conditions which produces the maximum stresses in the foundation or the foundation component and as per the relevant Indian standard codes (IS Codes)/ equivalent International Standards of foundation design. Detailed design calculations shall be submitted by the bidder showing complete details of piles/pile groups proposed to be used.
- 12.2.6.** Design shall consider any sub-soil water pressure that may be encountered following relevant standard strictly.
- 12.2.7.** Necessary protection to the foundation work, if required shall be provided to take care of any special requirements for aggressive alkaline soil, black cotton soil or any other type of soil which is detrimental/harmful to the concrete foundations.
- 12.2.8.** RCC columns shall be provided with rigid connection at the base.
- 12.2.9.** All sub-structures shall be checked for sliding and overturning stability during both construction and operating conditions for various combinations of loads. Factors of safety for these cases shall be taken as mentioned in relevant Indian standard codes (IS Codes)/ equivalent International Standards or as stipulated elsewhere in the Specifications. For checking against overturning, weight of soil vertically above footing shall be taken and inverted frustum of pyramid of earth on the foundation should not be considered.
- 12.2.10.** Earth pressure for all underground structures shall be calculated using co-efficient of earth pressure at rest, co-efficient of active or passive earth pressure (whichever is applicable). However, for the design of substructures of any underground enclosures, earth pressure at rest shall be considered.
- 12.2.11.** In addition to earth pressure and ground water pressure etc., a surcharge load of $2T/\text{Sq.m}$ shall also be considered for the design of all underground structures including channels, sumps, tanks, trenches, substructure of any underground hollow enclosure etc., for the vehicular traffic in the vicinity of the structure.
- 12.2.12.** Following conditions shall be considered for the design of water tank in pumps house, channels, sumps, trenches and other underground structures:
 - a)** Full water pressure from inside and no earth pressure & ground water pressure & surcharge pressure from outside (application only to structures which are liable to be filled up with water or any other liquid).
 - b)** Full earth pressure, surcharge pressure and ground water pressure from outside and no water pressure from inside.
 - c)** Design shall also be checked against buoyancy due to the ground water during construction and maintenance stages. Minimum factor of safety of 1.5 against

buoyancy shall be ensured ignoring the superimposed loadings.

12.2.13. Base slab of any underground enclosure shall also be designed for empty condition during construction and maintenance stages with maximum ground water table (GWT). Minimum factor of safety of 1.5 against buoyancy shall be ensured ignoring the super-imposed loadings.

12.2.14. Base slab of any underground enclosure like water storage tank shall also be designed for the condition of different combination of pump sumps being empty during maintenance stages with maximum GWT. Intermediate dividing piers of such enclosures shall be designed considering water in one pump sump only and the other pumps sump being empty for maintenance.

12.3. ADMIXTURES & ADDITIVES

12.3.1. Only approved admixtures shall be used in the concrete for the Works. When more than one admixture is to be used, each admixture shall be batched in its own batch and added to the mixing water separately before discharging into the mixer. Admixtures shall be delivered in suitably labelled containers to enable identification.

12.3.2. Admixtures in concrete shall conform to relevant Indian standard codes (IS Codes)/ equivalent International Standards. The water proofing cement additives shall conform to relevant IS. Concrete Admixtures/ Additives shall be approved by Employer.

12.3.3. The Contractor may propose and the Employer may approve the use of a water-reducing set-retarding admixture in some of the concrete. The use of such an admixture will not be approved to overcome problems associated with inadequate concrete plant capacity or improperly planned placing operations and shall only be approved as an aid to overcoming unusual circumstances and placing conditions.

12.3.4. The water-reducing setting-retarding admixture shall be an approved brand as per relevant Indian standard codes (I S Codes)/ equivalent International Standards.

13. BUILDINGS

13.1. GENERAL

The scope includes the design, drawing, engineering and construction including anti-termite treatment, plinth protection, DPC of Building including sanitary, water supply, electrification, etc. as applicable, complete of Residential Staff Quarter Colony. Electrification and air conditioning of building shall be provided as detailed in other sections of electrical portion.

13.2. Residential Staff Quarter

GENERAL

The scope includes layout design, engineering and construction, including anti-termite treatment, plinth protection, DPC, peripheral drains, water supply, plumbing, sanitation, fire-fighting, electrification etc. of Residential Staff Quarter.

The building shall be constructed as per the building codes, relevant IS Codes, state Government norms and complete detailed Architecture drawings, structural design and construction drawings to be developed by the contractor. The RCC Roof shall be provided for all the floors and mumty.

Additional Roof with slopes (1 Vertical : 1.5 Horizontal) shall be provided in case the township is in snow bound terrain. This roof shall be MS truss Structure covered with MS profile sheets as per CPWD Specifications.

Tentative carpet area requirement :

Sr.	Particulars	Qty.	Area	Configuration
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No.				
1.	Ornamental Works such as development of lawns and landscaping	L/S	Job	
2.	LT Distribution and Street Lighting	L/S	Job	
3.	Residential Quarters			
3.1	Xen's Quarter	1 No.	1500 Sq.Ft.	Single Storey
3.2	AEE/AE's Quarter	1 No.	1300 Sq.Ft.	Single Storey
3.3	JEs Quarter	4 x 2 Sets	2500 Sq.Ft.	Double Storey
3.4	SBA's Quarter	12 x 2 Sets	3600 Sq.Ft.	Double Storey
4.	Roads for colony	L/S	7500 Sq. Ft.	
5.	Water supply incl. tube-well reservoirs etc.	Job	Job	
6.	Santry/Security Post	L/S	Job	

The vendor shall finalize the layout plan of the township as per available land and take approval of RECTPCL.

13.3. DESIGN CRITERIA

The Buildings shall be designed:

- a) To the requirements of the Indian Standards.
- b) For the specified climatic and loading conditions.
- c) To adequately suit the requirements of the equipment's and apparatus contained in the buildings and in all respects to be compatible with the intended use and occupancy.
- d) With a functional and economical space arrangement.
- e) To be aesthetically pleasing. Different buildings shall show a uniformity and consistency in architectural design, as far as possible.
- f) Suitable Expansion joints, wherever required, shall be provided as per Codal Provisions.
- g) All the members of the buildings frame shall be designed for the worst combination of loads as per relevant Indian standard codes (I S Codes)/ equivalent International Standards.
- h) Permissible stresses for different load combinations shall be taken as per relevant Indian standard codes (I S Codes) / equivalent International Standards.
- i) Seismic coefficient Method or Response spectrum method shall be used for seismic analysis of the building for Earthquake forces, as per relevant Indian standard codes (I S Codes)/ equivalent International Standards.

13.4. DESIGN LOADS

- a) Building structure shall be designed for the most critical combinations of dead loads, super-imposed loads, equipment loads, erection loads, wind loads, seismic loads, snow loading, if required etc. Any other incidental load, if anticipated, shall be duly accounted for in the design, and shall be clearly mentioned by the bidder.
- b) Dead loads shall include the weight of structures complete with finishes, fixtures and partitions, and shall be taken as per relevant Indian standard codes (I S Codes)/ equivalent International Standards.
- c) Super-imposed loads in different areas shall include live loads, minor equipment loads, cable trays, small pipe racks/hangers and erection, operation and maintenance loads, wherever these loads are expected. Equipment loads shall constitute, if applicable, all load of equipment's to be supported on the building frame.

AREA	Load
1. For buildings	5.0 kN/m ²
If higher than 5.0 kN/m ²	As per actual Requirement.
2. Staircases & Balconies.	5.0 kN/m ²
3. Toilets.	2.0 kN/m ²
4. Chequered Plate.	4.0 kN/m ²
5. Corridors/Walkways.	3.0 kN/m ²
6. Accessible Roofs.	1.5 kN/m ²
7. Non-accessible Roofs.	0.75 kN/m ²

- d) Wind loads shall be calculated as per relevant Indian standard codes (IS Codes)/ equivalent International Standards. The Factors affecting the wind speed shall be taken based on the site conditions.
- e) Earthquake loads shall be calculated as per relevant Indian standard codes (IS Codes)/ equivalent International Standards.
- f) Wind forces and Seismic forces shall not be considered to act simultaneously.
- g) Snow load shall be computed as per IS:875 part 4 (latest). When snow load is present in roofs, replace imposed load by snow loads in respective load combinations
- h) All the load combinations to create worst combinations of loads shall be as per relevant International standards/Indian Standards.
- i) Floors/ Slabs shall be designed to carry loads imposed by equipment's, cables, piping, movement of maintenance trucks (if required) and any other load associated with the building. In general, floors shall be designed for live loads as per relevant Indian standard codes (I S Codes)/ equivalent International Standards. Cable and piping loads shall also be considered in addition to the live loads for floors where these loads are expected.

13.5. FLOORS, WALLS & ROOFS

- a) All walls shall be non-load bearing in filled panel walls, in brickwork as per the specification. Minimum thickness of external walls shall be 230 mm (one brick) with 1:6 cement sand mortar. Partition walls if any shall be of 115 mm thick brick masonry in cement sand mortar (1:4). Bricks of class 75 Kg/cm sq shall be used.
- b) All Floor/Roof slabs shall be regular beam slab construction. However, sunken RCC slab shall be provided in toilet areas as per the requirement.
- c) Minimum height of skirting above finished floor level shall be 150 mm. The skirting material shall match with the floor finish.
- d) Minimum height of the parapet walls shall be 750 mm.
- e) Ground floor finish shall be laid over 20 mm thick cement sand mortar, 100 mm thick plain cement concrete (PCC) 1:4:8 (1 cement: 4 sand : 8 stone aggregates), 100 mm thick local sand filling. The earth below ground floor shall be well rammed before laying sand filling.
- f) First floor details shall comprise of finish as per schedule, 20 mm cement sand mortar and 50 mm thick PCC(1:4:8) over RCC slab.

13.6. DETAILS OF ROOF

Roof of the Building shall consist of Cast-in-situ RCC slab treated with a water proofing system which shall be an integral cement based treatment conforming to relevant Indian standard codes (IS Codes)/ equivalent International Standards. The water proofing

treatment shall be of following operations:

- a) Applying and grouting a slurry coat of neat cement using 2.75 kg/m² of cement admixed with proprietary water proofing compounds conforming to relevant Indian standard codes (IS Codes)/ equivalent International Standards. Over the RCC slab including cleaning the surface before treatment.
- b) Laying cement concrete using broken stone of size from 25mm to 100mm size with 50% of cement mortar 1:5 (1 cement: 5 coarse sand) admixed with proprietary water proofing compound conforming to relevant Indian standard codes (I S Codes)/ equivalent International Standards over 20mm thick layer of cement mortar of min 1:5 (Cement: 5 coarse sand) admixed with proprietary water proofing compound conforming to relevant Indian standard codes (IS Codes)/ equivalent International Standards to required slope and treating similarly the adjoining walls up to 300mm height including rounding of junctions of walls and slabs.
- c) After two days of proper curing applying a second coat of cement slurry admixed with proprietary water proofing compound conforming relevant Indian standard codes (IS Codes)/ equivalent International Standards.
- d) Finishing the surface with 20mm thick joint less cement mortar of mix 1:4 (1 cement: 4 coarse sand) admixed with proprietary water proofing compound conforming to relevant Indian standard codes (IS Codes)/ equivalent International Standards and finally finishing the surface with trowel with neat cement slurry and making of 300 x 300 square mm.
- e) The whole terrace so finished shall be flooded with water for a minimum period of two weeks for curing and for final test. All above operations to be done in order and as directed and specified by the Executive Engineer In charge.
- f) Average thickness of water proofing shall be 120 mm and minimum thickness at khurra shall be 65 mm.
- g) Additional Roof with slopes (1 Vertical : 1.5 Horizontal) shall be provided for township being in snow bound terrain.** This roof shall be MS pipe Structure covered with MS profile sheets (0.5mm) as per CPWD Specifications.

13.7. PLASTERING

External surfaces of buildings shall have 18 mm thick plaster in two layers, with the under layer 12mm thick 1:5 cement sand plaster and the top layer 6 mm thick 1:6 cement sand plaster. Inside wall surfaces shall have 12/15 mm thick 1:6 cement sand plaster. Rough surfaces shall have 15mm and smooth surface shall have 12 mm thick cement sand plaster.

All RCC ceilings shall be provided with 6 mm thick cement sand (fine) plaster (1:3).

13.8. EXTERNAL PAINTING

External surfaces of the Buildings shall be painted with acrylic exterior flat paint as per manufacturer's specification and approval of Employer.

13.9. DOORS, WINDOWS AND VENTILATORS

The schedule of doors, windows of the Residential Quarter g shall be as per the detailed finish schedule given in Table-1 (Detailed Finish Schedule), and shall conform to the relevant Indian standard codes (IS Codes)/ equivalent International Standards.

13.10. PLINTH PROTECTION

750 mm wide and 50 mm thick plain cement concrete 1:2:4 (1 cement:2 sand:4 graded 20 mm nominal size stone aggregate) shall be laid over 75 mm thick dry stone aggregates well

rammed and consolidated with interstices filled with local sand including smooth finishing top.

13.11. PLUMBING & SANITATION

- a) All plumbing and sanitation works shall be executed to comply with the requirements of the appropriate bye-laws, rules and regulations of the Local Authority having jurisdiction over such matters. The Contractor shall arrange for all necessary formalities to be met with regards to the inspection, testing, obtaining approval and giving notices etc.
- b) 'SINTEX' or an equivalent make PVC Roof water tank(s) of 1000 litres shall be provide for every unit
- c) Chlorinated Polyvinyl chloride (CPVC) pipes having thermal stability for hot and cold water supply including all CPVC plain and brass threading conforming to relevant Indian standard codes (IS Codes)/ equivalent International Standards shall be used for internal piping works for water supply.
- d) Sand C.I. pipes with lead joints conforming to relevant Indian standard codes (IS Codes)/ equivalent International Standards shall be used for sanitary works above ground level and RCC pipes shall be used for sanitary works below ground.
- e) Each toilet shall have the following minimum fittings:
 - (i) WC (Western type) 390 mm high along with toilet paper roll holder and all other fittings, in toilets attached to site office; or WC (Indian Type) Orissa Pattern (580 x 440 mm) with all fittings shall be provided in one toilet.
 - (ii) 1 nos. Urinal (430 x 260 x 350 mm size) with all fittings and built-in-sensor for automatic flush after use in the site office.
 - (iii) Wash basin (550 x 400 mm) with all fittings.
 - (iv) Bathroom mirror (600 x 450 x 6 mm thick) with hard board backing.
 - (v) CP brass towel rail (600 x 20 mm) with CP brass brackets.
- f) One no. stainless steel kitchen sink with Drain board (510 x 1040 x 178 mm bowl depth) for pantry shall be provided.
- g) All fittings, fasteners, gratings shall be chromium plated
- h) All sanitary fixtures and fittings shall be of approved quality and type, manufactured by reputed manufacturers. All items brought to site must bear identification marks of the Manufacturer.
- i) **Contractor shall provide necessary nos. of septic tank and soak pit of adequate capacity to treat the sewage/sullage from the buildings.**
- j) **Contractor shall undertake all other activities required to complete and commission the township & office building.**

13.12. BUILDING STORM WATER DRAINAGE

- a. The building design shall provide for the collection of storm water from the roof. This water shall be drained to the main drainage system of the Sub-station.
- b. PVC Rainwater down comer pipes conforming to relevant International standards/Indian Standards.
- c. All drains inside the buildings shall have minimum 40 mm thick grating covers; and in areas where heavy equipment loads are envisaged, Pre-Cast RCC covers shall be provided in place of steel grating.

13.13. DETAILED FINISHING SCHEDULE

The detailed finish schedule for Township is given below:

- a. Internal Finish Schedule

Table- 1: DETAILED FINISH SCHEDULE

Sl. No.	LOCATION	FLOORING & SKIRTING 150 MM HIGH	WALL (INTERNAL)	CEILING	DOOR, WINDOWS, VENTILATORS
1.	Residential Buildings	Vitrified tiles 8mm thick size 600 x 600mm	Non VOC acrylic emulsion paint over 2mm POP putty upto roof over approved primer coat	Painted with Non VOC acrylic emulsion paint to give an even shade.	Door shall have flush door shutter 35 mm thick with commercial ply duly painted & polished as per CPWD specification & as per the approval of Engineer- in- Charge. Door frames should be of sal/hard wood/ Red Marandi as per the as per CPWD specification & as per the approval of Engineer- in- Charge.
2.	Toilets	Ceramic tiles	DADO glazed tile 2100mm high, above that non VOC acrylic emulsion paint over 2 mm thick POP putty along with primer coat.	Non VOC acrylic Emulsion paint over approved primer coat for RCC building.	Windows shall be of powder coated aluminum frames with 5.5 mm Thick double glazing & hermetically sealed.
3	Office Rooms	Vitrified tiles 8mm thick size 600 x 600mm	Non VOC acrylic emulsion paint over 2mm POP putty upto roof over approved primer coat	Painted with Non VOC acrylic emulsion paint to give an even shade.	

13.14. WATER PROOFING TREATMENT

Integral cement based water proofing treatment including preparation of surface as required for treatment of roofs, balconies, terraces etc consisting of following operations:

- a) Applying a slurry coat of neat cement using 2.75 kg/sqm. of cement admixed with water proofing compound conforming to IS. 2645 and approved by Engineer-in-charge over the RCC slab including adjoining walls upto 300mm height including cleaning the surface before treatment.
- b) Laying brick bats with mortar using broken bricks/brick bats 25 mm to 115 mm size with 50% of cement mortar 1:5 (1 cement : 5 coarse sand) admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge over 20 mm thick layer of cement mortar of mix 1:5 (1 cement :5 coarse sand) admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge to required slope and treating similarly the adjoining walls upto 300 mm height including rounding of junctions of walls and slabs
- c) After two days of proper curing applying a second coat of cement slurry using 2.75 kg/sqm of cement admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge.
- d) Finishing the surface with 20 mm thick joint less cement mortar of mix 1:4 (1 cement: 4 coarse sand) admixed with water proofing compound conforming to IS : 2645 and

approved by Engineer-in-charge including laying glass fibre cloth of approved quality in top layer of plaster and finally finishing the surface with trowel with neat cement slurry and making pattern of 300x300 mm square 3 mm deep.

- e) The whole terrace so finished shall be flooded with water for a minimum period of two weeks for curing and for final test. All above operations to be done in order and as directed and specified by the Engineer-in-Charge
- f) With average thickness of 120mm and minimum thickness at khurra as 65 mm

13.15. SUNKEN WATER PROOFING (RCC):

- a) Water proofing treatment shall be done in sunken portion of WCs, bathroom etc. by applying cement slurry mixed with water proofing cement compound consisting of:
 - i. First layer of slurry of cement @ 0.488 kg/sqm mixed with water proofing cement compound @ 0.253 kg/ sqm. This layer will be allowed to air cure for 4 hours.
 - ii. Second layer of slurry of cement @ 0.242 kg/sqm mixed with water proofing cement compound @ 0.126 kg/sqm. This layer will be allowed to air cure for 4 hours followed with water curing for 48 hours.
- b) Treatment and sealing of joints, corners, junction of pipes and masonry with polymer mixed slurry shall be carried out as per CPWD specifications.

13.16. SPECIFICATIONS FOR PLUMBING, SANITATION & WATER SUPPLY ETC.

- a) All plumbing and sanitation shall be executed to comply with the requirements of the appropriate bye-laws, rules and regulations of the Local Authority having jurisdiction over such matters. The Contractor shall arrange for all necessary formalities to be met in regard to inspection, testing, obtaining approval and giving notices etc.
- b) Provision for water cooler shall be provided at suitable location.
- c) Each toilet shall be provided with Water Closet, Wash hand basin, health faucet, Mirror, Towel Rail, Paper Holder, Liquid soap dispenser, twin coat holder.
- d) In addition to general requirements of each toilets, 2 nos. Sensor based urinals shall be provided for common Gents toilet.
- e) Pantry shall be provided with stainless steel kitchen sink.
- f) The platform of kitchen sink and wash hand basin shall be provided with 18 mm thk. Mirror polished approved granite stone.
- g) The specification of different items, which are to be used for plumbing, sanitation & water supply etc. in are given below, the same shall be used during detailed engineering, unless otherwise mentioned else-where in the tender

S.No.	Items	Description
1	Wall hung Water Closet	Coloured vitreous china extended wall mounting water closet of approved size and shape including providing & fixing white vitreous china cistern with dual flush fitting, of flushing capacity 3 litre/6 litre (adjustable to 4 litre/8 litres), including seat cover, and cistern fittings, nuts, bolts and gasket etc complete
2	Squatting Pan	(Indian type W.C. pan) (white vitreous china Orissa pattern W.C. pan of size 580x440mm with integral type foot rests) shall be with 100mm sand cast iron P or S trap. 10 litre low level white P.V.C flushing cistern with manually controlled device (handle lever) conforming to IS:7231, with all fittings and fixtures complete including cutting and making good the walls and floors wherever required.
3	Wash Basin	Providing and fixing coloured wash basin counter type of (approximate size 630x450mm size under counter or over counter type), in case flat bash hand is required the approximate size shall be 550x400mm and shall be provided with C.P. close basin mixer (ISI approved) with CI. Brackets taps with battery based infrared sensor, 32mm C.P. brass waste and bottle trap of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever required. Other details shall be as per the

		drawings.
4	Urinal	White vitreous china battery based infrared sensor operated urinal of approx. size 610 x 390 x 370 mm having pre & post flushing with water (250 ml & 500 ml consumption), having water inlet from back side, including fixing to wall with suitable brackets all as per manufacturers specification and direction of Engineer-in-charge.
5	Urinal partition	10mm thk toughened glass partition with frosted film to be fixed in position for urinals on appropriate stainless steel patch fittings of desired shape and size
6	Kitchen sink	Stainless steel AISI 304 (18/8) Kitchen sink of 510x1040 mm bowl with depth of 178mm with drain board shall be provided and fixed as per IS 13983 with C.I brackets, and stainless steel plug 40mm with provision of 2 nos. CP brass long body bib cock conforming to IS Standard and weighing not less than 650 gm for CP bottle trap etc including painting of fittings and brackets, cutting and making good the wall
7	Bib cock	C.P. brass short body and long body bib cock 15mm nominal bore shall be of approved quality conforming to IS: 8931
8	Angle valve	C.P. brass angle valve of 15mm nominal bore provided and fixed in position for basin and cistern points of approved quality conforming IS :8931
9	Towel rail	C.P. brass towel rail of approved make of 600mm length, 25mm dia with a pair of brackets or flanges provided and fixed to wall beside each wash basin/set of wash basin with necessary screws, plugs, etc
10	Mirror	6mm thick beveled edge mirror approximate size 1000x600mm made of superior glass of approved make complete with a backing of 6 mm thick water proof hard board fixed to wooden cleats with 25mm dia SS studs, washers etc complete for each wash basin
11	Hooks	Double type coat & hat hooks with flanges, fixed to wall / shutter, etc. with necessary screws, washers & plugs
12	Liquid soap holder	C.P. brass liquid soap holder of approved make fixed with each wash basin to the wall with necessary CP brackets, CP screws, washers, plugs etc.
13	C.P. Brass or S.S. cockroach trap	Approved C.P. Brass cockroach trap shall be provided in the Kitchen, Toilets and pantry
14	Floor traps	PVC floor traps of self cleansing design shall be provided & fixed in position with 100 mm dia. inlet and 75mm dia. outlet of approved make, including making connection with PVC soil/waste pipes using rubber gaskets, embedding the trap in 150 mm thick PCC 1:2:4.
15	Internal Soil, waste and vent pipe	Unplasticised rigid PVC pipes of 75mm for waste & 110mm dia for soil shall be provided conforming to IS:13592 type B and all its fittings like bends, sockets, door bend, Y-tee etc. as per requirement with seal ring conforming to IS: 5382 including jointing with cement solvent conforms to IS:14182. All underground or under floor pipes shall be encased with 1:3:6 concrete. Minimum concrete cover shall be 75 mm thk.
16	Rain Water Pipe and fittings	<p>a) Unplasticised rigid PVC rain water pipes of required dia shall be provided and fixed on the wall face conforming to IS: 13592 type A as per requirement including jointing with seal ring conforming to IS: 5382 leaving 10mm gap for thermal expansion single socketed pipes including all fittings like bends, bat clamps gratings etc.</p> <p>b) Unplasticised PVC Moulded fittings/accessories including suitable dia. bend & shoes shall be provided and fixed for unplasticised rigid PVC rain water pipes conforming to IS:13592 type A including jointing with seal ring conforming to IS: 5382 leaving 10mm gap for thermal expansion.</p>

		<p>c) Clips of approved design shall be provided and fixed to unplasticised PVC rain water pipes by means of 50x50x50mm hard wood plugs, screwed with MS screws of required length including cutting brick work and fixing in cement mortar 1:4 (1 cement : 4 coarse sand) and making good the wall etc</p>
17	Internal & External water supply	<p>a) All CPVC pipes and fittings shall conform to IS:15778</p> <p>b) All internal CPVC pipe shall be concealed including cutting of chases and making good the wall.</p> <p>c) Wherever CPVC pipes are buried the same shall be provided and laid in position including trenching, sand cushion and refilling, etc. For trenching, sand cushion and refilling refer CPWD specification applicable for external piping work.</p> <p>d) All internal CPVC pipe shall be concealed including cutting of chases and making good the wall.</p> <p>e) ISI approved CPVC ball valve, non-return valves shall be provided and fixed in position as per requirement and direction of Engineer-in-charge.</p>
18	Water storage tanks	Triple layered Polyethylene water storage tanks shall be provided of approved brand and manufacture with cover and suitable locking arrangement, float valve and making necessary holes for inlet, outlet and overflow pipes. Capacity of water tank shall be 2x1500 litres for control room, 2X2000 litres for Transit Camp.
19	Sluice valve chamber	Masonry chamber for sluice valve shall be 600x600mm size in plan and depth 750mm, or matching with the site condition inside with 50 class designation brick work in cement mortar 1:5 (1 cement : 5 fine sand) with CI surface box 100 mm. Top diameter, 160 mm bottom dia and 180 mm deep (inside) with chained lid and RCC top slab 1:2:4 mix (1cement : 2 coarse sand: 4 graded stone aggregate 20 mm nominal size) necessary excavation foundation concrete 1:5:10 (1 cement : 5 fine aggregate : 10 graded stone aggregate 40 mm nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick finished with a floating coat of neat cement complete as per standard design with FPS bricks of class 75.
20	External Sewerage	Glazed stoneware pipes of 100 & 150mm diameter grade 'A' shall be provided, laid and jointed with stiff mixture of cement mortar in the proportion of 1:1 (1cement :1 fine sand) including testing of joints etc. complete. SW pipes shall be encased with Cement concrete 1:5:10 (1 cement: 5 coarse sand: 10 graded stone aggregate 40 mm nominal size) including bed concrete as per CPWD standard design and CPWD specifications. In case of non-availability of SW Pipe, contractor may use UPVC Pipe of similar dia with the prior approval of EIC without any financial implication to RECTPCL.
21	Gully trap	100x100 mm or 150x100 mm size P type Square-mouth S.W. gully trap class SP-1 complete with C.I. grating brick masonry chamber and water tight C.I. cover frame of 300 x300 mm size (inside), the weight of cover to be not less than 4.50 kg and frame to be not less than 2.70 kg as per standard design. FPS Bricks class designation 75 shall be provided for brick masonry chamber.
22	Manholes	FPS brick masonry manhole shall be constructed in cement mortar 1:4 (1 cement :4 coarse sand) RCC top slab with 1:2:4 mix (1 cement : 2 fine aggregate : 4 graded stone aggregate 20 mm nominal size) foundation concrete 1:4:8 mix (1cement : 4 coarse sand :8 graded stone aggregate 40 mm nominal size) inside plastering 12 mm thick with cement mortar 1:3 (1 cement : 3 coarse sand) finished with floating coat of neat cement and

		<p>making channels in cement concrete 1:2:4 (1 cement: 2 coarse sand :4 graded stone aggregate 20 mm nominal size) finished with a floating coat of neat cement complete as per standard design. The size and depth of manhole shall be suitably decided based on requirement of layout in line with CPWD specification.</p> <p>a) Inside size shall be 90 x 80 cm and 60 cm deep including CI cover with frame (light duty) 455 x 610 mm internal dimensions total weight of cover and frame shall not be less than 38 kg (weight of cover 23 kg and weight of frame 15 kg) and shall be constructed with F.P.S. bricks with class designation 75.</p> <p>b) Inside size shall be 120 x 90 cm and 90 cm or more deep including CI cover with frame (medium duty) 500mm internal diameter total weight of cover and frame to be not less than 116 kg (weight of cover 58 kg and weight of frame 58 kg) with FPS Bricks class designation 75.</p>
23	Foot Rest	<p>Orange colour safety foot rest of minimum 6 mm thick plastic encapsulated as per IS : 10910, on 12 mm dia steel bar conforming to IS: 1786, having minimum cross section as 23 mmx25 mm and over all minimum length 263 mm and width as 165 mm with minimum 112 mm space between protruded legs having 2 mm tread on top surface by ribbing or chequering besides necessary and adequate anchoring projections on tail length on 138 mm as per standard drawing and suitable to with stand the bend test and chemical resistance test as per specifications and having manufacture's permanent identification mark to be visible even after fixing, fixing in manholes with 30x20x15 cm cement concrete block 1:3:6 (1 cement : 3 fine aggregate : 6 graded stone aggregate 20 mm nominal size) complete.</p>
24	Road Gully Chamber	<p>Brick Masonry road gully chamber of 50x45x60cm shall be provided with FPS brick with cement mortar 1:4 including 500x450mm pre cast RCC Horizontal/vertical grating with frame complete</p>

13.17. ELECTRIFICATION

All electrification shall be executed as per details specified elsewhere in the technical specification. All details shall be as per relevant Indian standard codes (IS Codes)/ equivalent International Standards.

14. WATER SUPPLY

1. The contractor should arrange point for water connection, or arrange water tankers at his own cost, no payment shall be made for this.
2. The contractor shall carry out all the plumbing/erection works required for supply of water in township beyond the single point as at (i) above.
3. The contractor shall carry out all the plumbing/erection works required for supply of water to Fire Fighting pump house, Security room beyond the single point as at (i) above.
4. The details of tanks, pipes, fittings, fixtures etc. for water supply are given elsewhere in the specification under respective sections.
5. A scheme shall be prepared by the contractor indicating the layout and details of water supply which shall be got approved by Employer before actual start of work including all other incidental items not shown or specified but as may be required for complete performance of the works. All drawings shall be prepared by the contractor for approval of Employer.
6. Bore wells and pumps for water supply is in the scope of contractor.

15. SEWERAGE SYSTEM

1. Sewerage system shall be provided for all buildings wherever applicable.

2. The Contractor shall construct septic tank and soak pit suitable for 150 users. If septic and soak pit system is not acceptable by local Authority, contractor will have to install suitable sewerage system as per local statutory requirement.
3. The system shall be designed as per relevant Indian standard codes (I S Codes)/ equivalent International Standards. All drawings shall be prepared by the contractor for approval of Employer.

16. GENERAL SPECIFICATIONS FOR BUILDINGS:

These clauses are applicable for the vendor designed buildings, For the building, most of the finishing items are explained in previous clauses, if any of items are missed or may be required for completion of the same, the below mentioned clauses may also be referred.

- i. The material specification, workmanship and acceptance criteria shall be as per approved standard Field Quality Plan attached with this document. In case certain item is not covered in FQP, it shall be constructed as per CPWD specification. However, the contractor shall prepare field quality plan for civil works as per relevant IS codes/equivalent International Standards during detailed engineering stage and submit to Employer for approval within ONE month after award of work.
- ii. Post constructional Anti termite treatment shall be carried out for all buildings as per DSR item no. 2.34 & 2.35. Anti-termite chemical treatment shall be given to column pits, wall trenches, foundations of buildings, filling below the floors etc. as per IS: 6313 and other relevant Indian Standards
- iii. Reinforced cement concrete with controlled water cement ratio as per IS-code shall be used for all underground concrete structures such as pump-house, tanks, and water retaining structures for achieving water-tightness.
- iv. FPS or Modular clay/fly ash based Bricks having minimum 75 kg/cm² compressive strength can only be used for masonry work. Contractor shall ascertain himself at site regarding the availability of bricks of minimum 75 kg/cm² compressive strength before submitting his offer. However, Contractor can propose to use aerated concrete block or solid concrete blocks of compressive strength not less than 75kg/cm² without any cost implication to RECTPCL.
- v. Full brickwork shall be provided with cement mortar 1:6 (1cement: 6 coarse sand). Half brick work masonry shall be provided with cement mortar 1:4 (1cement: 4coarse sand) and two no 6mm dia ms bar at every third course.
- vi. 12mm cement plaster of mix 1:6 (1cement: 6 fine sand) shall be provided on the smooth side of internal walls. However rough side of walls shall be provided with 15mm cement plaster of mix 1:6 (1cement: 6 fine sand).
- vii. External plaster in two coats - 18mm Cement plaster in two coats under layer 12mm thick cement plaster 1:5 (1 cement: 5coarse sand) finished with a top layer 6mm thick cement plaster (1cement : 6 fine sand). External plastered surface shall be finished with white cement based putty of average thickness 1 mm, of approved brand and manufacturer to prepare the surface even and smooth. After putty the walls shall be finished with Premium Acrylic Smooth exterior paint of approved brand and manufacturer with Silicone additives of required shade (Two or more coats applied @ 1.43 ltr/ 10 sqm. over and including priming coat of exterior primer applied @ 2.20 kg/ 10 sqm). 13.8 6 mm thk. Cement plaster of mix 1:3 (1 cement: 3 fine sand) to RCC ceiling shall be done.
- viii. Internal walls shall be finished with Plaster of Paris putty of average thickness 2 mm, of approved brand and manufacture, over the plaster surface to prepare the surface even and smooth complete. In case plastered surface of buildings are covered under wall paneling, dado work, skirting etc. no putty and painting are required.
- ix. Internal Wall shall be painted with minimum two coats of premium acrylic emulsion paint having VOC (volatile organic compound) content less than 50gm per litre of approved brand and manufacture including applying additional coats wherever required, to achieve even shade and colour over priming coat as per manufacturer specification/ recommendation

- x. Non - VOC premium acrylic emulsion paint having volatile organic compound content less than 50gm per litre of approved brand and manufacture shall be used wherever specified.
- xi. Painting with synthetic enamel paint of approved brand and manufacture of required colour to give an even shade shall be provided on the steel doors, flush doors and rolling shutters in various buildings or as specified in the drawings. Two or more coats over an under coat of suitable shade with primer paint of approved brand and manufacture.
- xii. Two or more coats of French spirit polishing with a coat of wood filler shall be provided on the wooden doors and frames.
- xiii. Polished vitrified tiles in 60x60 cm size (thickness to be specified by the manufacturer) in flooring and skirting, with water absorption's less than 0.08% and conforming to IS: 15622 of approved make in all colours and shades, laid on cement mortar 20mm thick min. for flooring & 12mm thick for skirting 1:4 (1 cement: 4coarse sand) including grouting the joints with white cement and matching pigments etc., complete.
- xiv. Glazed Ceramic floor tiles 300x300mm (thickness to be specified by the manufacturer) of 1st quality conforming to IS:15622 of approved make in colours as approved by Engineering- charge in toilet and pantries area on 20mm thick min. cement mortar 1:4 (1 cement : 4coarsesand) including grouting the joints with white cement and matching pigments etc., complete.
- xv. 62 mm thick cement concrete flooring with concrete hardener topping, under layer 50 mm thick cement concrete 1:2:4 (1 cement: 2 fine aggregate : 4 graded stone aggregate 20mm nominal size) and top layer 12mm thick cement hardener consisting of mix 1:2 (1 cement hardener mix: 2 graded stone aggregate, 6mm nominal size) by volume, hardening compound mixed @ 2 litre per 50 kg of cement or as per manufacturer's specifications.
- xvi. Cement plaster skirting (up to 15 cm height) with cement mortar 1:3 (1 cement: 3 coarse sand) mixed with metallic concrete hardener in same ratio as for floor finished with a floating coat of neat cement. 21 mm thick in ACDB/DCDB room.
- xvii. Granite stone of 18mm thick gang saw cut mirror polished pre-molded and pre-polished, machine cut for of required size of approved shade, colour and texture laid over 20mm thick base cement mortar 1:4 (1 Cement: 4 coarse sand) with joints treated with white cement, mixed with matching pigment, epoxy touch ups, including rubbing, curing molding and polishing to edge to give high gloss finish etc. complete for staircase.
- xviii. Granite stone of flooring with 18mm thick gang saw cut mirror polished premoulded and prepolished, machine cut for of required size of approved shade, colour and texture laid over 20mm thick cement mortar 1:4. The joints are filled with jointing compound matching to the granite. Wherever granite is specified for the floor, 100mm granite skirting shall be provided with the walls. The granite outer surface shall be flushed to the plaster finish of the wall by molding / beveling of granite at top edge.
- xix. Granite counter of approved shade shall be provided and fixed with 18mm thick gang saw cut, mirror polished, premoulded and pre-polished, machine cut for pantry & kitchen platform facias and similar locations of required size, approved shade, colour & texture laid over 20mm thick base cement mortar 1:4 (1cement : 4 Coarse sand) joints treated with white cement, mixed with matching pigment, epoxy touch ups, including rubbing, curing moulding and polishing to edges to give high gloss finish etc complete at all levels.
- xx. Ceramic glazed wall tiles of 1st quality conforming to IS: 15622 (thickness to be specified by the manufacture) of approved make in all colours, shades as approved by Engineer-in- Charge in dados over 12mm thick bed of cement Mortar 1:3 (1 Cement: 3 Coarse sand) and jointing with grey cement slurry @ 3.3kg per sqm including pointing in white cement mixed with pigment of matching shade complete. Height of dado shall be 2.1m high in toilet, kitchen and pantry or elsewhere specified in the drawings or TS.
- xxi. Circular/hexagonal M.S. sheet ceiling fan box shall be provided in the ceiling with clamp of internal dia. 140 mm, 73 mm height, 3 mm thick rim, top and bottom lid of 1.5 mm M.S. Sheet. Lids shall be screwed in to M. S. box by means of 3 mm round headed screws, clamps shall be made of 12 mm dia. M. S. bar bent to shape as per standard drawing with overall length as 80 cm.
- xxii. All doors except for toilet shall have 100mm 6 lever CP Brass mortice lock. Anodized aluminum handles of ISI marked and approved size shall be provided for all doors and windows as per requirement and instruction of E.I.C.

- xxiii. Cylindrical keyless lock of 25 mm diameter and 50mm diameter knob on both sides (ISI marked) shall be provided for toilets.
- xxiv. Kitchen door shall have 250x16mm C.P. brass sliding door bolt.
- xxv. Door shall be provided with anodized aluminum tower bolt (barrel type) 250x10mm wherever door closers are not provided.
- xxvi. All windows shall have aluminum tower bolt (barrel type) 150x10mm as per requirement.
- xxvii. Plinth protection 50 mm thick of cement concrete 1:2:4 (1 cement : 2 fine aggregate : 4 graded stone) aggregate 20 mm nominal size) shall be laid over 75 mm bed of dry brick ballast 40 mm nominal size well rammed and consolidated and shall be grouted with fine sand including finishing the top smooth. Minimum width of plinth protection shall be 1000 mm .
- xxviii. Ward Robes of required height and about 600 mm deep shall be made out of 18 mm. thk anti termite treated commercial board ISI marked at end verticals, top and bottom, shutters, partition etc complete. The rear side of the unit shall be made with 6mm thk commercial ply ISI marked, which shall have French spirit polish on the exterior face. Inner surface of the storage cabinet shall be finished with 0.8mm thk approved laminate. The horizontal partition shall be of removable type fixed with necessary SS fittings and hardware. All external surfaces shall be finished with 4.0 mm thk approved veneer with melamine including making necessary grooves, teak wood moulding as per approved drawings. Each shutter shall have piano type stainless steel hinges and C.P. Brass or SS 125mm long handle. The unit shall have necessary fittings such as tower bolts, 4 lever CB locks etc complete.
- xxix. Angles 50x50x6 mm (minimum) with lugs shall be provided for edge protection all round cut outs/openings in floor slab.
- xxx. Item/ components of buildings not explicitly covered in the specification but required for completion of the project shall be deemed to be included in the scope.

17. EXTERNAL WATER SUPPLY FROM BORE-WELL TO FIRE WATER TANK/ BUILDING AND / OR TRANSIT CAMP:

- i. The drawing for the water supply from bore-well to fire water tank shall be developed by the Contractor. Water supply will be made available to the Contractor from a bore-well by the Employer at any one location within the sub-station. 80 mm dia CPVC pipe shall be provided by the Contractor from the bore-well to the fire water tank. The underground pipe line shall be laid as per CPWD Specification. The ball valve, NRV etc. shall be provided as per requirement. From this pipe line a 25 mm dia tap off shall be connected by the Contractor to the roof water tank provided for the control room building & transit camp.
- ii. The Contractor shall carry out all the external plumbing/erection works required for supply of water to the control room building, firewater tank and/ or transit camp beyond the single point as given above.
- iii. A scheme shall be prepared by the Contractor indicating the layout and details of water supply which shall be got approved from the Employer before actual start of work including all other incidental items not shown or specified but as may be required for complete performance of the works.

18. SUBMISSIONS

The following information/documents/drawings shall be submitted for review and approval

1. Structural design calculations, Structural drawings (including construction/ fabrication), both in hard and soft copies, for all reinforced concrete and structural steel structures.
2. Fully dimensioned and detailed floor plans, cross-sections, longitudinal sections and elevations identifying the major building components.
3. Product information of building components and materials, including walls, partitions, flooring, ceilings, roofing, doors, wall panelling and windows and building finishes along with BOQ.
4. A detailed schedule of building finishes including colours schemes along with item

description.

5. A door & window schedule showing door & window types and locations, lock sets and latch sets and other door hardware along with item details. Approval of the above information shall be obtained before ordering materials or starting construction/fabrication, as applicable.

19. MISCELLANEOUS REQUIREMENTS

- i. All joints including construction and expansion joints for the water retaining structures (RCC tank for Fire Fighting and underground water tank) shall be made water tight by using PVC ribbed water stops with central bulb. The minimum thickness of PVC water stops shall be 5 mm and minimum width shall be 230 mm.
- ii. The material specification, workmanship and acceptance criteria shall be as per approved standard Field Quality Plan attached with this document. In case certain item is not covered in FQP, it shall be constructed as per CPWD specification. However, the contractor shall prepare field quality plan for civil works as per relevant IS codes/equivalent International Standards during detailed engineering stage and submit to Employer for approval within ONE month after award of work.
- iii. Items/ components of buildings not explicitly covered in the specification but required for completion of the project shall be deemed to be included in the scope.

20. INTERFACING

The proper coordination & execution of all interfacing civil works activities like fixing of conduits in roofs/walls/floors, fixing of foundation bolts, fixing of lighting fixtures, fixing of supports/embedment, provision of cut outs etc. shall be the sole responsibility of the Contractor. He shall plan all such activities in advance and execute in such a manner that interfacing activities do not become bottlenecks and dismantling, breakage etc. is reduced to minimum.

21. STATUTORY RULES

- i. Contractor shall comply with all the applicable statutory rules pertaining to factories act (as applicable for the State), Fire Safety Rules of Tariff Advisory Committee, Water Act for pollution control etc.
- ii. Statutory clearance and norms of State Pollution Control Board shall be followed as per
- iii. Water Act for effluent quality from plant.
- iv. Requirement of sulphate resistant cement (SRC) for sub structural works shall be decided in accordance with the Indian Standards based on the findings of the detailed soil investigation. In case sulphate resistant cement is used as per requirement, differential cost between sulphate resistant cement and PPC cement shall be payable as an extra item.
- v. All building/construction materials shall conform to the best quality specified in CPWD specifications if not otherwise mentioned in this specification.
- vi. All tests as required in the standard field quality plans have to be carried out without any financial implication to employer

Second Envelope (Price Schedule)			
General guidelines for filling up the Price Schedules, Sch-1 to Sch-7			
Design, Manufacturing, Supply, Erection, Testing & Commissioning of New GIS Substations at Diskit & Padum and Bay extensions at existing PGCIL's GIS Substations at Phyang & Drass on Turnkey Basis associated with Strengthening of Transmission System of JKPDD under PMDP Scheme-15.			
TENDER PACKAGE No.:-RECTPCL/PIA/JKPDD/SS-03			
1	Fill up only green shaded cells in Sch-1, Sch-2, Sch-3, Sch-4, Sch-5, Sch-7, Guarantee Declaration and Bid Form 2nd Envelope.		
2	All the cells in Sch-6 are auto filled, therefore no cell is required to be filled up there.		
3	Instructions / error messages, if any, will be displayed automatically after selecting the cell.		
<table border="1" style="width: 100%;"> <tr> <td style="text-align: center;">Click for Detailed General Instructions</td> <td style="text-align: center;">Click to skip Instructions & Proceed</td> </tr> </table>		Click for Detailed General Instructions	Click to skip Instructions & Proceed
Click for Detailed General Instructions	Click to skip Instructions & Proceed		
<p>REC Transmission Projects Company Limited (A wholly owned subsidiary of REC, a 'Navratna CPSE' Under the Ministry of Power, Govt of India) ECE House, 3rd Floor, Annexe – II, 28 A, K G MARG, NEW DELHI – 110 001 Website: www.rectpcl.in</p>			

Annexure G to Amendment 7

Summary Sheet		
Name of Participating Bidder (To be filled by the bidder)		
Price Quoted (as per Schedule-6 after discount)		
Values in INR	Total Evaluated Price	0.00

Design, Manufacturing, Supply, Erection, Testing & Commissioning of New GIS Substations at Diskit & Padum and Bay extensions at existing PGCIL's GIS Substations at Phyang & Drass on Turnkey Basis associated with Strengthening of Transmission System of JKPDD under PMDP Scheme-15.

Click to Proceed



- I While filling up the worksheets following may please be observed :
- (i) Fill up only green shaded cells.
 - (ii) Certain data type entries have been restricted, such as Numeric values or limits of numeric values.
 - (iii) Select only the options provided in pull down menus.
 - (iv) Do not link any cell of this work book with any other work book.
 - (v) Do not use copy & paste or cut & paste options for filling up the data.
 - (vi) Do not reformat any of the cell of the work book.
- II This Workbook consists of following worksheets :

Cover :

Opening page of the workbook.

Names of Bidder :

- Select Sole Bidder or JV (Joint Venture) from the pull down menu. Do not leave this cell blank.
- Select nos. of the JV Partners other than the Lead Partner from drop down
- In case of JV partners more than 2, enter details of 3rd & more partners along with details of 2nd partner.
- Fill up names and address of the Sole Bidder and /or Joint Venture.
- Fill up date in dd-mm-yyyy format from drop down menu.
- Click for Sch-1 given at the right top of the worksheet to go to Sch-1.

Sch-1 (Ex-works Prices) :

Fill up unit rates for all the items in numeric values greater than 0

- (zero). If unit rate is left blank, the corresponding item shall be deemed to be included in the total price.
- Total amount shall get calculated automatically.
- Type Test charges shall appear automatically in Sch-1, after filling up Sch- 7 appropriately.

Sch-2 (Freight & Insurance Charges) :

Fill up unit rates for all the items in numeric values greater than

- 0 (zero). If unit rate is left blank, the corresponding item shall be deemed to be included in the total price.
- Total amount shall get calculated automatically.

Sch-3 (Erection Charges) :

Fill up unit rates for all the items in numeric values greater than

- 0 (zero). If unit rate is left blank, the corresponding item shall be deemed to be included in the total price.
- Total amount shall get calculated automatically.

Sch-4 (Training Charges) :

Annexure G to Amendment 7

- Not applicable, hence no cell is required to be filled up.
Sch-5 (Summary of GST applicable on Supply of Goods and
- Amount of GST shall be calculated automatically
Sch -6 :
Summary of all the Schedules without considering discount
(mentioned in
the work sheet discount) shall be displayed automatically.
- No cell is required to be filled in by the bidder in this worksheet.
- **Sch-7 (Type Test Charges) :**
- Fill up the rates & location where type tests are proposed.
- Total of this Sch-7 shall automatically appear in Sch-1.
Bid from 2nd Envelope :
- Fill up ref. no. as bidder's ref no. of this letter.
- This letter shall consider the net price as per Sch-6 (After
Discount).
- Fill up names & Designation of the representatives of other JV
partner(s) if the bidder is JV (Joint Venture) .
- Fill up additional information as required.

Annexure G to Amendment 7

Design, Manufacturing, Supply, Erection, Testing & Commissioning of New GIS Substations at Diskit & Padum and Bay extensions at existing PGCIL's GIS Substations at Phyang & Drass on Turnkey Basis associated with Strengthening of Transmission System of JKPDD under PMDP Scheme-15.	
TENDER PACKAGE No.:-RECTPCL/PIA/JKPDD/SS-03	
Enter following details of the bidder	
Specify type of Bidder [Select from drop down menu]	JV_JointVenture
Total Nos. of Partners in the JV [excluding the Lead Partner]	2 or More
Name of the Sole Bidder	
Address of the Sole Bidder	
Name of the other Partner-1	
Address of the other Partner-1	
Name of other Partner -2 (more, if any)	
Address of other Partner -2 (more, if any)	
Printed Name	
Designation	
email -id of Bid signatory	
Mobile No. of Bid signatory	
Fax No. of Bid signatory	
Date	
Place	



Design, Manufacturing, Supply, Erection, Testing & Commissioning of New GIS Substations at Diskit, Ladakh and Padum and Bay extensions at existing PGCIL's GIS Substations at Phyang & Drass on Turnkey Basis associated with Strengthening of Transmission System of JKPD under PMDP Scheme-15.

Annexure G to Amendment 7

(SCHEDULE OF RATES AND PRICES)

REC Transmission Projects Company Limited



Bidder's Name and Address :

To:
(A wholly owned subsidiary of REC, a 'Navratna CPSE'
Under the Ministry of Power, Govt of India)
ECE House, 3rd Floor, Annexe - II,
28 A, K G MARG, NEW DELHI - 110 001
Website: www.rectpcl.in

Name :

Address :

PLANT AND EQUIPMENT (INCLUDING MANDATORY SPARES PARTS) TO BE SUPPLIED:

All Prices are in Indian Rupees.

Sl. No.	HSN Code	Whether HSN in column '2' is confirm. If not indicate applicable HSN*	Rate of GST Applicable (%)	Whether rate of GST in column '4' is confirm. If not indicate applicable GST*	Item Description	Unit	Qty.	Unit Ex-works price(excluding GST)	Total Ex-works price(excluding GST)	GST Tax as Confirmed by Bidder
1	2	3	4	5	6	7	8	9	10=9x8	11
220/33kV New GIS Grid Substation at Diskit, Ladakh										
1					220/33kV New GIS Grid Substation at Diskit, Ladakh, U.T					
A.1					POWER TRANSFORMER					
A.1.1					POWER TRANSFORMER					
a)	85042330		18%		16.67 MVA, 220/33 KV Single Phase transformers (For: 3x16.67 MVA = 50 MVA + 1x16.67 MVA Spare), (Excluding insulating oil) as per IS	Nos.	4	0.00	0.00	0.00
b)	85049010		18%		Insulating oil for 3x16.67MVA + 1x16.67MVA Spare, 220/33 KV, 1-phase transformer (LOT* - Oil for One Transformer)	LOT*	4	0.00	0.00	0.00
c)	84248990		18%		Nitrogen Injection Fire Fighting System	Nos.	3	0.00	0.00	0.00
d)	72169990		18%		Neutral formation for 220kV HV & 33kV LV side including Neutral C.T.s, BPL Structure etc.	Set	1	0.00	0.00	0.00
e)	85049010		18%		On line Insulating oil drying system	Nos.	4	0.00	0.00	0.00
f)					On line Dissolved Gas & Moisture Analyser	Nos.	4	0.00	0.00	0.00
g)					Digital RTCC Panel with two RTCC relay	Nos.	1	0.00	0.00	0.00
A.1.2					Testing & Maintenance Equipments					
a)	73090090		18%		Oil Storage Tank (10KL)	No.	1	0.00	0.00	0.00
b)					Transformer Oil Filtration plant (6KLPH)	No.	1	0.00	0.00	0.00
c)					BDV TEST KIT	No.	1	0.00	0.00	0.00
d)					OIL SAMPLING BOTTLE	No.	3	0.00	0.00	0.00
e)					Automatic Capacitance and Tan Delta Kit	No.	1	0.00	0.00	0.00
A.2					AUXILIARY TRANSFORMER					
a)	85042100		18%		315 kVA, 33/0.433kV	Nos	2	0.00	0.00	0.00
B					245KV Equipment					
B.1					245KV GIS Equipment					
a)	85372000		28%		245kV, SF6 GIS Bus Bars Module including Bus Duct inside GIS Hall [Module description as per Section Project, Technical specification]	Set	2	0.00	0.00	0.00
b)	85372000		28%		245kV, SF6 GIS Transformer bay Module including Bus Duct inside GIS Hall [Module description as per Section Project, Technical specification]	Set	1	0.00	0.00	0.00
c)	85372000		28%		245kV, SF6 GIS Line bay Module including Bus Duct inside GIS Hall [Module description as per Section Project, Technical specification]	Set	1	0.00	0.00	0.00
d)	85372000		28%		245kV, SF6 GIS Bus Coupler bay Module [Module description as per Section Project, Technical specification]	Set	1	0.00	0.00	0.00
e)	85372000		28%		245kV, 1600A, 40kA, Wall Mounted Air Bushing for Connecting GIS to AIS (For Transformer, Reactor and line feeders) alongwith support structure, if required (Single Phase)	Nos.	6	0.00	0.00	0.00
B.2					245KV Outdoor Equipment					
i)	85354010		18%		216KV Surge Arrester (1-phase)	Nos.	6	0.00	0.00	0.00
ii)	73045930		18%		245kV BPI	Nos.	15	0.00	0.00	0.00
C					36KV Equipment					
C.1					36KV, 2500Amps, 25KA for 1 Sec GIS Equipment					
a)	85372000		28%		36kV, SF6 GIS Bus Bar Enclosure Module including Bus sectionalizer, Bus PT's, Bus riser etc [Module description as per Section Project, Technical specification]	Set	1	0.00	0.00	0.00
b)	85372000		28%		36kV, SF6 GIS Line bay Module [Module description as per Section Project, Technical specification]	Set	3	0.00	0.00	0.00
c)	85372000		28%		36kV, SF6 GIS Transformer bay Module [Module description as per Section Project, Technical specification]	Set	1	0.00	0.00	0.00
d)	85372000		28%		36kV, SF6 GIS Auxiliary transformer bay Module [Module description as per Section Project, Technical specification]	Set	2	0.00	0.00	0.00
C.2					36kV Outdoor equipment					
i)	85353090		18%		33 kV HDB 3 Φ Isolators with earth switch (Line Side)	Nos.	3	0.00	0.00	0.00
ii)	85354010		18%		30 kV Surge Arrestors (1-phase) (Line Side)	Nos.	15	0.00	0.00	0.00
					30 kV 1KG Fuse (630 Amp) 1Φ	Nos.	6	0.00	0.00	0.00
D.					Testing & Maintenance Equipment for GIS					
a)	85372000		28%		SF6 Gas filling & evacuating plant For 245kV & 36kV GIS	Set	1	0.00	0.00	0.00
b)	85372000		28%		Partial Discharge Monitoring System for GIS as per Technical Specification	Set	1	0.00	0.00	0.00
i)	85372000		28%		For 245kV GIS	Set	1	0.00	0.00	0.00
ii)	85372000		28%		For 36kV GIS	Set	1	0.00	0.00	0.00
c)	85372000		28%		Dew Point meter For 245kV & 36kV GIS	Set	1	0.00	0.00	0.00
d)	85372000		28%		SF6 Gas Leak Detector For 245kV & 36kV GIS	Set	1	0.00	0.00	0.00
e)	85372000		28%		EOT crane for 245kV GIS Hall	Set	1	0.00	0.00	0.00
f)	85372000		28%		SF6 Gas Analyser	Set	1	0.00	0.00	0.00
E.					RELAY PANELS (WITH AUTOMATION)					
E1					245kV Front Glass Door Simplex Panels					
a)	85371000		28%		Circuit Breaker Relay Panel With Auto Reclose	Set	2	0.00	0.00	0.00
ii)	85371000		28%		With out Auto Reclose	Set	1	0.00	0.00	0.00
b)	85371000		28%		Line Protection Panel	Set	1	0.00	0.00	0.00
c)	85371000		28%		Transformer Protection Panel (For both HV & LV side)	Set	1	0.00	0.00	0.00
d)	85371000		28%		Bus Bar Protection Panel	Set	1	0.00	0.00	0.00
E2					Teleprotection Equipments					
a)					Digital protection coupler Panel including cabling etc.	Set	1	0.00	0.00	0.00
b)					Digital protection coupler including cabling etc. for other end	Set	1	0.00	0.00	0.00
F.					COMMON EQUIPMENTS					
a)					Megaohm meter - 5kV Digital Battery operated as per specs.	No.	1	0.00	0.00	0.00
b)					Digital Multimeter	No.	1	0.00	0.00	0.00

Annexure G to Amendment 7

Sl. No.	HSN Code	Whether HSN in column 2 is applicable to indicate applicable HSN*	Whether rate of GST is applicable (%)	Whether rate of GST is confirmed to indicate applicable GST*	Item Description	Unit	Qty.	Unit Ex-works price(excluding GST)	Total Ex-works price(excluding GST)	GST Tax as Confirmed by Bidder
1	2	3	4	5	6	7	8	9	10=9x8	11
G.					SUBSTATION AUTOMATION					
G.1					Complete Substation Automation System (SAS) for substation including hardware and software for the substation & remote control stations alongwith associated equipments for the following bays as per Technical Specification					
a)					Main bays to be automated					
i)	90328990		18%		245 kV system	Bay Nos.	3		0.00	0.00
ii)	90328990		18%		36 kV system	Bay Nos.	7		0.00	0.00
iii)	90328990		18%		BCU for controlling & monitoring of Auxilary System	Set	1		0.00	0.00
H					LT Switchgear (As per Technical specification)					
a)	85371000		28%		415V Main switchboard	Set	1		0.00	0.00
b)	85371000		28%		415V ACDB	Set	1		0.00	0.00
c)	85371000		28%		415V MLDB	Set	1		0.00	0.00
d)	85371000		28%		415V Emergency LDB	Set	1		0.00	0.00
e)	85371000		28%		220V DCDB	Set	2		0.00	0.00
f)	85371000		28%		48V DCDB	Set	2		0.00	0.00
I.					Batteries					
a)					220V					
i)	85072000		28%		400 AH	Nos	2		0.00	0.00
b)					48V					
i)	85072000		28%		300 AH	Nos	2		0.00	0.00
J.					Float Cum Boost Battery Charger					
a)					220V Float Cum Boost Battery Charger					
i)	85044030		28%		60A/60A	Nos	2		0.00	0.00
b)					48V Float Cum Boost Battery Charger					
i)	85044030		28%		40A/40A	Nos	2		0.00	0.00
K.					Diesel Generator with control Panel					
a)	85021200		18%		250 kVA	Set	1		0.00	0.00
b)					10KL Bulk Storage Tank as per IS	No.	1		0.00	0.00
L.					Fire Protection System					
a)					Portable / Trolley/Wheel mounted extinguishers					
i)	84241000		28%		9 litre water type	Nos	5		0.00	0.00
ii)	84241000		28%		45 litre foam type	Nos	3		0.00	0.00
iii)	84241000		28%		4.5 kg CO ₂ type	Nos	20		0.00	0.00
iv)	84241000		28%		6.0 kg Dry Chemical Powder (DCP) type	Nos	15		0.00	0.00
M.					Cables along with clamps, glands, lugs and straight joints etc.					
a)					Power Cables - (36kV grade) (Suitable for operation at extreme Negative Temperature (i.e. minus 30° Cel.)					
i)	85446090		28%		36kV Single Core, 630 Sq.mm Aluminium H.T Buried cable (Two length per Phase and one legh per neutral) along with all accessories including termination kit as per specification (for Power transformer application).	Metre	500		0.00	0.00
ii)	85446090		28%		36kV, 3 Core 300 Sq.mm Aluminium H.T Buried cable along with all accessories including termination kit as per specification (for Auxilary transformer application)	Meter	100		0.00	0.00
iii)	85446090		28%		36kV Single core 630 Sq.mm Aluminium H.T Buried cable (One length per phase) along with all accessories including termination kit as per specification (for Feeder Bay application).	Meter	600		0.00	0.00
b)					Power cables - (1.1kV grade) (Suitable for operation at extreme Negative Temperature (i.e. minus 30° Cel.)					
i)	85446090		28%		3.5Cx300 sqmm (XLPE) cable for filter Machine along with termination arrangement as per IS	Meter	150		0.00	0.00
N.					Air conditioning System for Control room cum administrative building, relay room etc.					
a)	84151010		28%		High wall type split AC unit of 2 TR capacity	Nos	5		0.00	0.00
O.					Heating System for various room in S/s					
a)					Oil Flow Heat Convectors	Nos.	50		0.00	0.00
P.					Fabrication, galvanising and supply of following Steel Structures (Grade C) including nuts, bolts, all types of washers, packplates, step bolts and gusset plates including foundation bolts.					
a)					Lattice Structure (Gantry Towers, Beams, LM and Equipment /support structure) including Foundation Bolts	MT	55		0.00	0.00
b)					Fastners and step bolts.(Nuts,Bolts & Washers)	MT	1.75		0.00	0.00
Q.					Telecommunication equipment					
A					SDH EQUIPMENTS(STM-4 MADM upto 5MSP Protected directions)					
(i)					Diskit					
					Base equipments (Common cards, Cross connect/control cards, power supply cards, power cabling, other hardware and accessories including sub rascks, patch cord, DDF etc fully equipped excluding (ii) & (iii) below	Nos.	1		0.00	0.00
					Phyang					
					Base equipments (Common cards,Cross connect/control cards, power supply cards, power cabling, other hardware and accessories including sub rascks, patch cord, DDF etc fully equipped excluding (ii) & (ii) below	Nos.	1		0.00	0.00
(ii)					Optical Interface Cards/SFP					
					Diskit					
a					S4.1 SFP	Nos.	0		0.00	0.00
b					L4.1 SFP	Nos.	4		0.00	0.00
					Phyang					
a					S4.1 SFP	Nos.	0		0.00	0.00
b					L4.1 SFP	Nos.	4		0.00	0.00
(iii)					Tributary cards					
					Diskit					
a					E1 Interface card(Min. 16 Interfaces per card)	Nos.	2		0.00	0.00
b					Ethernet interface 10/100 Base T with Layer-2 switching (Min 8 Interfaces per card)	Nos.	2		0.00	0.00
					Phyang					
a					E1 Interface card(Min. 16 Interfaces per card)	Nos.	2		0.00	0.00
b					Ethernet interface 10/100 Base T with Layer-2 switching (Min 8 Interfaces per card)	Nos.	2		0.00	0.00
B					Equipment Cabinet at Diskit					
2.0					Network Manager System(NMS)					
					Diskit					

Annexure G to Amendment 7

Sl. No.	HSN Code	Whether HSN in column 2 is applicable	Whether rate of GST is confirm. If not indicate applicable GST*	Item Description	Unit	Qty.	Unit Ex-works price(excluding GST)	Total Ex-works price(excluding GST)	GST Tax as Confirmed by Bidder	
1	2	3	4	5	6	7	8	9	10=9x8	11
(l)					Craft terminal					
a					Hardware	Set	1	0.00	0.00	
b					Software	Set	1	0.00	0.00	
					Phyang					
(l)					Craft terminal					
a					Hardware	Set	1	0.00	0.00	
b					Software	Set	1	0.00	0.00	
3.0					VOIP telephone instrument with one common switch(min. 8 port)					
					Diskit	No.	2	0.00	0.00	
					Phyang	No.	2	0.00	0.00	
4.0					Approach Cable (24 fibres)					
					Diskit					
a					24 Fibre(DW/SM)	Kms	1	0.00	0.00	
b					Installation hardware set for above 24 Fibre, Fibre Optic Approach Cable	Set	1	0.00	0.00	
					Phyang					
a					24 Fibre(DW/SM)	kms	1	0.00	0.00	
b					Installation hardware set for above 24 Fibre, Fibre Optic Approach Cable	Set	1	0.00	0.00	
5.0					FODP					
					Diskit					
a					48 Fibre:Indoor Type,Rack Mounted with FCPC Coupling & Pigtails(5mtrs)	No.s	1	0.00	0.00	
					Phyang					
a					48 Fibre:Indoor Type,Rack Mounted with FCPC Coupling & Pigtails(5mtrs)	No.s	1	0.00	0.00	
					Part-B: VENDOR ASSESSED QUANTITIES					
					Erection Hardware					
A.					Insulator Strings, Disc Insulator, Hardware, conductor, Al tube, bus-bar materials, cable trays, clamps, spacers, connectors including equipment connectors, Junction box, earthwire, buried cable trenches/pipe equipment & lighting, 36kV Cable Termination kit alongwith all accessories etc. for 245kV & 36 kV Switch yard:					
i)	85359090		18%		Transformer Bay - Wall mounted SF6 to Air bushing - Transformer bushing connection arrangement inclusive of I.A,BPI etc.	Set	1	0.00	0.00	
ii)	85359090		18%		220kV line Bay	Set	1	0.00	0.00	
iii)					Power Transformer, Neutral formation of HV & LV side, Neutral CT, BPI etc.	Set	1	0.00	0.00	
iv)	85359090		18%		33kV line Bays	Set	3	0.00	0.00	
v)					Aux. Transformer Bay	Set	2	0.00	0.00	
A1					Earthing material including Risers, Equipment earthing, structures earthing etc. (Excluding MS Rod and Chemical Earthing) inside and outside GIS Hall for complete scope of work as per technical specifications	LS	1	0.00	0.00	
a)	85359090		18%		40 mm Dia MS Rod	MT	150	0.00	0.00	
b)	85359090		18%		Chemical Electrolytic Type Earthing (As per IEEE-80): For Rocky soil where getting required earth resistance is not possible.	Nos.	15	0.00	0.00	
B.					Fire detection & Alarm System for all buildings					
i)	84241000		28%		245KV GIS hall	LS	1	0.00	0.00	
ii)	84241000		28%		36KV GIS hall/Room	LS	1	0.00	0.00	
iii)	84241000		28%		Panel room of 245kV	LS	1	0.00	0.00	
iv)	84241000		28%		Control room cum administrative building	LS	1	0.00	0.00	
v)					DG Room	LS	1	0.00	0.00	
C.					Illumination System (luminaries to be suitable for operation at extreme Negative Temperature (i.e. minus 30° Cel.)					
a)					Control room cum administrative building illumination	LS	1	0.00	0.00	
b)					Switchyard lighting	LS	1	0.00	0.00	
c)					Street lighting	LS	1	0.00	0.00	
d)					245KV GIS hall	LS	1	0.00	0.00	
e)					36KV GIS hall/Room	LS	1	0.00	0.00	
f)					Panel room of 245kV	LS	1	0.00	0.00	
g)					Store	LS	1	0.00	0.00	
h)					Security room	LS	1	0.00	0.00	
i)					Parking Shed	LS	1	0.00	0.00	
j)					DG Room	LS	1	0.00	0.00	
D.					Heating cum Ventilation system					
a)					245KV GIS hall (AHU as per Annexure - IV of TS)	LS	1	0.00	0.00	
b)					36KV GIS hall (630mm Sweep Exhaust Fan with Louvers - 2 No.)	LS	1	0.00	0.00	
E.					POWER & CONTROL CABLES (Suitable for operation at extreme Negative Temperature (i.e. minus 30° Cel.)					
a)					Power Cables(PVC)- (1.1kV grade)	LS	1	0.00	0.00	
b)					Power Cables (XLPE) (excluding 3.5C300 sqmm (XLPE) cable for filter Machine)- (1.1kV grade)	LS	1	0.00	0.00	
c)					Control Cable (PVC)- (1.1kV grade)	LS	1	0.00	0.00	
d)					Cable glands, lugs & straight through joints for Power & Control cables	LS	1	0.00	0.00	
					Part-C: Mandatory Spares					
A.					Mandatory Spare List for Transformer					
1					For 50MVA (3x 16.67MVA+1x16.67MVA) , 220/33 KV, 1-phase Autotransformer	LS	1	0.00	0.00	
2					SPARES FOR 245 kV GIS	LS	1	0.00	0.00	
i					245 KV SF6 CIRCUIT BREAKER (GIS)-	LS	1	0.00	0.00	
ii	85353090		18%		245 KV ISOLATORS :	LS	1	0.00	0.00	
iii)	85049010		18%		245 KV CURRENT TRANSFORMER	LS	1	0.00	0.00	
iv	85049010		18%		245 kV VOLTAGE TRANSFORMER	LS	1	0.00	0.00	
3	85381090		18%		SPARES FOR 36kV GIS	LS	1	0.00	0.00	
i	85352911		18%		36 KV CIRCUIT BREAKER:	LS	1	0.00	0.00	
ii	85353090		18%		36KV ISOLATORS :	LS	1	0.00	0.00	
iii)	85049010		18%		36 KV CURRENT TRANSFORMER	LS	1	0.00	0.00	
iv	85049010		18%		36 kV VOLTAGE TRANSFORMER	LS	1	0.00	0.00	
4	85354010		18%		216kV SURGE ARRESTOR	LS	1	0.00	0.00	
5	85353090		18%		36kV ISOLATOR	LS	1	0.00	0.00	
6	85354010		18%		30kV SURGE ARRESTOR	LS	1	0.00	0.00	
7	85021200		18%		DG SET	LS	1	0.00	0.00	
8	85072000		28%		BATTERY	LS	1	0.00	0.00	
9	85044030		28%		BATTERY CHARGER	LS	1	0.00	0.00	

Annexure G to Amendment 7

Sl. No.	HSN Code	Whether HSN in column 2 is applicable to indicate applicable HSN*	Whether rate of GST is applicable (%)	Whether rate of GST is confirmed to indicate applicable GST*	Item Description	Unit	Qty.	Unit Ex-works price(excluding GST)	Total Ex-works price(excluding GST)	GST Tax as Confirmed by Bidder
1	2	3	4	5	6	7	8	9	10=9x8	11
10	85371000		28%		RELAY & PROTECTION (220kV & 33kV)	LS	1		0.00	0.00
11					DIGITAL PROTECTION COUPLER	LS	1		0.00	0.00
12	90328990		18%		SAS	LS	1		0.00	0.00
13					LT SWITCHGEAR	LS	1		0.00	0.00
14					COMMON SPARES	LS	1		0.00	0.00
15					AUX. TRANSFORMER	LS	1		0.00	0.00
16					ILLUMINATION SYSTEM	LS	1		0.00	0.00
17	73269099		18%		ERECTION HARDWARE ITEMS	LS	1		0.00	0.00
18					TELE COMMUNICATION	LS	1		0.00	0.00
Total 1									0	0
220/33kV New GIS Grid Substation at Padum, Ladakh										
1.0					220/33kV New GIS Grid Substation at Padum, Ladakh,U.T					
A1					POWER TRANSFORMER					
a)	85042330		18%		16.67 MVA, 220/33 KV Single Phase transformers (For: 3x16.67 MVA = 50 MVA + 1x16.67 MVA Spare), (Excluding insulating oil) as per TS	Nos.	4		0.00	0.00
b)	85049010		18%		Insulating oil for 3x16.67MVA + 1x16.67MVA Spare, 220/33 KV, 1-phase transformer (LOT* - Oil for One Transformer)	LOT*	4		0.00	0.00
c)	84248990		18%		Nitrogen Injection Fire Fighting System	Nos.	3		0.00	0.00
d)	72169990		18%		Neutral formation for 220kV HV & 33kV LV side including Neutral outdoor C.L.s, BPL, Structure etc.	Set	1		0.00	0.00
e)	85049010		18%		On line Insulating oil drying system	Nos.	4		0.00	0.00
f)					On line Dissolved Gas & Moisture Analyser	Nos.	4		0.00	0.00
g)					Digital RTCC Panel with two no. Digital RTCC relay	Nos.	1		0.00	0.00
A2					BUS REACTOR					
a)					8.33 MVAR, 220/√3 kV, 1 Phase Bus Reactor (For: 3x8.33 MVAR = 25 MVAR + 1x8.33 MVAR Spare) (Excluding Insulating Oil) as per TS	No.	4		0.00	0.00
b)					Insulating oil for above 25MVAR Reactor (LOT* - Oil for One Reactor)	LOT*	4		0.00	0.00
c)					On line Insulating oil drying System	Nos.	4		0.00	0.00
d)					Nitrogen Injection Fire Fighting System	No.	3		0.00	0.00
A3					Testing & Maintenance Equipments					
a)	73090090		18%		Oil Storage Tank (10KL)	No.	1		0.00	0.00
b)					Transformer Oil Filtration plant (6KLP1)	No.	1		0.00	0.00
c)					BDV Test Kit	No.	1		0.00	0.00
d)					OIL Sampling Bottle	No.	3		0.00	0.00
e)					Automatic Capacitance and Tan Delta Kit	No.	1		0.00	0.00
A4					AUXILIARY TRANSFORMER					
a)	85042100		18%		315 kVA, 33/0.433kV	Nos	2		0.00	0.00
B					245KV Equipment					
B.1					245KV GIS Equipment					
a)	85372000		28%		245kV, SF6 GIS Bus Bars Module including Bus Duct inside GIS Hall [Module description as per Section Project, Technical specification]	Set	2		0.00	0.00
b)	85372000		28%		245kV, SF6 GIS Transformer bay Module including Bus Duct inside GIS Hall [Module description as per Section Project, Technical specification]	Set	1		0.00	0.00
c)	85372000		28%		245kV, SF6 GIS Line bay Module including Bus Duct inside GIS Hall [Module description as per Section Project, Technical specification]	Set	1		0.00	0.00
d)	85372000		28%		245kV, SF6 GIS Bus Coupler bay Module [Module description as per Section Project, Technical specification]	Set	1		0.00	0.00
e)	85372000		28%		245kV, SF6 GIS Bus Reactor bay module including Bus Duct inside GIS Hall (Module description as per Section Project, Technical Specification)	Set	1		0.00	0.00
f)	85372000		28%		245kV, 1600A, 40kA, Wall Mounted Air Bushing for Connecting GIS to AIS (For Transformer, Reactor and line feeders) alongwith support structure, if required (Single Phase)	Nos.	9		0.00	0.00
B.2					245KV Outdoor Equipment					
i)	85354010		18%		216KV Surge Arrester (1-phase)	Nos.	9		0.00	0.00
ii)	73045930		18%		245kV BPI	Nos.	21		0.00	0.00
C					36KV Equipment					
C.1					36KV, 2500Amps, 25KA for 1 Sec GIS Equipment					
a)	85372000		28%		36kV, SF6 GIS Bus Bar Enclosure Module including Bus sectionalizer, Bus PT's, Bus riser etc [Module description as per Section Project, Technical specification]	Set	1		0.00	0.00
b)	85372000		28%		36kV, SF6 GIS Line bay Module [Module description as per Section Project, Technical specification]	Set	3		0.00	0.00
c)	85372000		28%		36kV, SF6 GIS Transformer bay Module [Module description as per Section Project, Technical specification]	Set	1		0.00	0.00
d)	85372000		28%		36kV, SF6 GIS Auxiliary transformer bay Module [Module description as per Section Project, Technical specification]	Set	2		0.00	0.00
C-2					36kV Outdoor equipment					
i)	85353090		18%		33 kV HDB 3Φ Isolators with earth switch (Line Side)	No.	3		0.00	0.00
ii)	85354010		18%		30 kV Surge Arrestors (1-phase) (Line Side)	Nos.	15		0.00	0.00
iii)					30 kV 1KG Fuse (630 Amp) 1Φ	Nos.	6		0.00	0.00
D.					Testing & Maintenance Equipment for GIS					
a)	85372000		18%		SF6 Gas filling & evacuating plant For 245kV & 36kV GIS	Set	1		0.00	0.00
b)					Partial Discharge Monitoring System for GIS as per Technical Specification					
i)	85372000		28%		For 245kV GIS	Set	1		0.00	0.00
ii)	85372000		28%		For 36kV GIS	Set	1		0.00	0.00
c)	85372000		28%		Dew Point meter For 245kV & 36kV GIS	Set	1		0.00	0.00
d)	85372000		28%		SF6 Gas Leak Detector For 245kV & 36kV GIS	Set	1		0.00	0.00
e)	85372000		28%		EOT crane for 245kV GIS Hall	Set	1		0.00	0.00
f)	85372000		28%		SF6 Gas Analyser	Set	1		0.00	0.00
E.					RELAY PANELS (WITH AUTOMATION)					
E1					245kV Front Glass Door Simplex Panels					
a)					Circuit Breaker Relay Panel					
i)	85371000		28%		With Auto Reclose	Set	2		0.00	0.00
ii)	85371000		28%		With out Auto Reclose	Set	2		0.00	0.00
b)	85371000		28%		Line Protection Panel	Set	1		0.00	0.00

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1	2	3	4	5	6	7	8	9	10=9x8	11
c)	85371000		28%		Transformer Protection Panel (For both HV & LV side)	Set	1		0.00	0.00
d)					Bus Reactor Protection Panel	Set	1		0.00	0.00
e)	85371000		28%		Bus Bar Protection Panel	Set	1		0.00	0.00
E2					Teleprotection Equipments					
a)					Digital protection coupler Panel including cabling etc.	Set	1		0.00	0.00
b)					Digital protection coupler including cabling etc. for other end	Set	1		0.00	0.00
F.					COMMON EQUIPMENTS					
a)					Megohm meter- 5KV Digital Battery operated as per Specs.	No.	1		0.00	0.00
b)					Digital Multimeter	No.	1		0.00	0.00
G.					SUBSTATION AUTOMATION					
G.1					Complete Substation Automation System (SAS) for substation including hardware and software for the substation & remote control stations alongwith associated equipments for the following bays as per Technical Specification					
a)					Main bays to be automated					
i)	90328990		18%		245 kV system	Bay Nos.	4		0.00	0.00
ii)	90328990		18%		36 kV system	Bay Nos.	7		0.00	0.00
iii)	90328990		18%		BCU for controlling & monitoring of Auxiliary System	Set	1		0.00	0.00
H					LT Switchgear (As per Technical specification)					
a)	85371000		28%		415V Main switchboard	Set	1		0.00	0.00
b)	85371000		28%		415V ACDB	Set	1		0.00	0.00
c)	85371000		28%		415V MLDB	Set	1		0.00	0.00
d)	85371000		28%		415V Emergency LDB	Set	1		0.00	0.00
e)	85371000		28%		220V DCDB	Sets	2		0.00	0.00
f)	85371000		28%		48V DCDB	Set	2		0.00	0.00
I.					Batteries					
a)					220V					
i)	85072000		28%		400 AH	Nos	2		0.00	0.00
b)					48V					
i)	85072000		28%		300 AH	Nos	2		0.00	0.00
J.					Float Cum Boost Battery Charger					
a)					220V Float Cum Boost Battery Charger					
i)	85044030		28%		60A/60A	Nos	2		0.00	0.00
b)					48V Float Cum Boost Battery Charger					
i)	85044030		28%		40A/40A	Nos	2		0.00	0.00
K.					Diesel Generator with control Panel					
a)	85021200		18%		250 kVA	Set	1		0.00	0.00
b)					10KL Bulk Storage Tank as per TS	No.	1		0.00	0.00
L.					Fire Protection System					
a)					Portable/Trolley/Wheel mounted extinguishers					
i)	84241000		28%		9 litre water type	Nos	5		0.00	0.00
ii)	84241000		28%		45 litre foam type	Nos	3		0.00	0.00
iii)	84241000		28%		4.5 kg CO ₂ type	Nos	20		0.00	0.00
iv)	84241000		28%		6.0 kg Dry Chemical Powder (DCP) type	Nos	15		0.00	0.00
M.					Cables along with clamps, glands, lugs and straight joints etc.					
a)					Power Cables - (36kV grade) (Suitable for operation at extreme Negative Temperature (i.e. minus 30° C±1)					
i)	85446090		28%		36kV Single Core, 630 Sq.mm Aluminium H.T Buried cable (Two length per Phase and one length per neutral) along with all accessories including termination kit as per specification (for Power transformer application).	Metre	500		0.00	0.00
ii)	85446090		28%		36kV, 3 Core 300 Sq.mm Aluminium H.T Buried cable along with all accessories including termination kit as per specification (for Auxiliary transformer application)	Meter	100		0.00	0.00
iii)	85446090		28%		36kV Single core 630 Sq.mm Aluminium H.T Buried cable (One length per phase) along with all accessories including termination kit as per specification (for Feeder Bay application).	Meter	600		0.00	0.00
b)					Power cables - (1.1kV grade) (Suitable for operation at extreme Negative Temperature (i.e. minus 30° C±1)					
i)	85446090		28%		3.5Cx300 sqmm (XLPE) cable for filter Machine along with termination arrangement as per TS	Meter	150		0.00	0.00
N.					Air conditioning System for Control room cum administrative building, SAS room etc.					
a)	84151010		28%		High wall type split AC unit of 2 TR capacity	Nos	5		0.00	0.00
O.					Heating System for various rooms in S/s					
a)					Oil Flow Heat Convectors	Nos.	50		0.00	0.00
P.					Fabrication, galvanising and supply of following Steel Structures (Grade C) including nuts, bolts, all types of washers, packplates, step bolts and gusset plates including foundation bolts.					
a)					Lattice Structure (Gantry Towers, Beams, LM and Equipment /support structure) including Foundation Bolts	MT	60		0.00	0.00
b)					Fastners and step bolts.(Nuts,Bolts & Washers)	MT	2		0.00	0.00
Q					Telecommunication equipment					
A					SDH EQUIPMENTS(STM-4 MADM upto 5MSP Protected directions)					
(i)					Padum					
					Base equipments(Common cards,Cross connect/control cards, power supply cards, power cabling, other hardware and accessories including sub rascas, patch cord, DDF etc fully equipped excluding (ii) & (iii) below	Nos.	1		0.00	0.00
					Drass					
					Base equipments(Common cards,Cross connect/control cards, power supply cards, power cabling, other hardware and accessories including sub rascas, patch cord, DDF etc fully equipped excluding (ii) & (ii) below	Nos.	1		0.00	0.00
(ii)					Optical Interface Cards/SFP					
					Padum					
a					S4.1 SFP	Nos.	0		0.00	0.00
b					L4.1 SFP	Nos.	4		0.00	0.00
					Drass					
a					S4.1 SFP	Nos.	0		0.00	0.00
b					L4.1 SFP	Nos.	4		0.00	0.00
(iii)					Tributary cards					
					Padum					

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1	2	3	4	5	6	7	8	9	10=9x8	11
a					E1 Interface card(Min. 16 Interfaces per card)	Nos.	2		0.00	0.00
b					Ethernet interface 10/100 Base T with Layer-2 switching (Min 8 Interfaces per card)	Nos.	2		0.00	0.00
					Drass					
a					E1 Interface card(Min. 16 Interfaces per card)	Nos.	2		0.00	0.00
b					Ethernet interface 10/100 Base T with Layer-2 switching (Min 8 Interfaces per card)	Nos.	2		0.00	0.00
B					Equipment Cabinet at Padum	Nos.	1		0.00	0.00
2.0					Network Manager System(NMS)					
					Padum					
(I)					Craft terminal					
a					Hardware	Set	1		0.00	0.00
b					Software	Set	1		0.00	0.00
					Drass					
(I)					Craft terminal					
a					Hardware	Set	1		0.00	0.00
b					Software	Set	1		0.00	0.00
3.0					VOIP telephone instrument with one common switch(min. 8 port)					
					Padum	No.	2		0.00	0.00
					Drass	No.	2		0.00	0.00
4					Approach Cable (24 fibres)					
					Padum					
a					24 Fibre(DWDM)	Kms	1		0.00	0.00
b					Installation hardware set for above 24 Fibre, Fibre Optic Approach Cable	Set	1		0.00	0.00
					Drass					
a					24 Fibre(DWDM)	kms	1		0.00	0.00
b					Installation hardware set for above 24 Fibre, Fibre Optic Approach Cable	Set	1		0.00	0.00
5.0					FODP					
					Padum					
a					48 Fibre:Indoor Type,Rack Mounted with FCPC Coupling & Pigtails(5mtrs)	No.	1		0.00	0.00
					Drass					
a					48 Fibre:Indoor Type,Rack Mounted with FCPC Coupling & Pigtails(5mtrs)	No.	1		0.00	0.00
					Part-B: VENDOR ASSESSED QUANTITIES					
A.					Erection Hardware					
					Insulator strings, Disc Insulator, Hardware, conductor, Al tube, bus-bar materials, cable trays, clamps, spacers, connectors including equipment connectors, Junction box, earthwire, buried cable trenches/ pipe equipment & lighting, 36kV Cable Termination kit alongwith all accessories etc. for 245kV &36 kV Switch yard:					
i)	85359090		18%		Transformer Bay - Wall mounted SF6 to Air bushing - Transformer bushing connection arrangement inclusive of I.A,BPI etc.	Set	1		0.00	0.00
ii)	85359090		18%		220kV line Bay	Set	1		0.00	0.00
iii)	85359090		18%		220 /√3 Bus Reactor Bay	Set	1		0.00	0.00
iv)					Power Transformer, Neutral formation of HV & LV side, Neutral CT, BPI etc.	Set	1		0.00	0.00
v)	85359090		18%		33kV line Bays	Set	3		0.00	0.00
vi)					Aux. Transformer Bay	Set	2		0.00	0.00
A1					Earthing material including Risers, Equipment earthing, structures earthing etc. (Excluding MS Rod and Chemical Earthing) inside and outside GIS Hall for complete scope of work as per technical specifications					
a)	85359090		18%		40 mm Dia MS Rod	MT	150		0.00	0.00
b)	85359090		18%		Chemical Electrolytic Type Earthing (As per IEEE-80): For Rocky soil where getting required earth resistance is not possible.	Nos.	15		0.00	0.00
B.					Fire detection & Alarm System for all buildings					
i)	84241000		28%		245KV GIS hall	LS	1		0.00	0.00
ii)	84241000		28%		36KV GIS hall/Room	LS	1		0.00	0.00
iii)	84241000		28%		Panel room of 245kV	LS	1		0.00	0.00
iv)	84241000		28%		Control room cum administrative building	LS	1		0.00	0.00
v)					DG Room	LS	1		0.00	0.00
C.					Illumination System (luminaries to be suitable for operation at extreme Negative Temperature (i.e. minus 30° Cel.)					
a)					Control room cum administrative building illumination	LS	1		0.00	0.00
b)					Switchyard lighting	LS	1		0.00	0.00
c)					Street lighting	LS	1		0.00	0.00
d)					245KV GIS hall	LS	1		0.00	0.00
e)					36KV GIS hall/Room	LS	1		0.00	0.00
f)					Panel room of 245kV	LS	1		0.00	0.00
g)					Store	LS	1		0.00	0.00
h)					Security room	LS	1		0.00	0.00
i)					Parking Shed	LS	1		0.00	0.00
j)					DG Room	LS	1		0.00	0.00
D.					Heating cum Ventilation system					
a)					245KV GIS hall (AHU as per Annexure - IV of TS)	LS	1		0.00	0.00
b)					36KV GIS hall (630mm Sweep Exhaust Fan with Louvers - 2 No.)	LS	1		0.00	0.00
E.					POWER & CONTROL CABLES (Suitable for operation at extreme Negative Temperature (i.e. minus 30° Cel.)					
a)					Power Cables(PVC)- (1.1kV grade)	LS	1		0.00	0.00
b)					Power Cables (XLPE) (excluding 3.5C300 sqmm (XLPE) cable for filter Machine)- (1.1kV grade)	LS	1		0.00	0.00
c)					Control Cable (PVC)- (1.1kV grade)	LS	1		0.00	0.00
d)					Cable glands, lugs & straight through joints for Power & Control cables	LS	1		0.00	0.00
A.					Part-C: Mandatory Spares					
1					Mandatory Spare List for Transformer					
					For50MVA (3x 16.67MVA+1x16.67MVA) , 220/33 KV, 1-phase Autotransformer	LS	1		0.00	0.00
2					For 25MVAR (3x8.33+1x8.33MVAR), 220/√3, 1 Phase Bus Reactor	LS	1		0.00	0.00
3					SPARES FOR 245 kV GIS	LS	1		0.00	0.00
i					245 KV SF6 CIRCUIT BREAKER (GIS):	LS	1		0.00	0.00
ii	85353090		18%		245 KV ISOLATORS :	LS	1		0.00	0.00
iii)	85049010		18%		245 KV CURRENT TRANSFORMER	LS	1		0.00	0.00
iv	85049010		18%		245 kV VOLTAGE TRANSFORMER	LS	1		0.00	0.00

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1	2	3	4	5	6	7	8	9	10=9x8	11
4	85381090		18%		SPARES FOR 36kV GIS	LS	1		0.00	0.00
i	85352911		18%		36 KV CIRCUIT BREAKER:	LS	1		0.00	0.00
ii	85353090		18%		36KV ISOLATORS :	LS	1		0.00	0.00
iii)	85049010		18%		36 KV CURRENT TRANSFORMER	LS	1		0.00	0.00
iv	85049010		18%		36 kV VOLTAGE TRANSFORMER	LS	1		0.00	0.00
5	85354010		18%		216kV SURGE ARRESTOR	LS	1		0.00	0.00
6	85353090		18%		36KV ISOLATOR	LS	1		0.00	0.00
7	85354010		18%		30kV SURGE ARRESTOR	LS	1		0.00	0.00
8	85021200		18%		DG SETS :	LS	1		0.00	0.00
9	85072000		28%		BATTERY	LS	1		0.00	0.00
10	85044030		28%		BATTERY CHARGER	LS	1		0.00	0.00
11	85371000		28%		RELAY & PROTECTION (220kV & 33kV)	LS	1		0.00	0.00
12					DIGITAL PROTECTION COUPLER	LS	1		0.00	0.00
13	90328990		18%		SAS	LS	1		0.00	0.00
14					LT SWITCHGEAR	LS	1		0.00	0.00
15					COMMON SPARES	LS	1		0.00	0.00
16					AUX.TRANSFORMER	LS	1		0.00	0.00
17					ILLUMINATION SYSTEM	LS	1		0.00	0.00
18	73269099		18%		ERECTION HARDWARE ITEMS	LS	1		0.00	0.00
19					TELE COMMUNICATION	LS	1		0.00	0.00
Total 2									0	0
Extension of 220kV Line bay extension at GIS Grid Substation at Phyang(Leh), Ladakh, U.T.										
1.00					220kV Line bay extension at GIS Grid Substation at Phyang(Leh), Ladakh, U.T.					
A					245KV Equipment					
A.1					245KV GIS Equipment					
a)	85372000		28%		245kV, SF6 GIS Bus Bars Module Extension [Module description as per Section Project, Technical specification]	Set	2		0.00	0.00
b)	85372000		28%		245kV, SF6 GIS Line bay Module including Bus Duct inside GIS Hall [Module description as per Section Project, Technical specification]	Set	1		0.00	0.00
c)	85372000		28%		245kV, 1600A, 40kA, Wall mounted SF6/ Air Bushing for Connecting GIS to AIS (For line feeder) alongwith support structure, if required (Single Phase)	Nos.	3		0.00	0.00
A.2					245KV Outdoor Equipment					
i)	85354010		18%		216KV Surge Arrester (1-phase)	Nos.	3		0.00	0.00
ii)	73045930		18%		245kV BPI	Nos.	6		0.00	0.00
B)					RELAY PANELS (WITH AUTOMATION)					
B1					245kV Front Door Glass Simplex Panels					
i)	85371000		28%		Circuit Breaker Relay Panel With Auto Reclose	Set	1		0.00	0.00
b)	85371000		28%		Line Protection Panel	Set	1		0.00	0.00
c)	85371000		28%		Augmentation of existing Bus Bar Protection Scheme	Set	1		0.00	0.00
C.					SUBSTATION AUTOMATION					
C.1					Augmentation of existing Substation Automation System (SAS) for 220kV Line Bay as per Technical Specification					
a)					Main bays to be automated					
i)	90328990		18%		245 kV system	Bay Nos.	1		0.00	0.00
D.					Fabrication, galvanising and supply of following Steel Structures (Grade C) including nuts, bolts, all types of washers, packplates, step bolts and gusset plates including foundation bolts.					
a)					Lattice Structure (Gantry Towers, Beams, and Equipment support structure) including Foundation Bolts	MT	14		0.00	0.00
b)					Fastners and step bolts.(Nuts,Bolts & Washers)	MT	0.5		0.00	0.00
					Part-B: VENDOR ASSESSED QUANTITIES					
A.					Erection Hardware					
					Insulator Strings, Disc insulator, Hardware, conductor, Al tube, bus-bar materials, cable trays, clamps, spacers, connectors including equipment connectors, Junction box, earthwire, buried cable trenches/ pipe equipment & lighting, etc for 245kV Switch yard.					
i)	85359090		18%		220kV line bay	Set	1		0.00	0.00
A1	85359090		18%		Earthing material Risers, Equipment earthing, structures earthing etc. inside and outside GIS Hall for complete scope of work as per technical specifications	LS	1		0.00	0.00
B.					Illumination System (luminaries to be suitable for operation at extreme Negative Temperature (i.e. minus 30° Cel.)					
a)					Switchyard - 220kV Line Bay lighting	LS	1		0.00	0.00
B.					POWER & CONTROL CABLES (Suitable for operation at extreme Negative Temperature (i.e. minus 30° Cel.)					
a)					Power Cables(PVC) - (1.1kV grade) for 220kV Line Bay	LS	1		0.00	0.00
b)					Control Cable (PVC) - (1.1kV grade) For 220kV Line bay	LS	1		0.00	0.00
c)					Cable glands, lugs & straight through joints for Power & Control cables	LS	1		0.00	0.00
					Part-C: Mandatory Spares					
1.0					245kV GIS	LS	1		0.00	0.00
i					245 KV SF6 CIRCUIT BREAKER (GIS):	LS	1		0.00	0.00
ii	85353090		18%		245 KV ISOLATORS(GIS) :	LS	1		0.00	0.00
iii)	85049010		18%		245 KV CURRENT TRANSFORMER (GIS)	LS	1		0.00	0.00
2	85354010		18%		216kV SURGE ARRESTOR	LS	1		0.00	0.00
3	85371000		28%		RELAY & PROTECTION (220kV)	LS	1		0.00	0.00
4					ERECTION HARDWARE ITEMS	LS	1		0.00	0.00
Total 3									0.00	0.00
Extension of 245kV LINE BAY EXTENSION AT 220/66kV GIS GRID SUBSTATION AT DRASS, Ladakh, U.T.										
1.00					220kV Line Bay for 220/66kV GIS Grid Substation at Drass, Ladakh,U.T.					
A					245KV Equipment					
A.1					245KV GIS Equipment					
i)	85372000		28%		245kV, SF6 GIS Bus Bars Module Extension [Module description as per Section Project, Technical specification]	Set	2		0.00	0.00
ii)	85372000		28%		245kV, SF6 GIS Line bay Module including Bus Duct inside GIS Hall [Module description as per Section Project, Technical specification]	Set	1		0.00	0.00

Annexure G to Amendment 7

Sl. No.	HSN Code	Whether HSN in column 2 is applicable indicate applicable HSN*	Whether rate of GST in column 4 is confirmed. If not indicate applicable (%)	Whether rate of GST in column 5 is confirmed. If not indicate applicable GST*	Item Description	Unit	Qty.	Unit Ex-works price(excluding GST)	Total Ex-works price(excluding GST)	GST Tax as Confirmed by Bidder
1	2	3	4	5	6	7	8	9	10=9x8	11
iii)	85372000		28%		245kV, 1600A, 40kA, Wall mounted SF6/ Air Bushing for Connecting GIS to AIS (For line feeder) alongwith support structure, if required (Single Phase)	Nos.	3		0.00	0.00
A2										
i)	85354010		18%		245KV Outdoor Equipment					
ii)	73045930		18%		216KV Surge Arrester (1-phase)	Nos.	3		0.00	0.00
B										
B1										
245kV Front Door Glass Simplex Panels										
i)	85371000		28%		Circuit Breaker Relay Panel with Auto reclose	Set	1		0.00	0.00
ii)	85371000		28%		Line Protection Panel	Set	1		0.00	0.00
iii)	85371000		28%		Augmentation of existing 220kV Bus bar Protection Scheme	Set	1		0.00	0.00
C.										
C1										
Augmentation of Substation Automation System (SAS) for following 220kV Line bays as per Technical Specification										
i)					245 kV Line bay	Nos.	1		0.00	0.00
D.										
Fabrication, galvanising and supply of following Steel Structures (Grade C) including nuts, bolts, all types of washers, packplates, step bolts and gusset plates including foundation bolts.										
i)	90328990		18%		Lattice Structure (Gantry Towers, Beams and Equipment support structure) including Foundation Bolts	MT	14		0.00	0.00
ii)					Fastners and step bolts.(Nuts,Bolts & Washers)	MT	0.5		0.00	0.00
Part-B: VENDOR ASSESSED QUANTITIES										
A.										
Erection Hardware										
Insulator String, Disc Insulator, Hardware, conductor, Al tube, bus-bar materials, cable trays & its support structure, clamps, spacers, connectors including equipment connectors, Junction box, earthwire, buried cable trenches/ pipe, equipment & lighting for 245kV Line bay extension in Switch yard:										
i)					220kV line bay	Set	1		0.00	0.00
A1										
Earthing material Risers, Equipment earthing, structures earthing etc. inside and outside GIS Hall for complete scope of work as per technical specifications										
B.										
Fire detection & Alarm System for GIS Hall Extension										
i)	85359090		18%		245KV GIS hall Extension (90 Sq. M approx.)	LS	1		0.00	0.00
C.										
85359090										
Illumination System (luminaries to be suitable for operation at extreme Negative Temperature (i.e. minus 45° Cel.)										
i)					245kV GIS Hall Extension (90 Sq.M app.)	LS	1		0.00	0.00
ii)					Switchyard lighting - 220kV Line Bay	LS	1		0.00	0.00
D.										
Air conditioning & Ventilation System										
D.1										
Ventilation system										
i)					245KV GIS hall Extension Portion (Extension of Ventilation Duct by 5M approx. along with Heating Arrangement)	LS	1		0.00	0.00
E.										
POWER & CONTROL CABLES (Suitable for operation at extreme Negative Temperature (i.e. minus 45° Cel.)										
i)					Power Cables(PVC) - (1.1kV grade) for 220kV Line Bay	LS	1		0.00	0.00
ii)					Control Cable (PVC) - (1.1kV grade) For 220kV Line bay	LS	1		0.00	0.00
iii)					Cable glands, lugs & straight through joints for Power & Control cables	LS	1		0.00	0.00
Part-C: Mandatory Spares										
1.0	85353090		18%		245kV GIS	LS	1		0.00	0.00
i)	85049010		18%		245 KV SF6 CIRCUIT BREAKER (GIS):	LS	1		0.00	0.00
ii)	85354010		18%		245 KV ISOLATORS (GIS):	LS	1		0.00	0.00
iii)	85371000		28%		245 KV CURRENT TRANSFORMER (GIS)	LS	1		0.00	0.00
2					216kV SURGE ARRESTOR	LS	1		0.00	0.00
3					RELAY & PROTECTION (220kV)	LS	1		0.00	0.00
4					ERECTION HARDWARE ITEMS	LS	1		0.00	0.00
TOTAL -4									0.00	0.00
TOTAL EX-Works PRICE (Total1+Total2+Total3+Total4)									0.00	0.00
GST Tax as Confirmed by Bidder										0.00

Note : Specify amount of GST on the transaction between contractor and employer.

1) To facilitate the bidders, Employer has indicated an HSN/SAC code and rate of GST against each item in the Price Schedule except for some of lumpsum quantities/lot/Set as mentioned at ITB 11.3.2. It shall entirely be the responsibility of the bidder to check the HSN/SAC code and rate of GST given against each item. The bidder may either confirm the HSN/SAC and rate of GST or if the bidder opts to classify the item in question under a different HSN/SAC code or opts to indicate a different rate of GST, bidder may indicate the same in the columns provided. The bidder shall solely be responsible for HSN/SAC classification and the rate of GST for each item. Employer's liability for reimbursement/payment of GST shall be lower of the GST applicable at the rate as confirmed/deemed confirmed in the bid or actual GST paid/payable by the bidder for that item.

2) For Supply of plants & equipment and Services from within India, HSN/SAC has not been indicated for some of lumpsum quantities/lot/Set as each of these consists of many items for which billing break up shall be furnished during contract execution. For the purpose of evaluation, the bidder has to indicate the rate of GST applicable on these items. As it is possible that the incidence of GST on each of these items may be different, provision has been made in the price schedules for quoting the bid price in different categories based on the incidence of GST. The bidder shall accordingly quote price in different tax categories. HSN /SAC for these items shall be furnished along with billing breakup prior to payment for these items. Employer's liability for reimbursement/payment of GST shall be lower of the GST applicable at the rate as confirmed/deemed confirmed in the bid or actual GST paid/payable by the bidder for that item.

3) In case the bidder leaves the cell of confirmation of the HSN code and/or GST rate "blank", the HSN code and corresponding GST rate indicated by the Employer shall be deemed to be the one confirmed by the Bidder.

4) HSN stands for Harmonized System of Nomenclature and SAC stands for Service Accounting Code, used for classification of Goods for GST purpose.

Date :		Printed Name :	
Place :		Designation:	

Annexure G to Amendment 7

TENDER PACKAGE No.:RECTPCL/PIA/JKPDD/SS-03				Schedule - 2	
Design, Manufacturing, Supply, Erection, Testing & Commissioning of New GIS Substations at Diskit & Padum and Bay extensions at existing PGCIL's GIS Substations at Phyang & Drass on Turnkey Basis associated with Strengthening of Transmission System of JKPDD under PMDP Scheme-15.					
(SCHEDULE OF RATES AND PRICES)					
Bidder's Name and Address :					REC
Name :					To: Transmission Projects Company Limited (A wholly owned subsidiary of REC, a 'Navratna CPSE' Under the Ministry of Power, Govt of India)ECE House, 3rd Floor, Annexe - II, 28 A, K G MARG, NEW DELHI - 110 001 Website: www.rectpcl.in
Address :					
LOCAL TRANSPORTATION, INSURANCE AND OTHER INCIDENTAL SERVICES					
All Prices are in Indian Rupees.					
Sl. No.	Description	Unit	Quantity	Unit Freight, In-transit, Insurance, Loading & Unloading Charges	Total Freight, In-transit, Insurance, Loading & Unloading Charges
1	2	3	4	5	6 = 4 x 5
220/33kV New GIS Grid Substation at Diskit, Ladakh, U.T					
1.0	220/33kV New GIS Grid Substation at Diskit, Ladakh, U.T				
A.1	POWER TRANSFORMER				
A1.1	POWER TRANSFORMER				
a)	16.67 MVA, 220/33 KV Single Phase transformers (For: 3x16.67 MVA = 50 MVA + 1x16.67 MVA Spare). (Excluding insulating oil) as per TS	Nos.	4		0
b)	Insulating oil for 3x16.67MVA + 1x16.67MVA Spare, 220/33 KV, 1-phase transformer (LOT* - Oil for One Transformer)	LOT*	4		0
c)	Nitrogen Injection Fire Fighting System	Nos.	3		0
d)	Neutral formation for 220kV HV & 33kV LV side including Neutral C.T.s, BPL Structure etc.	Set	1		0
e)	On line Insulating oil drying system	Nos.	4		0
f)	On line Dissolved Gas & Moisture Analyser	Nos.	4		0
g)	Digital RTCC Panel with two RTCC relay	Nos.	1		0
A1.2	Testing & Maintenance Equipments				
a)	Oil Storage Tank (10KL)	No.	1		0
b)	Transformer Oil Filtration plant (6KLPH)	No	1		0
c)	BDV TEST KIT	No.	1		0
d)	OIL SAMPLING BOTTLE	No.	3		0
e)	Automatic Capacitance and Tan Delta Kit	No.	1		0
A.2	AUXILIARY TRANSFORMER				
a)	315 kVA, 33/0.433kV	Nos	2		0
B	245KV Equipment				
B.1	245KV GIS Equipment				
a)	245kV, SF6 GIS Bus Bars Module including Bus Duct inside GIS Hall [Module description as per Section Project, Technical specification]	Set	2		0
b)	245kV, SF6 GIS Transformer bay Module including Bus Duct inside GIS Hall [Module description as per Section Project, Technical specification]	Set	1		0
c)	245kV, SF6 GIS Line bay Module including Bus Duct inside GIS Hall [Module description as per Section Project, Technical specification]	Set	1		0
d)	245kV, SF6 GIS Bus Coupler bay Module [Module description as per Section Project, Technical specification]	Set	1		0
e)	245kV, 1600A, 40kA, Wall Mounted Air Bushing for Connecting GIS to AIS (For Transformer, Reactor and line feeders) alongwith support structure, if required (Single Phase)	Nos.	6		0
B.2	245KV Outdoor Equipment				
i)	216KV Surge Arrester (1-phase)	Nos.	6		0
ii)	245kV BPI	Nos.	15		0
C	36KV Equipment				
C.1	36KV, 2500Amps, 25KA for 1 Sec GIS Equipment				



Annexure G to Amendment 7

Sl. No.	Description	Unit	Quantity	Unit Freight, In-transit, Insurance, Loading & Unloading Charges	Total Freight, In-transit, Insurance, Loading & Unloading Charges
1	2	3	4	5	6 = 4 x 5
a)	36kV, SF6 GIS Bus Bar Enclosure Module including Bus sectionalizer, Bus PT's, Bus riser etc [Module description as per Section Project, Technical specification]	Set	1		0
b)	36kV, SF6 GIS Line bay Module [Module description as per Section Project, Technical specification]	Set	3		0
c)	36kV, SF6 GIS Transformer bay Module [Module description as per Section Project, Technical specification]	Set	1		0
d)	36kV, SF6 GIS Auxiliary transformer bay Module [Module description as per Section Project, Technical specification]	Set	2		0
C.2 36kV Outdoor equipment					
i)	33 kV HDB 3 Φ Isolators with earth switch (Line Side)	Nos	3		0
ii)	30 kV Surge Arrestors (1-phase) (Line Side)	Nos	15		0
iii)	30 kV HG Fuse (630 Amp) 1phase	Nos	6		0
D. Testing & Maintenance Equipment for GIS					
a)	SF6 Gas filling & evacuating plant For 245kV & 36kV GIS	Set	1		0
b)	Partial Discharge Monitoring System for GIS as per Technical Specification				
i)	For 245kV GIS	Set	1		0
ii)	For 36kV GIS				
c)	Dew Point meter				
i)	For 245kV & 36kV GIS	Set	1		0
d)	SF6 Gas Leak Detector				
i)	For 245kV & 36kV GIS	Set	1		0
e)	EOT crane for 245kV GIS Hall	Set	1		0
f)	SF6 Gas Analyser	Set	1		0
E. RELAY PANELS (WITH AUTOMATION)					
E1 245kV Front Glass Door Simplex Panels					
a)	Circuit Breaker Relav Panel				
i)	With Auto Reclose	Set	2		0
ii)	Without Auto Reclose	Set	1		0
b)	Line Protection Panel	Set	1		0
c)	Transformer Protection Panel (For both HV & LV side)	Set	1		0
d)	Bus Bar Protection Panel	Set	1		0
E2 Teleprotection Equipments					
a)	Digital protection coupler Panel including cabling etc.	Set	1		0
b)	Digital protection coupler including cabling etc. for other end	Set	1		0
F. COMMON EQUIPMENTS					
a)	Megaohm meter - 5kV Digital Battery operated as per specs.	No.	1		0
b)	Digital Multimeter	No.	1		0
G. SUBSTATION AUTOMATION					
G.1	Complete Substation Automation System (SAS) for substation including hardware and software for the substation & remote control stations alongwith associated equipments for the following bays as per Technical Specification				
a)	Main bays to be automated				
i)	245 kV system	Bav Nos.	3		0
ii)	36 kV system	Bav Nos.	7		0
iii)	BCU for controlling & monitoring of Auxiliary System	Set	1		0
H LT Switchgear (As per Technical specification)					
a)	415V Main switchboard	Set	1		0
b)	415V ACDB	Set	1		0
c)	415V MLDB	Set	1		0
d)	415V Emergency LDB	Set	1		0
e)	220V DCDB	Set	2		0
f)	48V DCDB	Set	2		0
I. Batteries					
a)	220V				
i)	400 AH	Nos	2		0
b)	48V				
i)	300 AH	Nos	2		0
J. Float Cum Boost Battery Charger					

Annexure G to Amendment 7

Sl. No.	Description	Unit	Quantity	Unit Freight, In-transit, Insurance, Loading & Unloading Charges	Total Freight, In-transit, Insurance, Loading & Unloading Charges
1	2	3	4	5	6 = 4 x 5
a)	220V Float Cum Boost Battery Charger				
i)	60A/60A	Nos	2		0
b)	48V Float Cum Boost Battery Charger				
i)	40A/40A	Nos	2		0
K.	Diesel Generator with control Panel				
a)	250 kVA	Set	1		0
b)	10KL Bulk Storage Tank as per TS	No.	1		0
L.	Fire Protection System				
a)	Portable /Trolley/Wheel mounted extinguishers				
i)	9 litre water type	Nos	5		0
ii)	45 litre foam type	Nos	3		0
iii)	4.5 kg CO ₂ type	Nos	20		0
iv)	6.0 kg Dry Chemical Powder (DCP) type	Nos	15		0
M.	Cables along with clamps, glands, lugs and straight joints etc.				
a)	Power Cables - (36kV grade) (Suitable for operation at extreme Negative Temperature (i.e. minus 30° Cel.)				
i)	36kV Single Core, 630 Sq.mm Aluminium H.T Buried cable (Two length per Phase and one length per neutral) along with all accessories including termination kit as per specification (for Power transformer application).	Metre	500		0
ii)	36kV, 3 Core 300 Sq.mm Aluminium H.T Buried cable along with all accessories including termination kit as per specification (for Auxiliary transformer application).	Meter	100		0
iii)	36kV Single core 630 Sq.mm Aluminium H.T Buried cable (One length per phase) along with all accessories including termination kit as per specification (for Feeder Bay application).	Meter	600		0
b)	Power cables - (1.1kV grade) (Suitable for operation at extreme Negative Temperature (i.e. minus 30° Cel.)				
i)	3.5Cx300 sqmm (XLPE) cable for filter Machine along with termination arrangement as per TS	Meter	150		0
N.	Air conditioning System for Control room cum administrative building, relay room etc.				
a)	High wall type split AC unit of 2 TR capacity	Nos	5		0
O.	Heating System for various room in S/s				
a)	Oil Flow Heat Convector	Nos.	50		0
P.	Fabrication, galvanising and supply of following Steel Structures (Grade C) including nuts, bolts, all types of washers, packplates, step bolts and gusset plates including foundation bolts.				
a)	Lattice Structure (Gantry Towers, Beams, LM and Equipment /support structure) including Foundation Bolts	MT	55		0
b)	Fastners and step bolts.(Nuts,Bolts & Washers)	MT	1.75		0
Q.	Telecommunication equipment				
A	SDH EQUIPMENTS(STM-4 MADM upto 5MSP Protected directions)				
(i)	Diskit				
	Base equipments (Common cards, Cross connect/control cards, power supply cards, power cabling, other hardware and accessories including sub racks, patch cord, DDF etc fully equipped excluding (ii) & (iii) below	Nos.	1		0
	Phyang				

Annexure G to Amendment 7

Sl. No.	Description	Unit	Quantity	Unit Freight, In-transit, Insurance, Loading & Unloading Charges	Total Freight, In-transit, Insurance, Loading & Unloading Charges
1	2	3	4	5	6 = 4 x 5
	Base equipments (Common cards,Cross connect/control cards, power supply cards, power cabling, other hardware and accessories including sub rascks, patch cord, DDF etc fully equipped excluding (ii) & (ii) below	Nos.	1		0
(ii)	Optical Interface Cards/SFP				
	Diskit				
a	S4.1 SFP	Nos.	0		0
b	L4.1 SFP	Nos.	4		0
	Phyang				
a	S4.1 SFP	Nos.	0		0
b	L4.1 SFP	Nos.	4		0
(iii)	Tributary cards				
	Diskit				
a	E1 Interface card(Min. 16 Interfaces per card)	Nos.	2		0
b	Ethernet interface 10/100 Base T with Layer-2 switching (Min 8 Interfaces per card)	Nos.	2		0
	Phyang				
a	E1 Interface card(Min. 16 Interfaces per card)	Nos.	2		0
b	Ethernet interface 10/100 Base T with Layer-2 switching (Min 8 Interfaces per card)	Nos.	2		0
B	Equipment Cabinet at Diskit	Nos.	1		0
2.0	Network Manager System(NMS)				
	Diskit				
(I)	Craft terminal				
a	Hardware	Set	1		0
b	Software	Set	1		0
	Phyang				
(I)	Craft terminal				
a	Hardware	Set	1		0
b	Software	Set	1		0
3.0	VOIP telephone instrument with one common switch(min. 8 port)				
	Diskit	No.	2		0
	Phyang	No.	2		0
4.0	Approach Cable (24 fibres)				
	Diskit				
a	24 Fibre(DWSM)	Kms	1		0
b	Installation hardware set for above 24 Fibre, Fibre Optic Approach Cable	Set	1		0
	Phyang				
a	24 Fibre(DWSM)	kms	1		0
b	Installation hardware set for above 24 Fibre, Fibre Optic Approach Cable	Set	1		0
5.0	FODP				
	Diskit				
a	48 Fibre:Indoor Type,Rack Mounted with FCPC Coupling & Pigtails(5mtrs)	No.s	1		0
	Phyang				
a	48 Fibre:Indoor Type,Rack Mounted with FCPC Coupling & Pigtails(5mtrs)	No.s	1		0
	Part-B: VENDOR ASSESSED QUANTITIES				
	Erection Hardware				
A.	Insulator Strings, Disc Insulator, Hardware, conductor, Al tube, bus-bar materials, cable trays, clamps, spacers, connectors including equipment connectors, Junction box, earthwire, buried cable trenches/ pipe equipment & lighting, 36kV Cable Termination kit alongwith all accessories etc. for 245kV &36 kV Switch yard:				
i)	Transformer Bay - Wall mounted SF6 to Air bushing - Transformer bushing connection arrangement inclusive of LA, BPI etc.	Set	1		0
ii)	220kV line Bay	Set	1		0
iii)	Power Transformer, Neutral formation of HV & LV side, Neutral CT, BPI etc.	Set	1		0
iv)	33kV line Bays	Set	3		0
v)	Aux. Transformer Bay	Set	2		0

Annexure G to Amendment 7

Sl. No.	Description	Unit	Quantity	Unit Freight, In-transit, Insurance, Loading & Unloading Charges	Total Freight, In-transit, Insurance, Loading & Unloading Charges
1	2	3	4	5	6 = 4 x 5
A1	Earthing material including Risers, Equipment earthing, structures earthing etc. (Excluding MS Rod and Chemical Earthing) inside and outside GIS Hall for complete scope of work as per technical specifications				
a)	40 mm Dia MS Rod	MT	150		0
b)	Chemical Electrolytic Type Earthing (As per IEEE-80): For Rocky soil where getting required earth resistance is not possible.	Nos.	15		0
B.	Fire detection & Alarm System for all buildings				
i)	245KV GIS hall	LS	1		0
ii)	36KV GIS hall/Room	LS	1		0
iii)	Panel room of 245kV	LS	1		0
iv)	Control room cum administrative building	LS	1		0
v)	DG Room	LS	1		0
C.	Illumination System (luminaries to be suitable for operation at extreme Negative Temperature (i.e. minus 30° Cel.)				
a)	Control room cum administrative building illumination	LS	1		0
b)	Switchyard lighting	LS	1		0
c)	Street lighting	LS	1		0
d)	245KV GIS hall	LS	1		0
e)	36KV GIS hall/Room	LS	1		0
f)	Panel room of 245kV	LS	1		0
g)	Store	LS	1		0
h)	Security room	LS	1		0
i)	Parking Shed	LS	1		0
j)	DG Room	LS	1		0
D.	Heating cum Ventilation system				
a)	245KV GIS hall (AHU as per Annexure - IV of IS)	LS	1		0
b)	36KV GIS hall (630mm Sweep Exhaust Fan with Louvers - 2 No.)	LS	1		0
E.	POWER & CONTROL CABLES (Suitable for operation at extreme Negative Temperature (i.e. minus 30° Cel.)				
a)	Power Cables(PVC)- (1.1kV grade)	LS	1		0
b)	Power Cables (XLPE) (excluding 3.5Cx300 sqmm (XLPE) cable for filter Machine)- (1.1kV grade)	LS	1		0
c)	Control Cable (PVC)- (1.1kV grade)	LS	1		0
d)	Cable glands, lugs & straight through joints for Power & Control cables	LS	1		0
	Part-C: Mandatory Spares				
A.	Mandatory Spare List for Transformer				
1	For 50MVA (3x 16.67MVA+1x16.67MVA) , 220/33 KV, 1-phase Autotransformer	LS	1		0
2	SPARES FOR 245 kV GIS	LS	1		0
i	245 KV SF6 CIRCUIT BREAKER (GIS):	LS	1		0
ii	245 KV ISOLATORS :	LS	1		0
iii)	245 KV CURRENT TRANSFORMER	LS	1		0
iv	245 kV VOLTAGE TRANSFORMER	LS	1		0
3	SPARES FOR 36kV GIS	LS	1		0
i	36 KV CIRCUIT BREAKER:	LS	1		0
ii	36KV ISOLATORS :	LS	1		0
iii)	36 KV CURRENT TRANSFORMER	LS	1		0
iv	36 kV VOLTAGE TRANSFORMER	LS	1		0
4	216kV SURGE ARRESTOR	LS	1		0
5	36kV ISOLATOR	LS	1		0
6	30kV SURGE ARRESTOR	LS	1		0
7	DG SET	LS	1		0
8	BATTERY	LS	1		0
9	BATTERY CHARGER	LS	1		0
10	RELAY & PROTECTION (220kV & 33kV)	LS	1		0
11	DIGITAL PROTECTION COUPLER	LS	1		0
12	SAS	LS	1		0
13	LT SWITCHGEAR	LS	1		0
14	COMMON SPARES	LS	1		0
15	AUX. TRANSFORMER	LS	1		0
16	ILLUMINATION SYSTEM	LS	1		0
17	ERECTION HARDWARE ITEMS	LS	1		0

Annexure G to Amendment 7

Sl. No.	Description	Unit	Quantity	Unit Freight, In-transit, Insurance, Loading & Unloading Charges	Total Freight, In-transit, Insurance, Loading & Unloading Charges
1	2	3	4	5	6 = 4 x 5
18	TELE COMMUNICATION	LS	1		0
Total 1					0
220/33kV New GIS Grid Substation at Padum, Ladakh, U.T					
I	220/33kV New GIS Grid Substation at Padum, Ladakh, U.T				
1.0	220/33kV New GIS Grid Substation at Padum, Ladakh, U.T				
A1	POWER TRANSFORMER				
a)	16.67 MVA, 220/33 KV Single Phase transformers (For: 3x16.67 MVA = 50 MVA + 1x16.67 MVA Spare), (Excluding insulating oil) as per TS	Nos.	4		0
b)	Insulating oil for 3x16.67MVA + 1x16.67MVA Spare, 220/33 KV, 1-phase transformer (LOT* - Oil for One Transformer)	LOT*	4		0
c)	Nitrogen Injection Fire Fighting System	Nos.	3		0
d)	Neutral formation for 220kV HV & 33kV LV side including Neutral outdoor CT,s, BPL Structure etc.	Set	1		0
e)	On line Insulating oil drying system	Nos.	4		0
f)	On line Dissolved Gas & Moisture Analyser	Nos.	4		0
g)	Digital RTCC Panel with two no. Digital RTCC relay	Nos.	1		0
A2	BUS REACTOR				
a)	8.33 MVAR, 220/√3 kV, 1 Phase Bus Reactor (For: 3x8.33 MVAR = 25 MVAR + 1x8.33 MVAR Spare) (Excluding Insulating Oil) as per TS	No.	4		0
b)	Insulating oil for above 25MVAR Reactor (LOT* - Oil for One Reactor)	LOT*	4		0
c)	On line Insulating oil drying System	Nos.	4		0
d)	Nitrogen Injection Fire Fighting System	No.	3		0
A3	Testing & Maintenance Equipments				
a)	Oil Storage Tank (10KL)	No.	1		0
b)	Transformer Oil Filtration plant (6KLPH)	No	1		0
c)	BDV Test Kit	No.	1		0
d)	OIL Sampling Bottle	No.	3		0
e)	Automatic Capacitance and Tan Delta Kit	No.	1		0
A4	AUXILIARY TRANSFORMER				
a)	315 kVA, 33/0.433kV	Nos	2		0
B	245KV Equipment				
B.1	245KV GIS Equipment				
a)	245kV, SF6 GIS Bus Bars Module including Bus Duct inside GIS Hall [Module description as per Section Project, Technical specification]	Set	2		0
b)	245kV, SF6 GIS Transformer bay Module including Bus Duct inside GIS Hall [Module description as per Section Project, Technical specification]	Set	1		0
c)	245kV, SF6 GIS Line bay Module including Bus Duct inside GIS Hall [Module description as per Section Project, Technical specification]	Set	1		0
d)	245kV, SF6 GIS Bus Coupler bay Module [Module description as per Section Project, Technical specification]	Set	1		0
e)	245kV, SF6 GIS Bus Reactor bay module including Bus Duct inside GIS Hall (Module description as per Section Project, Technical Specification)	Set	1		0
f)	245kV, 1600A, 40kA, Wall Mounted Air Bushing for Connecting GIS to AIS (For Transformer, Reactor and line feeders) alongwith support structure, if required (Single Phase)	Nos.	9		0
B.2	245KV Outdoor Equipment				
i)	216KV Surge Arrester (1-phase)	Nos.	9		0
ii)	245kV BPL	Nos.	21		0
C	36KV Equipment				
C.1	36KV, 2500Amps, 25KA for 1 Sec GIS Equipment				
a)	36kV, SF6 GIS Bus Bar Enclosure Module including Bus sectionalizer, Bus PT's, Bus riser etc [Module description as per Section Project, Technical specification]	Set	1		0

Annexure G to Amendment 7

Sl. No.	Description	Unit	Quantity	Unit Freight, In-transit, Insurance, Loading & Unloading Charges	Total Freight, In-transit, Insurance, Loading & Unloading Charges
1	2	3	4	5	6 = 4 x 5
b)	36kV, SF6 GIS Line bay Module [Module description as per Section Project, Technical specification]	Set	3		0
c)	36kV, SF6 GIS Transformer bay Module [Module description as per Section Project, Technical specification]	Set	1		0
d)	36kV, SF6 GIS Auxiliary transformer bay Module [Module description as per Section Project, Technical specification]	Set	2		0
C-2 36kV Outdoor equipment					
i)	33 kV HDB 3 Φ Isolators with earth switch (Line Side)	Nos	3		0
ii)	30 kV Surge Arrestors (1-phase) (Line Side)	Nos	15		0
iii)	30 kV HG Fuse (630 Amp) 1phase	Nos	6		0
D. Testing & Maintenance Equipment for GIS					
a)	SF6 Gas filling & evacuating plant For 245kV & 36kV GIS	Set	1		0
b)	Partial Discharge Monitoring System for GIS as per Technical Specification				
i)	For 245kV GIS	Set	1		0
ii)	For 36kV GIS	Set	1		0
c)	Dew Point meter For 245kV & 36kV GIS	Set	1		0
d)	SF6 Gas Leak Detector For 245kV & 36kV GIS	Set	1		0
e)	EOT crane for 245kV GIS Hall	Set	1		0
f)	SF6 Gas Analyser	Set	1		0
E. RELAY PANELS (WITH AUTOMATION)					
E1 245kV Front Glass Door Simplex Panels					
a)	Circuit Breaker Relay Panel				
i)	With Auto Reclose	Set	2		0
ii)	With out Auto Reclose	Set	2		0
b)	Line Protection Panel	Set	1		0
c)	Transformer Protection Panel (For both HV & LV side)	Set	1		0
d)	Bus Reactor Protection Panel	Set	1		0
e)	Bus Bar Protection Panel	Set	1		0
E2 Teleprotection Equipments					
a)	Digital protection coupler Panel including cabling etc.	Set	1		0
b)	Digital protection coupler including cabling etc. for other end	Set	1		0
F. COMMON EQUIPMENTS					
a)	Megohm meter- 5kV Digital Battery operated as per	No.	1		0
b)	Digital Multimeter	No.	1		0
G. SUBSTATION AUTOMATION					
G.1	Complete Substation Automation System (SAS) for substation including hardware and software for the substation & remote control stations alongwith associated equipments for the following bays as per Technical Specification				
a)	Main bays to be automated				
i)	245 kV system	Bay Nos.	4		0
ii)	36 kV system	Bay Nos.	7		0
iii)	BCU for controlling & monitoring of Auxiliary System	Set	1		0
H LT Switchgear (As per Technical specification)					
a)	415V Main switchboard	Set	1		0
b)	415V ACDB	Set	1		0
c)	415V MLDB	Set	1		0
d)	415V Emergency LDB	Set	1		0
e)	220V DCDB	Sets	2		0
f)	48V DCDB	Set	2		0
I. Batteries					
a)	220V				
i)	400 AH	Nos	2		0
b)	48V				
i)	300 AH	Nos	2		0
J. Float Cum Boost Battery Charger					
a)	220V Float Cum Boost Battery Charger				
i)	60A/60A	Nos	2		0
b)	48V Float Cum Boost Battery Charger				

Annexure G to Amendment 7

Sl. No.	Description	Unit	Quantity	Unit Freight, In-transit, Insurance, Loading & Unloading Charges	Total Freight, In-transit, Insurance, Loading & Unloading Charges
1	2	3	4	5	6 = 4 x 5
j)	40A/40A	Nos	2		0
K.	Diesel Generator with control Panel				
a)	250 kVA	Set	1		0
b)	10KL Bulk Storage Tank as per TS	No.	1		0
L.	Fire Protection System				
a)	Portable /Trolley/Wheel mounted extinguishers				
i)	9 litre water type	Nos	5		0
ii)	45 litre foam type	Nos	3		0
iii)	4.5 kg CO ₂ type	Nos	20		0
iv)	6.0 kg Dry Chemical Powder (DCP) type	Nos	15		0
M.	Cables along with clamps, glands, lugs and straight joints etc.				
a)	Power Cables - (36kV grade) (Suitable for operation at extreme Negative Temperature (i.e. minus 30° Cel.)				
i)	36kV Single Core, 630 Sq.mm Aluminium H.T Buried cable (Two length per Phase and one length per neutral) along with all accessories including termination kit as per specification (for Power transformer application)	Metre	500		0
ii)	36kV, 3 Core 300 Sq.mm Aluminium H.T Buried cable along with all accessories including termination kit as per specification (for Auxiliary transformer application)	Meter	100		0
iii)	36kV Single core 630 Sq.mm Aluminium H.T Buried cable (One length per phase) along with all accessories including termination kit as per specification (for Feeder Bay application).	Meter	600		0
b)	Power cables - (1.1kV grade) (Suitable for operation at extreme Negative Temperature (i.e. minus 30° Cel.)				
i)	3.5Cx300 sqmm (XLPE) cable for filter Machine along with termination arrangement as per TS	Meter	150		0
N.	Air conditioning System for Control room cum administrative building, SAS room etc.				
a)	High wall type split AC unit of 2 TR capacity	Nos	5		0
O.	Heating System for various rooms in S/s				
a)	Oil Flow Heat Convector	Nos.	50		0
P.	Fabrication, galvanising and supply of following Steel Structures (Grade C) including nuts, bolts, all types of washers, packplates, step bolts and gusset plates including foundation bolts.				
a)	Lattice Structure (Gantry Towers, Beams, LM and Equipment /support structure) including Foundation Bolts	MT	60		0
b)	Fastners and step bolts.(Nuts,Bolts & Washers)	MT	2		0
Q	Telecommunication equipment				
A	SDH EQUIPMENTS(STM-4 MADM upto 5MSP Protected directions)				
(i)	Padum				
	Base equipments(Common cards,Cross connect/control cards, power supply cards, power cabling, other hardware and accessories including sub rascks, patch cord, DDF etc fully equipped excluding (ii) & (iii) below	Nos.	1		0
	Drass				
	Base equipments(Common cards,Cross connect/control cards, power supply cards, power cabling, other hardware and accessories including sub rascks, patch cord, DDF etc fully equipped excluding (ii) & (ii) below	Nos.	1		0
(ii)	Optical Interface Cards/SFP				
	Padum				

Annexure G to Amendment 7

Sl. No.	Description	Unit	Quantity	Unit Freight, In-transit, Insurance, Loading & Unloading Charges	Total Freight, In-transit, Insurance, Loading & Unloading Charges
1	2	3	4	5	6 = 4 x 5
a	S4.1 SFP	Nos.	0		0
b	L4.1 SFP	Nos.	4		0
	Drass				
a	S4.1 SFP	Nos.	0		0
b	L4.1 SFP	Nos.	4		0
(iii)	Tributary cards				
	Padum				
a	E1 Interface card(Min. 16 Interfaces per card)	Nos.	2		0
b	Ethernet interface 10/100 Base T with Layer-2 switching (Min 8 Interfaces per card)	Nos.	2		0
	Drass				
a	E1 Interface card(Min. 16 Interfaces per card)	Nos.	2		0
b	Ethernet interface 10/100 Base T with Layer-2 switching (Min 8 Interfaces per card)	Nos.	2		0
B	Equipment Cabinet at Padum	Nos.	1		0
2.0	Network Manager System(NMS)				
	Padum				
(l)	Craft terminal				
a	Hardware	Set	1		0
b	Software	Set	1		0
	Drass				
(l)	Craft terminal				
a	Hardware	Set	1		0
b	Software	Set	1		0
3.0	VOIP telephone instrument with one common switch(min. 8 port)				
	Padum	No.	2		0
	Drass	No.	2		0
4	Approach Cable (24 fibres)				
	Padum				
a	24 Fibre(DWSM)	Kms	1		0
b	Installation hardware set for above 24 Fibre, Fibre Optic Approach Cable	Set	1		0
	Drass				
a	24 Fibre(DWSM)	kms	1		0
b	Installation hardware set for above 24 Fibre, Fibre Optic Approach Cable	Set	1		0
5.0	FODP				
	Padum				
a	48 Fibre:Indoor Type,Rack Mounted with FCPC Coupling & Pigtails(5mtrs)	No.	1		0
	Drass				
a	48 Fibre:Indoor Type,Rack Mounted with FCPC Coupling & Pigtails(5mtrs)	No.	1		0
	Part-B: VENDOR ASSESSED QUANTITIES				
A.	Erection Hardware				
	Insulator strings, Disc Insulator, Hardware, conductor, Al tube, bus-bar materials, cable trays, clamps, spacers, connectors including equipment connectors, junction box, earthwire, buried cable trenches/pipe equipment & lighting, 36kV Cable Termination kit alongwith all accessories etc. for 245kV &36 kV Switch yard:				
i)	Transformer Bay - Wall mounted SF6 to Air bushing - Transformer bushing connection arrangement inclusive of LA, BPI etc.	Set	1		0
ii)	220kV line Bay	Set	1		0
iii)	220/√3 Bus Reactor Bay	Set	1		0
iv)	Power Transformer, Neutral formation of HV & LV side, Neutral CT, BPI etc.	Set	1		0
v)	33kV line Bays	Set	3		0
vi)	Aux. Transformer Bay	Set	2		0
A1	Earthing material including Risers, Equipment earthing, structures earthing etc. (Excluding MS Rod and Chemical Earthing) inside and outside GIS Hall for complete scope of work as per technical specifications				
a)	40 mm Dia MS Rod	MT	150		0
b)	Chemical Electrolytic Type Earthing (As per IEEE-80): For Rocky soil where getting required earth resistance is not possible.	Nos.	15		0

Annexure G to Amendment 7

Sl. No.	Description	Unit	Quantity	Unit Freight, In-transit, Insurance, Loading & Unloading Charges	Total Freight, In-transit, Insurance, Loading & Unloading Charges
1	2	3	4	5	6 = 4 x 5
B.	Fire detection & Alarm System for all buildings				
i)	245KV GIS hall	LS	1		0
ii)	36KV GIS hall/Room	LS	1		0
iii)	Panel room of 245kV	LS	1		0
iv)	Control room cum administrative building	LS	1		0
v)	DG Room				
C.	ILLUMINATION SYSTEM (luminaries to be suitable for operation at extreme Negative Temperature (i.e. minus 30° Cel.)				
a)	Control room cum administrative building illumination	LS	1		0
b)	Switchward lighting	LS	1		0
c)	Street lighting	LS	1		0
d)	245KV GIS hall	LS	1		0
e)	36KV GIS hall/Room	LS	1		0
f)	Panel room of 245kV	LS	1		0
g)	Store	LS	1		0
h)	Security room	LS	1		0
i)	Parking Shed	LS	1		0
j)	DG Room	LS	1		0
D.	Heating cum Ventilation system				
a)	245KV GIS hall (AHU as per Annexure - IV of IS)	LS	1		0
b)	36KV GIS hall (630mm Sweep Exhaust Fan with Louvers - 2 No.)	LS	1		0
E.	POWER & CONTROL CABLES (Suitable for operation at extreme Negative Temperature (i.e. minus 30° Cel.)				
a)	Power Cables(PVC)- (1.1kV grade)	LS	1		0
b)	Power Cables (XLPE) (excluding 3.5Cx300 sqmm (XLPE) cable for filter Machine)- (1.1kV grade)	LS	1		0
c)	Control Cable (PVC)- (1.1kV grade)	LS	1		0
d)	Cable glands, lugs & straight through joints for Power & Control cables	LS	1		0
	Part-C: Mandatory Spares				
A.	Mandatory Spare List for Transformer				
1	For 50MVA (3x 16.67MVA+1x16.67MVA), 220/33 KV, 1-phase Autotransformer	LS	1		0
2	For 25MVAR (3x8.33+1x8.33MVAR), 220/√3, 1 Phase Bus Reactor	LS	1		0
3	SPARES FOR 245 kV GIS	LS	1		0
i	245 KV SF6 CIRCUIT BREAKER (GIS):	LS	1		0
ii	245 KV ISOLATORS :	LS	1		0
iii)	245 KV CURRENT TRANSFORMER	LS	1		0
iv	245 kV VOLTAGE TRANSFORMER	LS	1		0
4	SPARES FOR 36kV GIS	LS	1		0
i	36 KV CIRCUIT BREAKER:	LS	1		0
ii	36KV ISOLATORS :	LS	1		0
iii)	36 KV CURRENT TRANSFORMER	LS	1		0
iv	36 kV VOLTAGE TRANSFORMER	LS	1		0
5	216kV SURGE ARRESTOR	LS	1		0
6	36kV ISOLATOR	LS	1		0
7	30kV SURGE ARRESTOR	LS	1		0
8	DG SETS :	LS	1		0
9	BATTERY	LS	1		0
10	BATTERY CHARGER	LS	1		0
11	RELAY & PROTECTION (220kV & 33kV)	LS	1		0
12	DIGITAL PROTECTION COUPLER	LS	1		0
13	SAS	LS	1		0
14	LT SWITCHGEAR	LS	1		0
15	COMMON SPARES	LS	1		0
16	AUX.TRANSFORMER	LS	1		0
17	ILLUMINATION SYSTEM	LS	1		0
18	ERECTION HARDWARE ITEMS	LS	1		0
19	TELE COMMUNICATION	LS	1		0
Total 2					0
Extension of 220kV Line bay extension at GIS Grid Substation at Phyang(Leh), Ladakh, U.T.					
1.0	220kV Line bay extension at GIS Grid Substation at Phyang(Leh), Ladakh, U.T.				
A	245KV Equipment				
A.1	245KV GIS Equipment				

Annexure G to Amendment 7

Sl. No.	Description	Unit	Quantity	Unit Freight, In-transit, Insurance, Loading & Unloading Charges	Total Freight, In-transit, Insurance, Loading & Unloading Charges
1	2	3	4	5	6 = 4 x 5
a)	245kV, SF6 GIS Bus Bars Module Extension [Module description as per Section Project, Technical specification]	Set	2		0
b)	245kV, SF6 GIS Line bay Module including Bus Duct inside GIS Hall [Module description as per Section Project, Technical specification]	Set	1		0
c)	245kV, 1600A, 40kA, Wall mounted SF6/Air Bushing for Connecting GIS to AIS (For line feeder) alongwith support structure, if required (Single Phase)	Nos.	3		0
A.2	245KV Outdoor Equipment				
i)	216KV Surge Arrester (1-phase)	Nos.	3		0
ii)	245kV BPI	Nos.	6		0
B)	RELAY PANELS (WITH AUTOMATION)				
B1	245kV Front Door Glass Simplex Panels				
a)	Circuit Breaker Relay Panel With Auto Reclose				
b)	Line Protection Panel	Set	1		0
c)	Augmentation of existing Bus Bar Protection Scheme	Set	1		0
C.	SUBSTATION AUTOMATION				
C.1	Augmentation of existing Substation Automation System (SAS) for 220kV Line Bay as per Technical Specification				
a)	Main bays to be automated				
i)	245 kV system	Bay Nos.	1		0
D.	Fabrication, galvanising and supply of following Steel Structures (Grade C) including nuts, bolts, all types of washers, packplates, step bolts and gusset plates including foundation bolts.				
a)	Lattice Structure (Gantry Towers, Beams, and Equipment support structure) including Foundation Bolts	MT	14		0
b)	Fasteners and step bolts.(Nuts,Bolts & Washers)	MT	0.5		0
	Part-B: VENDOR ASSESSED QUANTITIES				
A.	Erection Hardware				
	Insulator Strings, Disc insulator, Hardware, conductor, Al tube, bus-bar materials, cable trays, clamps, spacers, connectors including equipment connectors, junction box, earthwire, buried cable trenches/pipe equipment & lighting, etc. for 245kV Switch yard:				
i)	220kV line bay	Set	1		0
A1	Earthing material Risers, Equipment earthing, structures earthing etc. inside and outside GIS Hall for complete scope of work as per technical specifications	LS	1		0
B.	Illumination System (luminaries to be suitable for operation at extreme Negative Temperature (i.e. minus 30° Cel.)				
a)	Switchyard - 220kV Line Bay lighting	LS	1		0
B.	POWER & CONTROL CABLES (Suitable for operation at extreme Negative Temperature (i.e. minus 30° Cel.)				
a)	Power Cables(PVC) - (1.1kV grade) for 220kV Line Bay	LS	1		0
b)	Control Cable (PVC) - (1.1kV grade) For 220kV Line bay	LS	1		0
c)	Cable glands, lugs & straight through joints for Power & Control cables	LS	1		0
	Part-C: Mandatory Spares				
1.0	245kV GIS	LS	1		0
i	245 KV SF6 CIRCUIT BREAKER (GIS):	LS	1		0
ii	245 KV ISOLATORS(GIS) :	LS	1		0
iii)	245 KV CURRENT TRANSFORMER (GIS)	LS	1		0

Annexure G to Amendment 7

Sl. No.	Description	Unit	Quantity	Unit Freight, In-transit, Insurance, Loading & Unloading Charges	Total Freight, In-transit, Insurance, Loading & Unloading Charges
1	2	3	4	5	6 = 4 x 5
2	216kV SURGE ARRESTOR	LS	1		0
3	RELAY & PROTECTION (220kV)	LS	1		0
4	ERECTION HARDWARE ITEMS	LS	1		0
Total 3					0
Extension of 245kV LINE BAY EXTENSION AT 220/66kV GIS GRID SUBSTATION AT DRASS, Ladakh, U.T.					
1	220kV Line Bay for 220/66kV GIS Grid Substation at Drass, Ladakh, U.T.				
A	245KV Equipment				
A.1	245KV GIS Equipment				
i)	245kV, SF6 GIS Bus Bars Module Extension [Module description as per Section Project, Technical specification]	Set	2		0
ii)	245kV, SF6 GIS Line bay Module including Bus Duct inside GIS Hall [Module description as per Section Project, Technical specification]	Set	1		0
iii)	245kV, 1600A, 40kA, Wall mounted SF6/Air Bushing for Connecting GIS to AIS (For line feeder) alongwith support structure, if required (Single Phase)	Nos.	3		0
A2	245KV Outdoor Equipment				
i)	216KV Surge Arrester (1-phase)	Nos.	3		0
ii)	245kV BPI	Nos.	6		0
B	RELAY PANELS (WITH AUTOMATION)				
B1	245kV Front Door Glass Simplex Panels				
i)	Circuit Breaker Relay Panel with Auto reclose	Set	1		0
ii)	Line Protection Panel	Set	1		0
iii)	Augmentation of existing 220kV Bus bar Protection Scheme	Set	1		0
C.	SUBSTATION AUTOMATION				
C1	Augmentation of Substation Automation System (SAS) for following 220kV Line bays as per Technical Specification				
i)	245 kV Line bay	Nos.	1		0
D.	Fabrication, galvanising and supply of following Steel Structures (Grade C) including nuts, bolts, all types of washers, packplates, step bolts and gusset plates including foundation bolts.				
i)	Lattice Structure (Gantry Towers, Beams and Equipment support structure) including Foundation Bolts	MT	14		0
ii)	Fastners and step bolts.(Nuts,Bolts & Washers)	MT	0.5		0
Part-B: VENDOR ASSESSED QUANTITIES					
A.	Erection Hardware				
	Insulator String, Disc Insulator, Hardware, conductor, Al tube, bus-bar materials, cable trays & its support structure, clamps, spacers, connectors including equipment connectors, Junction box, earthwire, buried cable trenches/pipe, equipment & lighting for 245kV Line bay extension in Switch yard:				
i)	220kV line bay	Set	1		0
A1	Earthing material Risers, Equipment earthing, structures earthing etc. inside and outside GIS Hall for complete scope of work as per technical specifications	LS	1		0
B.	Fire detection & Alarm System for GIS Hall Extention				
i)	245KV GIS hall Extention (90 Sq. M approx.)	LS	1		0
C.	Illumination System (luminaries to be suitable for operation at extreme Negative Temperature (i.e. minus 45° Cel.)				
i)	245kV GIS Hall Extention (90 Sq.M app.)	LS	1		0
ii)	Switchyard lighting - 220kV Line Bay	LS	1		0
D.	Air conditioning & Ventilation System				

Annexure G to Amendment 7

Sl. No.	Description	Unit	Quantity	Unit Freight, In-transit, Insurance, Loading & Unloading Charges	Total Freight, In-transit, Insurance, Loading & Unloading Charges
1	2	3	4	5	6 = 4 x 5
D.1	Ventilation system				
i)	245KV GIS hall Extension Portion (Extension of Ventilation Duct by 5M approx. along with Heating Arrangement)	LS	1		0
E.	POWER & CONTROL CABLES (Suitable for operation at extreme Negative Temperature (i.e. minus 45° Cel.)				
i)	Power Cables(PVC) - (1.1kV grade) for 220kV Line Bay	LS	1		0
ii)	Control Cable (PVC) - (1.1kV grade) For 220kV Line bay	LS	1		0
iii)	Cable glands, lugs & straight through joints for Power & Control cables	LS	1		0
	Part-C: Mandatory Spares				
1.0	245kV GIS	LS	1		0
i)	245 KV SF6 CIRCUIT BREAKER (GIS):	LS	1		0
ii)	245 KV ISOLATORS (GIS):	LS	1		0
iii)	245 KV CURRENT TRANSFORMER (GIS)	LS	1		0
2	216kV SURGE ARRESTOR	LS	1		0
3	RELAY & PROTECTION (220kV)	LS	1		0
4	ERECTION HARDWARE ITEMS	LS	1		0
Total 4					0
Grand Total of Schedule-2(Total1+Total2+Total3+Total4)				0.00	
Note : Bidders to note that the item description under various schedule are through unique material ID for respective items under SAP ERP system and therefore, identical item descriptions appears in schedule-1 (Ex-works) & Schedule-2(F&I). However, the prices to be quoted in price schedule-2(F&I) shall be towards local					
Date :		Printed Name:			
Place :		Designation:			

Design, Manufacturing, Supply, Erection, Testing, Commissioning of New 220/33kV New GIS Substation at Diskit, Ladakh and Bay extensions at existing PGIL's GIS Substations at Phyang & Drass on Turnkey Basis associated with Strengthening of Transmission System of JKPPD under PMDP Scheme-15.

Annexure C to Amendment 7

(SCHEDULE OF RATES AND PRICES)

Bidder's Name and Address :					To: Limited (A wholly owned subsidiary of REC, a 'Navratna CPSE' Under the Ministry of Power, Govt of India) ECE House, 3rd Floor, Annex - II, 28 A, K G MARG, NEW DELHI - 110 001 Website: www.rectpl.in					
Name :					REC Transmission Projects Company					
Address :										
INSTALLATION CHARGES										
All Prices are in Indian Rupees.										
Sl. No.	(SAC) Service Accounting Code	Whether SAC in column '2' is confirm. If not indicate applicable SAC*	Rate of GST Applicable (%)	Whether rate of GST in column '4' is confirm. If not indicate applicable GST*	Description	Unit	Quantity	Unit Erection Charges	Total Erection Charges	Total GST as confirmed by Bidder
1	2	3	4	5	6	7	8	9	10=8x9	11
220/33kV New GIS Grid Substation at Diskit, Ladakh, U.T										
1					220/33kV New GIS Grid Substation at Diskit, Ladakh, U.T					
Part-A : EMPLOYER ASSESSED QUANTITIES										
POWER TRANSFORMER										
a)	998736		18%		16.67 MVA, 220/33 KV Single Phase transformers (For: 3x16.67 MVA = 50 MVA + 1x16.67 MVA Spare), (Excluding insulating oil) as per IS	Nos.	4		0.00	0.00
b)	998736		18%		Insulating oil for 3x16.67MVA + 1x16.67MVA Spare, 220/33 KV, 1-phase transformer (LOT* - Oil for One Transformer)	LOT*	4		0.00	0.00
c)	998736		18%		Nitrogen Injection Fire Fighting System	Nos.	3		0.00	0.00
d)	998736		18%		Neutral formation for 220kV HV & 33kV LV side including Neutral C.T.s, BPL Structure etc.	Set	1		0.00	0.00
e)	998736		18%		On line Insulaing oil drying system	Nos.	4		0.00	0.00
f)	998736		18%		On line Dissolved Gas & Moisture Analyser	Nos.	4		0.00	0.00
g)	998736		18%		Digital RTCC Panel with two RTCC relay	Nos.	1		0.00	0.00
A.2 AUXILIARY TRANSFORMER										
a)	998736		18%		315 kVA, 33/0.433kV	Nos	2		0.00	0.00
B 245KV Equipment										
B.1 245KV GIS Equipment										
a)	998736		18%		245kV, SF6 GIS Bus Bars Module including Bus Duct inside GIS Hall [Module description as per Section Project, Technical specification]	Set	2		0.00	0.00
b)	998736		18%		245kV, SF6 GIS Transformer bay Module including Bus Duct inside GIS Hall [Module description as per Section Project, Technical specification]	Set	1		0.00	0.00
c)	998736		18%		245kV, SF6 GIS Line bay Module including Bus Duct inside GIS Hall [Module description as per Section Project, Technical specification]	Set	1		0.00	0.00
d)	998736		18%		245kV, SF6 GIS Bus Coupler bay Module [Module description as per Section Project, Technical specification]	Set	1		0.00	0.00
e)	998736		18%		245kV, 1600A, 40kA, Wall Mounted Air Bushing for Connecting GIS to AIS (For Transformer, Reactor and line feeders) alongwith support structure, if required (Single Phase)	Nos.	6		0.00	0.00
B.2 245KV Outdoor Equipment										
i)	998736		18%		216KV Surge Arrester (1-phase)	Nos.	6		0.00	0.00
ii)	995455		18%		245kV BPL	Nos.	15		0.00	0.00
C 36KV Equipment										
C.1 36KV, 2500Amps, 25KA for 3 Sec GIS Equipment										
a)	998736		18%		36kV, SF6 GIS Bus Bar Enclosure Module including Bus sectionalizer, Bus PT's, Bus riser etc [Module description as per Section Project, Technical specification]	Set	1		0.00	0.00
b)	998736		18%		36kV, SF6 GIS Line bay Module [Module description as per Section Project, Technical specification]	Set	3		0.00	0.00
c)	998736		18%		36kV, SF6 GIS Transformer bay Module [Module description as per Section Project, Technical specification]	Set	1		0.00	0.00
d)	998736		18%		36kV, SF6 GIS Auxiliary transformer bay Module [Module description as per Section Project, Technical specification]	Set	2		0.00	0.00
C-2 36kV Outdoor equipment										
i)	998736		18%		33 kV HDB 3 Φ Isolators with earth switch (Line Side)	Nos.	3		0.00	0.00
ii)	998736		18%		30 kV Surge Arrestors (1-phase) (Line Side)	Nos.	15		0.00	0.00
iii)	998736		18%		36 kV HG Fuse (630 Amp) 1 phase	Nos.	6		0.00	0.00
D. Testing & Maintenance Equipment for GIS										
a)	998736		18%		SF6 Gas filling & evacuating plant	Set	1		0.00	0.00
b)	998736		18%		Partial Discharge Monitoring System for GIS as per Technical Specification	Set	1		0.00	0.00
i)	998736		18%		For 245kV GIS	Set	1		0.00	0.00
ii)	998736		18%		For 36kV GIS	Set	1		0.00	0.00
c)					Dew Point meter	Set	1		0.00	0.00
d)	998736		18%		For 245kV & 36kV GIS	Set	1		0.00	0.00
e)	998736		18%		SF6 Gas Leak Detector	Set	1		0.00	0.00
f)	998736		18%		For 245kV & 36kV GIS	Set	1		0.00	0.00
g)	998736		18%		EOT crane for 245kV GIS Hall	Set	1		0.00	0.00
h)	998736		18%		SF6 Gas Analyser	Set	1		0.00	0.00
E RELAY PANELS (WITH AUTOMATION)										
E1 245kV Front Glass Door Simplex Panels										
a)					Circuit Breaker Relay Panel					
i)	998736		18%		With Auto Reclose	Set	2		0.00	0.00
ii)	998736		18%		With out Auto Reclose	Set	1		0.00	0.00
b)	998736		18%		Line Protection Panel	Set	1		0.00	0.00
c)	998736		18%		Transformer Protection Panel (For both HV & LV side)	Set	1		0.00	0.00
d)	998736		18%		Bus Bar Protection Panel	Set	1		0.00	0.00
E2 Teleprotection Equipments										
a)					Digital protection coupler Panel including cabling etc.	Set	1		0.00	0.00
b)					Digital protection coupler including cabling etc. for other end	Set	1		0.00	0.00
F COMMON EQUIPMENTS										
a)					Megaohm meter - 5kV Digital Battery operated as per spec	No.	1		0.00	0.00
b)					Digital Multimeter	No.	1		0.00	0.00
G. SUBSTATION AUTOMATION										
G.1 Complete Substation Automation System (SAS) for substation including hardware and software for the substation & remote control stations alongwith associated equipments for the following bays as per Technical Specification										
Main bays to be automated										
i)	998736		18%		245 kV system	Bay Nos.	3		0.00	0.00
ii)	998736		18%		36 kV system	Bay Nos.	7		0.00	0.00
iii)	998736		18%		BCU for controlling & monitoring of Auxiliary System	Set	1		0.00	0.00
H. LT Switchgear (As per Technical specification)										

Click to Sch. 4

Annexure G to Amendment 7

Sl. No.	(SAC) Service Accounting Code	Whether SAC is confirm. If not indicate applicable SAC*	Rate of GST Applicable (%)	Whether rate of GST is confirm. If not indicate applicable GST*	Description	Unit	Quantity	Unit Erection Charges	Total Erection Charges	Total GST as confirmed by Bidder
1	2	3	4	5	6	7	8	9	10=8x9	11
a)	998736		18		415V Main switchboard	Set	1			
b)	998736		18%		415V ACDB	Set	1		0.00	0.00
c)	998736		18%		415V MLDB	Set	1		0.00	0.00
d)	998731		18%		415V Emergency LDB	Set	1		0.00	0.00
e)	998736		18		220V DCDB	Set	2		0.00	0.00
f)	998736		18%		48V DCDB	Set	2		0.00	0.00
I.					Batteries					
a)					220V					
i)	998736		18%		400 AH	Nos	2		0.00	0.00
b)					48V					
i)	998736		18%		300 AH	Nos	2		0.00	0.00
J.					Float Cum Boost Battery Charger					
a)					220V Float Cum Boost Battery Charger					
i)	998736		18%		60A/60A	Nos	2		0.00	0.00
b)					48V Float Cum Boost Battery Charger					
i)	998736		18%		40A/40A	Nos	2		0.00	0.00
K.					Diesel Generator with control Panel					
a)	998731		18%		250 kVA	Set	1		0.00	0.00
b)					10KL Bulk Storage Tank as per IS	No.	1		0.00	0.00
L.					Fire Protection System					
a)					Portable / Trolley/Wheel mounted extinguishers					
i)	998736		18%		9 litre water type	Nos	5		0.00	0.00
ii)	998736		18%		45 litre foam type	Nos	3		0.00	0.00
iii)	995461		18%		4.5 kg CO2 type	Nos	20		0.00	0.00
iv)			18%		6.0 kg Dry Chemical Powder (DCP) type	Nos	15		0.00	0.00
M.					Cables along with clamps, glands, lugs and straight joints etc.					
a)					Power Cables - (36kV grade) (Suitable for operation at extreme Negative Temperature (i.e. minus 30° Cel.)					
i)	998736		18%		36kV Single Core, 630 Sq.mm Aluminium H.T Buried cable (Two length per Phase and one length per neutral) along with all accessories including termination kit as per specification (for Power transformer application).	Metre	500		0.00	0.00
ii)	998736		18%		36kV, 3 Core 300 Sq.mm Aluminium H.T Buried cable along with all accessories including termination kit as per specification (for Auxiliary transformer application).	Meter	100		0.00	0.00
iii)	998736		18%		36kV Single core 630 Sq.mm Aluminium H.T Buried cable (One length per phase) along with all accessories including termination kit as per specification (for Feeder Bay application).	Meter	600		0.00	0.00
b)					Power cables - (1.1kV grade) (Suitable for operation at extreme Negative Temperature (i.e. minus 30° Cel.)					
i)	998736		18%		3.5Cx300 sqmm (XLPE) cable for filter Machine along with termination arrangement as per IS	Meter	150		0.00	0.00
N.					Air conditioning System for Control room cum administrative building, relay room etc.					
a)	995463		18%		High wall type split AC unit of 2 TR capacity	Nos	5		0.00	0.00
O.					Heating System for various room in S/s					
a)					Oil Flow Heat Convector	Nos.	50		0.00	0.00
P.					Fabrication, galvanising and supply of following Steel Structures (Grade C) including nuts, bolts, all types of washers, packplates, step bolts and gusset plates including foundation bolts.					
a)	995455		18%		Lattice Structure (Gantry Towers, Beams, LM and Equipment /support structure) including Foundation Bolts	MT	55		0.00	0.00
b)	995455		18%		Fastners and step bolts.(Nuts,Bolts & Washers)	MT	1.75		0.00	0.00
Q.					Telecommunication equipment					
A					SDH EQUIPMENTS(STM-4 MADM upto 5MSP Protected directions)					
(i)					Diskit					
	998784		18%		Base equipments (Common cards, Cross connect/control cards, power supply cards, power cabling, other hardware and accessories including sub racks, patch cord, DDF etc fully equipped excluding (ii) & (iii) below	Nos.	1		0.00	0.00
					Phyang					
	998784		18%		Base equipments (Common cards,Cross connect/control cards, power supply cards, power cabling, other hardware and accessories including sub racks, patch cord, DDF etc fully equipped excluding (ii) & (iii) below	Nos.	1		0.00	0.00
(ii)					Optical Interface Cards/SFP					
					Diskit					
a	998784		18%		S4.1 SFP	Nos.	0		0.00	0.00
b	998784		18%		L4.1 SFP	Nos.	4		0.00	0.00
					Phyang					
a	998784		18%		S4.1 SFP	Nos.	0		0.00	0.00
b	998784		18%		L4.1 SFP	Nos.	4		0.00	0.00
(iii)					Tributary cards					
					Diskit					
a	998784		18%		E1 Interface card(Min. 16 Interfaces per card)	Nos.	2		0.00	0.00
b	998784		18%		Ethernet interface 10/100 Base T with Layer-2 switching (Min 8 Interfaces per card)	Nos.	2		0.00	0.00
					Phyang					
a	998784		18%		E1 Interface card(Min. 16 Interfaces per card)	Nos.	2		0.00	0.00
b	998784		18%		Ethernet interface 10/100 Base T with Layer-2 switching (Min 8 Interfaces per card)	Nos.	2		0.00	0.00
B	998784		18%		Equipment Cabinet at Diskit	Nos.	1		0.00	0.00
2.0					Network Manager System(NMS)					
					Diskit					
(I)					Craft terminal					
a			18%		Hardware	Set	1		0.00	0.00
b	998784		18%		Software	Set	1		0.00	0.00
					Phyang					
(I)					Craft terminal					
a	998784		18%		Hardware	Set	1		0.00	0.00
b	998784		18%		Software	Set	1		0.00	0.00
3.0					VOIP telephone instrument with one common switch(min. 8 port)					
	998336		18%		Diskit	No.	2		0.00	0.00
	998336		18%		Phyang	No.	2		0.00	0.00
4.0					Approach Cable (24 fibres)					
					Diskit					
a					24 Fibre(DWSM)	Kms	1		0.00	0.00
b					Installation hardware set for above 24 Fibre, Fibre Optic Approach Cable	Set	1		0.00	0.00
					Phyang					
a					24 Fibre(DWSM)	kms	1		0.00	0.00
b					Installation hardware set for above 24 Fibre, Fibre Optic Approach Cable	Set	1		0.00	0.00
5.0					FODP					
					Diskit					

Annexure G to Amendment 7

Sl. No.	(SAC) Service Accounting Code	Whether SAC is confirm. If not indicate applicable SAC*	Rate of GST Applicable (%)	Whether rate of GST is confirm. If not indicate applicable GST*	Description	Unit	Quantity	Unit Erection Charges	Total Erection Charges	Total GST as confirmed by Bidder
1	2	3	4	5	6	7	8	9	10=Bx9	11
a					48 Fibre:Indoor Type,Rack Mounted with FCPC Coupling & Pigtails(5mtrs)	No.	1		0.00	0.00
a					Phyang 48 Fibre:Indoor Type,Rack Mounted with FCPC Coupling & Pigtails(5mtrs)	No.	1		0.00	0.00
Q					Training of employers personnel as per clause 11 of section project	LS	1		0.00	0.00
A.					Part-B: VENDOR ASSESSED QUANTITIES					
					Erection Hardware					
					Insulator Strings, Disc Insulator, Hardware, conductor, Al tube, bus-bar materials, cable trays, clamps, spacers, connectors including equipment connectors, Junction box, earthwire, buried cable trenches/pipe equipment & lighting, 36kV Cable Termination kit alongwith all accessories etc. for 245kV &36 kV Switch yard.					
i)	998731		18%		Transformer Bay - Wall mounted SF6 to Air bushing - Transformer bushing connection arrangement inclusive of L.A.BPI etc.	Set	1		0.00	0.00
ii)	998731		18%		220kV line Bay	Set	1		0.00	0.00
iii)					Power Transformer, Neutral formation of HV & LV side, Neutral CT, BPI etc.	Set	1		0.00	0.00
iv)	998731		18%		33kV line Bays	Set	3		0.00	0.00
v)					Aux. Transformer Bay	Set	2		0.00	0.00
A1					Earthing material including Risers, Equipment earthing, structures earthing etc. (Excluding MS Rod and Chemical Earthing) inside and outside GIS Hall for complete scope of work as per					
a)	85359090		18%		40 mm Dia MS Rod	MT	150		0.00	0.00
b)	85359090		18%		Chemical Electrolytic Type Earthing (As per IEEE-80): For Rocky soil where getting required earth resistance is not possible.	Nos.	15		0.00	0.00
B.					Fire detection & Alarm System for all buildings					
i)	995461		18%		245KV GIS hall	LS	1		0.00	0.00
ii)	995461		18%		36KV GIS hall/Room	LS	1		0.00	0.00
iii)	995461		18%		Panel room of 245kV	LS	1		0.00	0.00
iv)	995461		18%		Control room cum administrative building	LS	1		0.00	0.00
v)					DG Room					
C.					Illumination System (luminaries to be suitable for operation at extreme Negative Temperature (i.e. minus 30° Cel.)					
a)	998739		18%		Control room cum administrative building illumination	LS	1		0.00	0.00
b)	998731		18%		Switchyard lighting	LS	1		0.00	0.00
c)	998731		18%		Street lighting	LS	1		0.00	0.00
d)	998739		18%		245KV GIS hall	LS	1		0.00	0.00
e)	998739		18%		36KV GIS hall/Room	LS	1		0.00	0.00
f)	998739		18%		Panel room of 245kV	LS	1		0.00	0.00
g)	998739		18%		Store	LS	1		0.00	0.00
h)	998739		18%		Security room	LS	1		0.00	0.00
i)	998739		18%		Parking Shed	LS	1		0.00	0.00
j)					DG Room	LS	1		0.00	0.00
D.					Headline cum Ventilation system					
a)	995463		18%		245KV GIS hall (AHU as per Annexure - IV of TS)	LS	1		0.00	0.00
b)	995463		18%		36KV GIS hall (630mm Sweep Exhaust Fan with Louvers - 2 Nos)	LS	1		0.00	0.00
E.					POWER & CONTROL CABLES (Suitable for operation at extreme Negative Temperature (i.e. minus 30° Cel.)					
a)	998736		18%		Power Cables(PVC)- (1.1kV grade)	LS	1		0.00	0.00
b)	998736		18%		Power Cables (XLPE) (excluding 3.5Cx300 sqmm (XLPE) cable for filter Machine)- (1.1kV grade)	LS	1		0.00	0.00
c)	998736		18%		Control Cable (PVC)- (1.1kV grade)	LS	1		0.00	0.00
d)	998736		18%		Cable glands, lugs & straight through joints for Power & Control cables	LS	1		0.00	0.00
1.0	995432		18%		Part-C: Civil Works for 220/33kV GIS S/S				0.00	0.00
2.1	995432		18%		Soil Investigation and Contour Survey as per TS	LS	1		0.00	0.00
2.2					Earth work filling with borrowed earth with all leads and lifts including etc (borrowed area to be decided by contractor)	Cu. M	5000		0.00	0.00
a)					Levelling of Area (Cutting & Filling of Soil & Backfilling with same excavated soil)					
b)					Soft Rock	Cu. M	1000		0.00	0.00
					Normal Soil	Cu. M	10000		0.00	0.00
3.0					Design, Engineering and Construction of foundation for following equipments/Structures. All civil works including earthwork excavation for all type of soils , concreting, reinforcement steel,Steel grating for Transformer oil pits, Rail tracks, other miscellaneous steel, backfill and disposable of excess earth, all complete as per TS and approved drawing.					
i	995455		18%		16.67 MVA, 220/33 KV Single Phase transformers (For: 3x16.67 MVA = 50 MVA + 1x16.67 MVA Spare), (Excluding insulating oil) as per TS	Nos.	4		0.00	0.00
ii	995455		18%		315KVA Auxiliary Transformer	No.	2		0.00	0.00
iii	995455		18%		250 KVA D.G.Set	No.	1		0.00	0.00
iv	995455		18%		Take Off Gantry tower Structure,	No.	6		0.00	0.00
v	995455		18%		Lightning Mast	No.	2		0.00	0.00
vi	995455		18%		Equipments structure for L.A, BPI in 220kV AIS	No.	21		0.00	0.00
4.0					Design, Engineering and Construction of RCC Fire Protection walls for Transformer /Reactors . All civil works including earthwork excavation for all type of soils , concreting, reinforcement steel, other miscellaneous steel, backfill and disposable of excess earth, all complete as per TS and approved drawing.	No.	4		0.00	0.00
5.0					Design, Engineering & Construction of Cable Trench of various sizes and crossings as per drg. given in specs including all civil works, earthwork excavation for all type of soils , concreting, reinforcement steel,backfill and disposable of excess earth, all complete as per TS and approved drawing.					
j)					Section 1-1	RMT	25		0.00	0.00
iii)					Section 2-2	RMT	200		0.00	0.00
iii)	995462		18%		Section 3-3	RMT	40		0.00	0.00
iv)	995462		18%		Section 4-4	RMT	10		0.00	0.00
6.0					Design, Engineering & Construction of Buried Cable Trench for HT Cable from Power Transformer to 33kV GIS, Feeders and Auxiliary Power Supply arrangement as per approved drawing	RMT	150		0.00	0.00

Annexure G to Amendment 7

Sl. No.	(SAC) Service Accounting Code	Whether SAC is confirm. If not indicate applicable SAC*	Rate of GST Applicable (%)	Why this rate of GST is confirm. If not indicate applicable GST*	Description	Unit	Quantity	Unit Erection Charges	Total Erection Charges	Total GST as confirmed by Bidder
1	2	3	4	5	6	7	8	9	10=8x9	11
7.0					Design, Engineering and Construction of following buildings inclusive of Excavation in all kind of soils, RCC, RCC reinforcement, internal cable trench (if required) internal and external finish, internal water supply, internal and external sanitation, septic tank and soak pit etc. complete in all respects					
	995454		18%		CONTROL ROOM CUM ADMINISTRATION BUILDING	Sq.M	500		0.00	0.00
	995454		18%		245 KV GIS HALL					
	995454		18%		GIS Hall - It shall be PER Building as per TS	Sq. M.	270		0.00	0.00
	995454		18%		AHU Room and Panel Room	Sq. M.	72		0.00	0.00
					36KV GIS ROOM/HALL					
	995454		18%		GIS ROOM	Sq. M.	72		0.00	0.00
	995454		18%		Security room	Sq. M.	12		0.00	0.00
	995454		18%		Store (Covered 6 x 15)	Sq. M.	90		0.00	0.00
	995454		18%		DG Room	Sq. M.	50		0.00	0.00
	995454		18%		Parking shed RCC for 5 Nos. Vehicle	LS	1		0.00	0.00
8.0					Construction of Concrete (RCC) road. All civil works for roads including earthwork excavation, grading, backfill, disposable of excess earth, concreting, reinforcement steel, RCC hume pipe crossings (NP3 Pipe) etc. all complete as per TS and approved drawings.					
	995421		18%		Road 3.75m wide	Sq.M.	1000		0.00	0.00
	995421		18%		Road 5.5m wide	Sq.M.	400		0.00	0.00
9.0					Design, Engineering & Construction of Boundary wall including excavation, concrete, reinforcement steel ,structural steel, plaster, painting, barbed wire and concertina coil etc all complete as per technical specification (2.5 m high R.C.C frame wall as per Drawing and 0.5 m high angle support on top).	RMts	1000		0.00	0.00
10.0	995454		18%		Main boundary wall Gate (Steel) including all works complete as per technical specification	No.	1		0.00	0.00
11.0	995454		18%		Chain link fencing as per technical specification and drawing	RMts	120		0.00	0.00
12.0	995454		18%		Fencing Gate / Switchyard Gate	No.	2		0.00	0.00
13.0	995454		18%		Design and Construction of Substation rain water Drainage system	LS	1		0.00	0.00
14.0	995454		18%		Antweed Treatment	Sq. mt	8000		0.00	0.00
15.0	995454		18%		75mm thick P.C.C (1:5:10) in switchyard area	Sq.mt	8000		0.00	0.00
16.0	995454		18%		Gravel Filling (100 mm Thick)	Sq. mt	8000		0.00	0.00
17.0					Supplying & laying RCC hume pipe of grade (NP-3) for culverts and cable trench crossings of following dia.					
	995462		18%		250mm dia	RM	15		0.00	0.00
	995462		18%		300mm dia	RM	25		0.00	0.00
	995462		18%		450mm dia	RM	10		0.00	0.00
18.0	995462		18%		Supplying and erecting dewatering pumps					
	995462		18%		5.0 HP	Nos.	2		0.00	0.00
	995462		18%		1.0HP	Nos.	2		0.00	0.00
19.0					Providing and Laying of G.I pipe (Medium Duty) for water supply from borewell/water source to control room building and security room.					
	995462		18%		100 mm Dia GI pipe	RM	150		0.00	0.00
	995462		18%		40mm Dia pipe	RM	50		0.00	0.00
20.0					Random rubble Masonary Retaining Wall					
	995456		18%		Random rubble Masonary with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12(1 cement: 6 coarse sand and 12 graded stone aggregate 20mm nominal size) upto plinth level with cement mortar 1:6 (1 cement : 6 coarse sand) as per approved drawing	CuM	350		0.00	0.00
21	995454				Rain Water Harvesting	LS	1		0.00	0.00
22	995454				Miscellaneous Structural Steel	MT	5		0.00	0.00
Design, Engineering, Supply & Construction of Residential Staff Quarters & associated facilities at 50 MVA, 220/33 kV Gas Insulated Substation (GIS) at Diskit(Nubra Region)										
B.										
1					Civil Works- Design, Engineering, including procurement and subcontracting (if any), delivery, construction, Contouring and site leveling (if required), installation and completion of the facilities including supply of mandatory spares for following residential staff quarters					
					Xen's Quarter 1500 Sq.Ft. 1 Nos. Single Storey	Sq. Ft.	1500		0.00	0.00
					AEE/AE's Quarter 1300 Sq.Ft. 1 Nos. Single Storey	Sq. Ft.	1300		0.00	0.00
					JEs Quarter 2500 Sq.Ft. Double Storey 4 x 2 Sets	Sq. Ft.	2500		0.00	0.00
					SBA's Quarter 3600 Sq.Ft. Double Storey 12 x 2 Sets	Sq. Ft.	3600		0.00	0.00
					Santry/Security Post	Sq. Ft.	100		0.00	0.00
					Septic tank and soakpit for township	LS	1		0.00	0.00
					Providing & Laying of SW pipes for external sewerage system as per technical specification & approved design all sizes 100 mm, 200 mm, 300 mm including construction of inspection chambers as per approved design.	LS	1		0.00	0.00
					External water supply arrangement as per approved design for colony & other buildings etc	LS	1		0.00	0.00
					Underground water storage tank of approved size & capacity for colony & other buildings	LS	1		0.00	0.00
					RCC Road as per approved layout	LS	1		0.00	0.00
					Ornamental Works such as development of lawns and landscaping	LS	1		0.00	0.00
2					Electrical Works- Design, Engineering, procurement, delivery, erection, testing and commissioning of the facilities for following job works:-					
					Construction of 1 x 100 KVA, 11/0.433 kV Distribution transformer along with 11kV isolator, horn gap fuse , Bus Post Insulator and Surge arrestors for LT Station alongwith 415 V, 400A Township DB etc in complete as required.	LS	1		0.00	0.00
					Electrical Panel/Sub- Panel as per the works requirement in complete.	LS	1		0.00	0.00
					Internal & External Wiring for Power & light points including DB, switchboard etc in complete with proper earthing as per works requirement	LS	1		0.00	0.00
					Ceiling Fan, 1400 mm sweep in complete.	LS	1		0.00	0.00
					Lighting Fixture LED Luminaires type as per illumination level required for the indoor building lightening etc in complete.	LS	1		0.00	0.00
					LED Street Light Luminaire as per illumination level required for the street in complete as required.	LS	1		0.00	0.00
					Power & Control wiring including earthing, DB, timer etc for street light as required in complete. (Suitable for operation at extreme Negative Temperature (I.e. minus 30 Cel.)					
			5%		Street Lighting Pole of 6 meter of approved make as required in complete.	LS	1		0.00	0.00
					1.1kV grade 3.5Cx240 sqmm (PVC) Power Cable as required in complete.	LS	1		0.00	0.00
					1.1kV grade 3.5Cx70 sqmm (PVC) Power Cable as required in complete.	LS	1		0.00	0.00
					1.1kV grade 3.5Cx35 sqmm (PVC) Power Cable as required in complete.	LS	1		0.00	0.00

Annexure G to Amendment 7

Sl. No.	(SAC) Service Accounting Code	Whether SAC is applicable. If not indicate applicable SAC*	Rate of GST Applicable (%)	Why this rate of GST is not applicable GST*	Description	Unit	Quantity	Unit Erection Charges	Total Erection Charges	Total GST as confirmed by Bidder
1	2	3	4	5	6	7	8	9	10=8x9	11
1					1.1kV grade 2Cx16 sqmm (PVC) Power Cable as required in complete.	LS	1		0.00	0.00
3					Any other item required for completion of scope of works	LS	1		0.00	0.00
4					Design Engineering & Construction of Boundary Wall for Township: 1.5 Mtr. Height with RCC column & 230 thk. Brickwork, including excavation, RCC, Reinforcement Steel, plaster, painting complete including one MS Steel gate of Mtr.	RM	200		0.00	0.00
Total-1									0.00	0.00
220/33kV New GIS Grid Substation at Padum, Ladakh, U.T										
1					245/36kV New GIS Grid Substation at Padum, Ladakh, U.T.					
Part-A : EMPLOYER ASSESSED QUANTITIES										
POWER TRANSFORMER										
a)	998736		18%		16.67 MVA, 220/33 KV Single Phase transformers (For: 3x16.67 MVA = 50 MVA + 1x16.67 MVA Spare). (Excluding insulating oil) as per IS.	Nos.	4		0.00	0.00
b)	998736		18%		Insulating oil for 3x16.67MVA + 1x16.67MVA Spare, 220/33 KV, 1-phase transformer (LOT* - Oil for One Transformer).	LOT*	4		0.00	0.00
c)	998736		18%		Nitrogen Injection Fire Fighting System	Nos.	3		0.00	0.00
d)	998736		18%		Neutral formation for 220kV HV & 33kV LV side incld	Set	1		0.00	0.00
e)	998736		18%		On line Insulating oil drying system	Set	4		0.00	0.00
f)	998736		18%		On line Dissolved Gas & Moisture Analyser	Nos.	4		0.00	0.00
g)	998736		18%		Digital RTCC Panel with two no. Digital RTCC relay	Nos.	1		0.00	0.00
A2					BUS REACTOR					
a)					8.33 MVAR, 220/√3 kV, 1 Phase Bus Reactor (For: 3x8.33 MVAR = 25 MVAR + 1x8.33 MVAR Spare) (Excluding Insulating Oil) as per IS	No.	4		0.00	0.00
b)					Insulating oil for above 25MVAR Reactor (LOT* - Oil for One Reactor)	LOT*	4		0.00	0.00
c)					On line Insulating oil drying System	Nos.	4		0.00	0.00
d)	998736		18%		Nitrogen Injection Fire Fighting System	No.	3		0.00	0.00
A3					AUXILIARY TRANSFORMER					
a)	998736		18%		315 kVA, 33/0.433kV	Nos	2		0.00	0.00
B					245KV Equipment					
B.1					245KV GIS Equipment					
a)	998736		18%		245kV, SF6 GIS Bus Bars Module including Bus Duct inside GIS Hall [Module description as per Section Project, Technical specification]	Set	2		0.00	0.00
b)	998736		18%		245kV, SF6 GIS Transformer bay Module including Bus Duct inside GIS Hall [Module description as per Section Project, Technical specification]	Set	1		0.00	0.00
c)	998736		18%		245kV, SF6 GIS Line bay Module including Bus Duct inside GIS Hall [Module description as per Section Project, Technical specification]	Set	1		0.00	0.00
d)	998736		18%		245kV, SF6 GIS Bus Coupler bay Module [Module description as per Section Project, Technical specification]	Set	1		0.00	0.00
e)					245kV, SF6 GIS Bus Reactor bay module including Bus Duct inside GIS Hall (Module description as per Section Project, Technical Specification)	Set	1		0.00	0.00
f)	998736		18%		245kV, 1600A, 40kA, Wall Mounted Air Bushing for Connecting GIS to AIS (For Transformer, Reactor and line feeders) alongwith support structure, if required (Single Phase)	Nos.	9		0.00	0.00
B.2					245KV Outdoor Equipment					
i)	998736		18%		216KV Surge Arrester (1-phase)	Nos.	9		0.00	0.00
ii)	995455		18%		245KV BPT	Nos.	21		0.00	0.00
C					36KV Equipment					
C.1					36KV, 2500Amps, 25KA for 1 Sec GIS Equipment					
a)	998736		18%		36kV, SF6 GIS Bus Bar Enclosure Module including Bus sectionalizer, Bus PT's, Bus riser etc [Module description as per Section Project, Technical specification]	Set	1		0.00	0.00
b)	998736		18%		36kV, SF6 GIS Line bay Module [Module description as per Section Project, Technical specification]	Set	3		0.00	0.00
c)	998736		18%		36kV, SF6 GIS Transformer bay Module [Module description as per Section Project, Technical specification]	Set	1		0.00	0.00
d)	998736		18%		36kV, SF6 GIS Auxiliary transformer bay Module [Module description as per Section Project, Technical specification]	Set	2		0.00	0.00
C-2					36kV Outdoor equipment					
i)	998736		18%		33 kV HDB 3Φ Isolators with earth switch (Line Side)	Nos.	3		0.00	0.00
ii)	998736		18%		30 kV Surge Arrestors (1-phase) (Line Side)	Nos.	15		0.00	0.00
iii)	998736		18%		30 kV HG Fuse (630 Amp) 1 phase	Nos.	6		0.00	0.00
D.					Testing & Maintenance Equipment for GIS					
a)	998736		18%		SF6 Gas filling & evacuating plant For 245kV & 36kV GIS	Set	1		0.00	0.00
b)					Partial Discharge Monitoring System for GIS as per Technical Specification					
i)	998736		18%		For 245kV GIS	Set	1		0.00	0.00
ii)	998736		18%		For 36kV GIS	Set	1		0.00	0.00
c)					Dew Point meter					
d)					For 245kV & 36kV GIS	Set	1		0.00	0.00
e)	998736		18%		SF6 Gas Leak Detector For 245kV & 36kV GIS	Set	1		0.00	0.00
f)	998736		18%		EOT crane for 245kV GIS Hall	Set	1		0.00	0.00
g)	998736		18%		Sf6 Gas Analyser	Set	1		0.00	0.00
E.					RELAY PANELS (WITH AUTOMATION)					
E1					245KV Front Glass Door Simplex Panels					
a)	998736		18%		Circuit Breaker Relay Panel	Set	2		0.00	0.00
i)	998736		18%		With Auto Reclose	Set	2		0.00	0.00
ii)	998736		18%		With out Auto Reclose	Set	2		0.00	0.00
b)	998736		18%		Line Protection Panel	Set	1		0.00	0.00
c)	998736		18%		Transformer Protection Panel (For both HV & LV side)	Set	1		0.00	0.00
d)	998736		18%		Bus Reactor Protection Panel	Set	1		0.00	0.00
e)	998736		18%		Bus Bar Protection Panel	Set	1		0.00	0.00
E2					Teleprotection Equipments					
a)					Digital protection coupler Panel including cabling etc.	Set	1		0.00	0.00
b)					Digital protection coupler including cabling etc. for other end	Set	1		0.00	0.00
F.	998736		18%		COMMON EQUIPMENTS					
a)					Megohm meter- 5KV Digital Battery operated as per Specs.	No.	1		0.00	0.00
b)					Digital Multimeter	No.	1		0.00	0.00

Annexure G to Amendment 7

Sl. No.	(SAC) Service Accounting Code	Whether SAC is confirm. If not indicate applicable SAC*	Rate of GST Applicable (%)	Why this rate of GST is confirm. If not indicate applicable GST*	Description	Unit	Quantity	Unit Erection Charges	Total Erection Charges	Total GST as confirmed by Bidder
1	2	3	4	5	6	7	8	9	10=8x9	11
G.					SUBSTATION AUTOMATION					
G.1					Complete Substation Automation System (SAS) for substation including hardware and software for the substation & remote control stations alongwith associated equipments for the following bays as per Technical Specification					
a)					Main bays to be automated					
i)	998736		18%		245 kV system	Bay Nos.	4		0.00	0.00
ii)	998736		18%		36 kV system	Bay Nos.	7		0.00	0.00
iii)	998736		18%		BCU for controlling & monitoring of Auxiliary System	Set	1		0.00	0.00
H					LT Switchgear (As per Technical specification)					
a)	998736		18%		415V Main switchboard	Set	1		0.00	0.00
b)	998736		18%		415V ACDB	Set	1		0.00	0.00
c)	998731		18%		415V MLDB	Set	1		0.00	0.00
d)	998736		18%		415V Emergency LDB	Set	1		0.00	0.00
e)	998736		18%		220V DCDB	Sets	2		0.00	0.00
f)	998736		18%		48V DCDB	Set	2		0.00	0.00
I.					Batteries					
a)					220V					
i)	998736		18%		400 AH	Nos	2		0.00	0.00
b)					48V					
i)	998736		18%		300 AH	Nos	2		0.00	0.00
J.					Float Cum Boost Battery Charger					
a)					220V Float Cum Boost Battery Charger					
i)	998736		18%		60A/60A	Nos	2		0.00	0.00
b)					48V Float Cum Boost Battery Charger					
i)	998736		18%		40A/40A	Nos	2		0.00	0.00
K.					Diesel Generator with control Panel					
a)	998731		18%		250 kVA	Set	1		0.00	0.00
b)	995454		18%		10KL Bulk Storage Tank as per IS	No.	1		0.00	0.00
L.					Fire Protection System					
a)					Portable /Trolley/Wheel mounted extinguishers					
i)	998736		18%		9 litre water type	Nos	5		0.00	0.00
ii)	998736		18%		45 litre foam type	Nos	3		0.00	0.00
iii)	995461		18%		4.5 kg CO2 type	Nos	20		0.00	0.00
iv)					6.0 kg Dry Chemical Powder (DCP) type	Nos	15		0.00	0.00
M.					Cables along with clamps, glands, lugs and straight joints etc.					
a)					Power Cables - (36kV grade) (Suitable for operation at extreme Negative Temperature (i.e. minus 30° Cel.)					
i)	998736		18%		36kV Single Core, 630 Sq.mm Aluminium H.T Buried cable (Two length per Phase and one length per neutral) along with all accessories including termination kit as per specification (for Power transformer application).	Metre	500		0.00	0.00
ii)	998736		18%		36kV, 3 Core 300 Sq.mm Aluminium H.T Buried cable along with all accessories including termination kit as per specification (for Auxiliary transformer application).	Meter	100		0.00	0.00
iii)	998736		18%		36kV Single core 630 Sq.mm Aluminium H.T Buried cable (One length per phase) along with all accessories including termination kit as per specification (for Feeder Bay application).	Meter	600		0.00	0.00
b)					Power cables - (1.1kV grade) (Suitable for operation at extreme Negative Temperature (i.e. minus 30° Cel.)					
i)	998736		18%		3.5Cx300 sqmm (XLPE) cable for filter Machine along with termination arrangement as per IS	Meter	150		0.00	0.00
N.					Air conditioning System for Control room cum administrative building, relay room etc.					
a)	995463		18%		High wall type split AC unit of 2 TR capacity	Nos	5		0.00	0.00
O.					Heating System for various rooms in S/s					
a)					Oil Flow Heat Convectors	Nos.	50		0.00	0.00
P.					Fabrication, galvanising and supply of following Steel Structures (Grade C) including nuts, bolts, all types of washers, packplates, step bolts and gusset plates including foundation bolts.					
a)	995455		18%		Lattice Structure (Gantry Towers, Beams, LM and Equipment /support structure) including Foundation Bolts	MT	60		0.00	0.00
b)	995455		18%		Fastners and step bolts.(Nuts,Bolts & Washers)	MT	2		0.00	0.00
Q					Telecommunication equipment					
A					SDH EQUIPMENTS(STM-4 MADM upto 5MSP Protected directions)					
(i)					Drass					
	998784		18%		Base equipments(Common cards,Cross connect/control cards, power supply cards, power cabling, other hardware and accessories including sub rasks, patch cord, DDF etc fully equipped excluding (ii) & (iii) below	Nos.	1		0.00	0.00
					Padum					
	998784		18%		Base equipments(Common cards,Cross connect/control cards, power supply cards, power cabling, other hardware and accessories including sub rasks, patch cord, DDF etc fully equipped excluding (ii) & (iii) below	Nos.	1		0.00	0.00
(ii)					Optical Interface Cards/SFP					
a)	998784		18%		Padum S4.1 SFP	Nos.	0		0.00	0.00
b)	998784		18%		L4.1 SFP	Nos.	4		0.00	0.00
					Drass					
a)	998784		18%		S4.1 SFP	Nos.	0		0.00	0.00
b)	998784		18%		L4.1 SFP	Nos.	4		0.00	0.00
(iii)					Tributary cards					
a)	998784		18%		Padum E1 Interface card(Min. 16 Interfaces per card)	Nos.	2		0.00	0.00
b)	998784		18%		Ethernet interface 10/100 Base T with Layer-2 switching (Min 8 Interfaces per card)	Nos.	2		0.00	0.00
					Drass					
a)	998784		18%		E1 Interface card(Min. 16 Interfaces per card)	Nos.	2		0.00	0.00
b)	998784		18%		Ethernet interface 10/100 Base T with Layer-2 switching (Min 8 Interfaces per card)	Nos.	2		0.00	0.00
B					Equipment Cabinet at Padum					
2.0					Network Manager System(NMS)					
(i)					Padum					
a)	998784		18%		Craft terminal Hardware	Set	1		0.00	0.00
b)	998784		18%		Software	Set	1		0.00	0.00
					Drass					
(i)					Craft terminal					
a)	998784		18%		Hardware	Set	1		0.00	0.00
b)	998784		18%		Software	Set	1		0.00	0.00

Annexure G to Amendment 7

Sl. No.	(SAC) Service Accounting Code	Whether SAC is confirm. If not indicate applicable SAC*	Rate of Tax Applicable (%)	Whether rate of GST is confirm. If not indicate applicable GST*	Description	Unit	Quantity	Unit Erection Charges	Total Erection Charges	Total GST as confirmed by Bidder
1	2	3	4	5	6	7	8	9	10=Bx9	11
3.0					VOIP telephone instrument with one common switch(min. 8 port)					
	998336		18%		Padum	No.	2		0.00	0.00
	998336		18%		Drass	No.	2		0.00	0.00
4.0					Approach Cable (24 fibres)					
					Padum					
a					24 Fibre(DWSM)	Kms	1		0.00	0.00
b					Installation hardware set for above 24 Fibre, Fibre Optic Approach Cable	Set	1		0.00	0.00
					Drass					
a					24 Fibre(DWSM)	kms	1		0.00	0.00
b					Installation hardware set for above 24 Fibre, Fibre Optic Approach Cable	Set	1		0.00	0.00
5.0					FODP					
					Padum					
a					48 Fibre,Indoor Type,Rack Mounted with FCPC Coupling & Pigtails(5mtrs)	No.	1		0.00	0.00
					Drass					
a					48 Fibre,Indoor Type,Rack Mounted with FCPC Coupling & Pigtails(5mtrs)	No.	1		0.00	0.00
Q					Training of employers personnel as per clause 11 of section project	LS	1		0.00	0.00
					Part-B: VENDOR ASSESSED QUANTITIES					
A.					Erection Hardware					
					Insulator Strings, Disc Insulator,Hardware, conductor, Al tube, bus-bar materials, cable trays, clamps, spacers, connectors including equipment connectors, Junction box, earthwire, buried cable trenches/pipe equipment & lighting, 36kV Cable Termination kit alongwith all accessories etc. for 245kV &36 kV Switch yard:					
i)	998731		18%		Transformer Bay - Wall mounted Sf6 to Air bushing - Transformer bushing connection arrangement inclusive of L.A,BPI etc.	Set	1		0.00	0.00
ii)	998731		18%		220kV line Bay	Set	1		0.00	0.00
iii)	998731		18%		220/√3 Bus Reactor Bay	Set	1		0.00	0.00
iv)	998731		18%		Power Transformer, Neutral formation of HV & LV side, Neutral CT, BPI etc.	Set	1		0.00	0.00
v)	998731		18%		33kV line Bays	Set	3		0.00	0.00
vi)	998731		18%		Aux. Transformer Bay	Set	2		0.00	0.00
A1					Earthing material including Risers, Equipment earthing, structures earthing etc. (Excluding MS Rod and Chemical Earthing) inside and outside GIS Hall for complete scope of work as per					
a)	85359090		18%		40 mm Dia MS Rod	MT	150		0.00	0.00
b)	85359090		18%		Chemical Electrolytic Type Earthing (As per IEEE-80): For Rocky soil where getting required earth resistance is not possible.	Nos.	15		0.00	0.00
B)					Fire detection & Alarm System for all buildings or					
i)	995461		18%		245KV GIS hall	LS	1		0.00	0.00
ii)	995461		18%		36KV GIS hall/Room	LS	1		0.00	0.00
iii)	995461		18%		Panel room of 245kV	LS	1		0.00	0.00
iv)	995461		18%		Control room cum administrative building	LS	1		0.00	0.00
					DG Room					
					Illumination System (luminaries to be suitable for operation at extreme Negative Temperature (i.e. minus 30° Cel.)					
C.					Control room cum administrative building illumination	LS	1		0.00	0.00
a)	998739		18%		Control room cum administrative building illumination	LS	1		0.00	0.00
b)	998731		18%		Switchyard lighting	LS	1		0.00	0.00
c)	998739		18%		Street lighting	LS	1		0.00	0.00
d)	998739		18%		245KV GIS hall	LS	1		0.00	0.00
e)	998739		18%		36KV GIS hall/Room	LS	1		0.00	0.00
f)	998739		18%		Panel room of 245kV	LS	1		0.00	0.00
g)	998739		18%		Store	LS	1		0.00	0.00
h)	998739		18%		Security room	LS	1		0.00	0.00
i)	998739		18%		Parking Shed	LS	1		0.00	0.00
j)	998739		18%		DG Room	LS	1		0.00	0.00
D.					Heating cum Ventilation system					
a)	995463		18%		245KV GIS hall (AHU as per Annexure - IV of TS)	LS	1		0.00	0.00
b)	995463		18%		36KV GIS hall (630mm Sweep Exhaust Fan with Louvers - 2 No.)	LS	1		0.00	0.00
					POWER & CONTROL CABLES (Suitable for operation at extreme Negative Temperature (i.e. minus 30° Cel.)					
E.					Power Cables(PVC)- (1.1kV grade)	LS	1		0.00	0.00
a)	998736		18%		Power Cables(PVC)- (1.1kV grade)	LS	1		0.00	0.00
b)	998736		18%		Power Cables (XLPE) (excluding 3.5Cx300 sqmm (XLPE) cable for filter Machine)- (1.1kV grade)	LS	1		0.00	0.00
c)	998736		18%		Control Cable (PVC)- (1.1kV grade)	LS	1		0.00	0.00
d)	998736		18%		Cable glands, lugs & straight through joints for Power & Control cables	LS	1		0.00	0.00
					Part-C: Civil Works (As per Technical Specifications)					
1.0	995432		18%		Soil Investigation and Contour Survey as per TS	LS	1		0.00	0.00
2.1	995432		18%		Earth work filling with borrowed earth with all leads and lifts including etc (borrowed area to be decided by contractor)	Cu. M	5000		0.00	0.00
2.2					Levelling of Area (Cutting & Filling of Soil & Backfilling with same excavated soil)					
a)					Soft Rock	Cu. M	1000		0.00	0.00
b)					Normal Soil	Cu. M	10000		0.00	0.00
3.0					Design, Engineering and Construction of foundation for following equipments/Structures. All civil works including earthwork excavation for all type of soils , concreting, reinforcement steel,Steel grating for Transformer oil pits, Rail tracks, other miscellaneous steel, backfill and disposable of excess earth, all complete as per TS and approved drawing.					
i	995455		18%		16.67 MVA, 220/33 KV Single Phase transformers (For: 3x16.67 MVA = 50 MVA + 1x16.67 MVA Spare), (Excluding insulating oil) as per TS	Nos.	4		0.00	0.00
ii	995455		18%		8.33 MVAR, 220/√3 kV, 1 Phase Bus Reactor (For: 3x8.33 MVAR = 25 MVAR + 1x8.33 MVAR Spare) (Excluding Insulating Oil) as per TS	No.	4		0.00	0.00
iii	995455		18%		315KVA Auxiliary Transformer	No.	2		0.00	0.00
iv	995455		18%		250 KVA D.C.Set	No.	1		0.00	0.00
v	995455		18%		Take Off Gantry tower Structure,	No.	6		0.00	0.00
vi	995455		18%		Lightning Mast	No.	2		0.00	0.00
vii	995455		18%		Equipments structure for L.A. BPI in 220kV AIS	No.	30		0.00	0.00
4.0	995454		18%		Design, Engineering and Construction of RCC Fire Protection walls for Transformer /Reactors . All civil works including earthwork excavation for all type of soils , concreting, reinforcement steel, other miscellaneous steel, backfill and disposable of excess earth, all complete as per TS and approved drawing.	No.	7		0.00	0.00

Annexure G to Amendment 7

Sl. No.	(SAC) Service Accounting Code	Whether SAC is confirm. If not indicate applicable SAC*	Rate of GST Applicable (%)	Whether rate of GST is confirm. If not indicate applicable GST*	Description	Unit	Quantity	Unit Erection Charges	Total Erection Charges	Total GST as confirmed by Bidder
1	2	3	4	5	6	7	8	9	10=8x9	11
5.0					Design, Engineering & Construction of Cable Trench of various sizes and crossings as per drg. given in specs including all civil works, earthwork excavation for all type of soils, concreting, reinforcement steel, backfill and disposal of excess earth, all complete as per TS and approved drawing.					
					Section 1-1	RMt	25		0.00	0.00
					Section 2-2	RMt	200		0.00	0.00
	995462		18%		Section 3-3	RMt	60		0.00	0.00
	995462		18%		Section 4-4	RMt	10		0.00	0.00
6.0					Design, Engineering & Construction of Buried Cable Trench for HT Cable from Power Transformer to 33kV GIS, Feeders and Auxiliary Power Supply arrangement as per approved drawing	RMt	150		0.00	0.00
7.0					Design, Engineering and Construction of following buildings inclusive of Excavation in all kind of soils, PCC, RCC, reinforcement, internal cable trench (if required) internal and external finish, internal water supply, internal and external sanitation, septic tank and soak pit etc. complete in all respects					
	995454		18%		CONTROL ROOM CUM ADMINISTRATION BUILDING	Sq.M	500		0.00	0.00
	995454		18%		245 KV GIS HALL					
	995454		18%		GIS Hall - It shall be PEB Building as per TS	Sq. M.	270		0.00	0.00
	995454		18%		AHU Room and Panel Room	Sq. M.	72		0.00	0.00
					38KV GIS ROOM/HALL					
	995454		18%		GIS ROOM	Sq. M.	72		0.00	0.00
	995454		18%		Security room	Sq. M.	12		0.00	0.00
	995454		18%		Store (Covered 6 x 15)	Sq. M.	90		0.00	0.00
					DG Room	Sq. M.	50		0.00	0.00
	995454		18%		Parking shed RCC for 5 Nos. Vehicle	LS	1		0.00	0.00
8.0					Construction of Concrete (RCC) road. All civil works for roads including earthwork excavatio, grading, backfill, disposal of excess earth, concreting, reinforcement steel, RCC hume pipe crossings (NP3 Pipe) etc. all complete as per TS and approved drawings.					
	995421		18%		Road 3.75m wide	Sq.M.	1100		0.00	0.00
	995421		18%		Road 5.5m wide	Sq.M.	400		0.00	0.00
9.0					Design, Engineering & Construction of Boundary wall including excavation, concrete, reinforcement steel, structural steel, plaster, painting, barbed wire and concertina coil etc all complete as per technical specification (2.5 m high R.C.C frame wall as per Drawing and 0.5 m high angle support on top).	RM	1000		0.00	0.00
10.0	995454		18%		Main boundary wall Gate (Steel) including all works complete as per technical specification	No.	1		0.00	0.00
11.0	995454		18%		Chain link fencing as per technical specification and drawing	RMts	120		0.00	0.00
12.0	995454		18%		Fencing Gate / Switchyard Gate	No.	2		0.00	0.00
13.0	995454		18%		Design and Construction of Substation rain water Drainage system	LS	1		0.00	0.00
14.0	995454		18%		Antweed Treatment	Sq. mt	8000		0.00	0.00
15.0	995454		18%		75mm thick P.C.C (1:5:10) in switchyard area	Sq.mt	8000		0.00	0.00
16.0	995454		18%		Gravel Filling (100 mm Thick)	Sq. mt	8000		0.00	0.00
17.0					Supplying & laying RCC hume pipe of grade (NP-3) for culverts and cable trench crossings of following dia.					
	995462		18%		250mm dia	RM	15		0.00	0.00
	995462		18%		300mm dia	RM	25		0.00	0.00
	995462		18%		450mm dia	RM	10		0.00	0.00
18.0					Supplying and erecting dewatering pumps					
	995462		18%		5.0 HP	Nos.	2		0.00	0.00
	995462		18%		1.0HP	Nos.	2		0.00	0.00
19.0					Providing and Laying of G.I. pipe (Medium Duty) for water supply from borewell/water source to control room building and security room.					
	995462		18%		100 mm Dia GI pipe	RM	150		0.00	0.00
	995462		18%		40mm Dia pipe	RM	50		0.00	0.00
20.0					Random rubble Masonary Retaining Wall					
	995456		18%		Random rubble Masonary with hard stone in foundation and plinth including levelling up with cement concrete 1:6:12(1 cement: 6 coarse sand and 12 graded stone aggregate 20mm nominal size) upto plinth level with cement mortar 1:6 (1 cement : 6 coarse sand) as per approved drawing	CuM	350		0.00	0.00
21	995456		18%		Rain Water Harvesting	LS	1		0.00	0.00
22	995456		18%		Miscellaneous Steel	MT	5		0.00	0.00
B.					Design, Engineering, Supply & Construction of Residential Staff Quarters & associated facilities at 50 MVA, 220/33 kV Gas Insulated Substation (GIS) at Padum (Zanskar)					
1					Civil Works- Design, Engineering, including procurement and subcontracting (if any), delivery, construction, Contouring and site leveling (if required), installation and completion of the facilities including supply of mandatory spares for following residential staff quarters.					
					Xen's Quarter 1500 Sq.Ft. 1 Nos. Single Storey	Sq. Ft.	1500		0.00	0.00
					AEE/AE's Quarter 1300 Sq.Ft. 1 Nos. Single Storey	Sq. Ft.	1300		0.00	0.00
					JEs Quarter 2500 Sq.Ft. Double Storey 4 x 2 Sets	Sq. Ft.	2500		0.00	0.00
					SBA's Quarter 3600 Sq.Ft. Double Storey 12 x 2 Sets	Sq. Ft.	3600		0.00	0.00
					Santry/Security Post	Sq. Ft.	100		0.00	0.00
					Septic tank and soakpit for township	LS	1		0.00	0.00
					Providing & Laying of SW pipes for external sewerage system as per technical specification & approved design all sizes 100 mm, 200 mm, 300 mm including construction of inspection chambers as per approved design.	LS	1		0.00	0.00
					External water supply arrangement as per approved design for colony & other buildings etc	LS	1		0.00	0.00
					Underground water storage tank of approved size & capacity for colony & other buildings	LS	1		0.00	0.00
					RCC Road as per approved layout	LS	1		0.00	0.00
					Ornamental Works such as development of lawns and landscaping	LS	1		0.00	0.00
2					Electrical Works- Design, Engineering, procurement, delivery, erection, testing and commissioning of the facilities for following job works:-					
					Construction of 1 x 100 KVA, 11/0.433 kV Distribution transformer along with 11kV isolator, horn gap fuse, Bus Post Insulator and Surge arrestors for LT Station alongwith 415 V, 400A Township DB etc in complete as required.	LS	1		0.00	0.00
					Electrical Panel/Sub- Panel as per the works requirement in complete.	LS	1		0.00	0.00
					Internal & External Wiring for Power & light points including DB, switchboard etc in complete with proper earthing as per works requirement.	LS	1		0.00	0.00
					Ceiling Fan, 1400 mm sweep in complete.	LS	1		0.00	0.00

Annexure G to Amendment 7

Sl. No.	(SAC) Service Accounting Code	Whether SAC is confirm. If not indicate applicable SAC*	Rate of GST Applicable (%)	Why this rate of GST is confirm. If not indicate applicable GST*	Description	Unit	Quantity	Unit Erection Charges	Total Erection Charges	Total GST as confirmed by Bidder
1	2	3	4	5	6	7	8	9	10=8x9	11
e.					Lighting Fixture LED Luminaires type as per illumination level required for the indoor building lighting etc in complete.	LS	1		0.00	0.00
f.					LED Street Light Luminaire as per illumination level required for the street in complete as required.	LS	1		0.00	0.00
g.					Power & Control wiring including earthing, DB, timer etc for street light as required in complete. (Suitable for operation at extreme Negative Temperature (i.e. minus 30° Cel.)					
h.					Street Lighting Pole of 6 meter of approved make as required in complete.	LS	1		0.00	0.00
i.					1.1kV grade 3.5Cx240 sqmm (PVC) Power Cable as required in complete.	LS	1		0.00	0.00
j.					1.1kV grade 3.5Cx70 sqmm (PVC) Power Cable as required in complete.	LS	1		0.00	0.00
k.					1.1kV grade 3.5Cx35 sqmm (PVC) Power Cable as required in complete.	LS	1		0.00	0.00
l.					1.1kV grade 2Cx16 sqmm (PVC) Power Cable as required in complete.	LS	1		0.00	0.00
3					Any other item required for completion of scope of works	LS	1		0.00	0.00
4					Design Engineering & Construction of Boundary Wall for Township: 1.5 Mtr. Height with RCC column & 230 thk. Brickwork, including excavation, RCC, Reinforcement Steel, plaster, painting complete including one MS Steel gate of Mtr.	RM	200		0.00	0.00
Total -2									0.00	0.00
Extension of 220kV Line bay extension at GIS Grid Substation at Phyang(Leh), Ladakh, U.T.										
1					220kV Line Bay at GIS Grid Substation at Phyang(Leh), Ladakh, U.T.					
A					Part-A: EMPLOYER ASSESSED QUANTITIES					
A1					245KV Equipment					
i)	998736		18%		245kV, SF6 GIS Bus Bars Module Extension [Module description as per Section Project, Technical specification]	Set	2		0.00	0.00
ii)	998736		18%		245kV, SF6 GIS Line bay Module including Bus Duct inside GIS Hall [Module description as per Section Project, Technical specification]	Set	1		0.00	0.00
iii)	998736		18%		245kV, 1600A, 40kA, Wall mounted SF6/Air Bushing for Connecting GIS to AIS (For line feeder) alongwith support structure, if required (Single Phase)	Nos.	3		0.00	0.00
A2					245KV Outdoor Equipment					
i)	998736		18%		216KV Surge Arrester (1-phase)	Nos.	3		0.00	0.00
ii)	995455		18%		245kV BPI	Nos.	6		0.00	0.00
B)					RELAY PANELS (WITH AUTOMATION)					
B1					245kV Front Door Glass Simplex Panels					
a)					Circuit Breaker Relay Panel					
i)	998736		18%		With Auto Reclose	Set	1		0.00	0.00
b)	998736		18%		Line Protection Panel	Set	1		0.00	0.00
c)	998736		18%		Augmentation of existing Bus Bar Protection Scheme	Set	1		0.00	0.00
C					SUBSTATION AUTOMATION					
CI					Augmentation of existing Substation Automation System (SAS) for 220kV Line Bay as per Technical Specification					
a)					Main bays to be automated					
i)	998736		18%		245 kV system	Bay No.	1		0.00	0.00
D					Fabrication, galvanising and supply of following Steel Structures (Grade C) including nuts, bolts, all types of washers, packplates, step bolts and gusset plates including foundation bolts.					
i)	995454		18%		Lattice Structure (Gantry Towers, Beams, and Equipment support structure) including Foundation Bolts Note: The proposed Gantry Structure should match with the existing Structure in the S/Stn.	MT	14		0.00	0.00
ii)	995454		18%		Fastners and Step Bolts (Nuts, Bolts and Washers)	MT	0.5		0.00	0.00
Q					Training of employers personnel as per clause 11 of section project	LS	1		0.00	0.00
A.					Part-B: VENDOR ASSESSED QUANTITIES					
					Erection Hardware					
					Hardware, conductor, Al tube, bus-bar materials, cable trays, clamps, spacers, connectors including equipment connectors, Junction box, earthwire, buried cable trenches/pipe, equipment & lighting etc. for 245kV Switch yard:					
i)	998731		18%		220kV line bay	Set	1		0.00	0.00
A1					Earthing material Risers, Equipment earthing, structures earthing etc. inside and outside GIS Hall for complete scope of work as per technical specifications.	LS	1		0.00	0.00
B.					illumination System (luminaries to be suitable for operation at extreme Negative Temperature (i.e. minus 30° Cel.)					
i)	998739		18%		Switchyard -220kV Line Bay lighting	LS	1		0.00	0.00
C.					POWER & CONTROL CABLES (Suitable for operation at extreme Negative Temperature (i.e. minus 30° Cel.)					
i)	998736		18%		Power Cables(PVC) - (1.1kV grade) for 220kV Line Bay	LS	1		0.00	0.00
ii)	998736		18%		Control Cable (PVC) - (1.1kV grade) For 220kV Line Bay	LS	1		0.00	0.00
iii)	998736		18%		Cable glands, lugs & straight through joints for Power & Control cables	LS	1		0.00	0.00
1.0					Part-C: Civil Works (As per Technical Specifications)					
					Design, Engineering and Construction of foundation for following equipments/Structures Note: The proposed Foundation shall match with the existing foundations of the S/Stn.					
i					Take Off Gantry tower Structure,	No	1		0.00	0.00
ii					Equipments structure for L.A, BPI in 220kV AIS	No.	9		0.00	0.00
Total -3									0.00	0.00
Extension of 245kV LINE BAY EXTENSION AT 220/66kV GIS GRID SUBSTATION AT DRASS, Ladakh, U.T.										
1					245kV Line Bay Extension at 220/66kV GIS Grid Substation at Drass, Ladakh,U.T.					
A					Part-A: EMPLOYER ASSESSED QUANTITIES					
A1					245KV Equipment					
i)	998736		18%		245kV, SF6 GIS Bus Bars Module [Module description as per Section Project, Technical specification]	Set	2		0.00	0.00
ii)	998736		18%		245kV, SF6 GIS Line bay Module [Module description as per Section Project, Technical specification]	Set	1		0.00	0.00

Annexure G to Amendment 7

Sl. No.	(SAC) Service Accounting Code	Whether SAC is confirmed. If not indicate applicable SAC*	Rate of GST Applicable (%)	Whether rate of GST is confirmed. If not indicate applicable GST*	Description	Unit	Quantity	Unit Erection Charges	Total Erection Charges	Total GST as confirmed by Bidder	
1	2	3	4	5	6	7	8	9	10=Bx9	11	
iii)	998736		18%		245kV, 1600A, 40kA, Wall mounted SF6/ Air Bushing for Connecting GIS to AIS (For line feeder) alongwith support structure, if required (Single Phase)	Nos.	3		0.00	0.00	
					245KV Outdoor Equipment						
A2	998736		18%		216KV Surge Arrester (1-phase)	Nos.	3		0.00	0.00	
i)	995455		18%		245KV BPI	Nos.	6		0.00	0.00	
					RELAY PANELS (WITH AUTOMATION)						
B)						245KV Front Door Simplex Panels					
B1	998736		18%		Circuit Breaker Relay Panel with Auto Reclose	Set	1		0.00	0.00	
i)	998736		18%		Line Protection Panel	Set	1		0.00	0.00	
ii)	998736		18%		Augmentation of existing 220kV Bus bar Protection Scheme	Set	1		0.00	0.00	
iii)	998736		18%						0.00	0.00	
					SUBSTATION AUTOMATION						
C						Augmentation of Substation Automation System (SAS) for following 220kV Line bays as per Technical Specification					
C1	998736		18%		245 kV Line Bay	Nos.	1		0.00	0.00	
					Fabrication, galvanising and supply of following Steel Structures including nuts, bolts, all types of washers, packplates, step bolts and gusset plates including foundation bolts.						
D	995454		18%		Lattice Structure (Gantry Towers, Beams and Equipment support structure) including Foundation Bolts	MT	14		0.00	0.00	
i)	995454		18%		Fastners and Step Bolts (Nuts, Bolts and Washers)	MT	0.5		0.00	0.00	
ii)	995454		18%						0.00	0.00	
					Training of employers personnel as per clause 11 of section project						
E						LS	1		0.00	0.00	
					Part-B: VENDOR ASSESSED QUANTITIES						
A					Erection Hardware				0.00	0.00	
					Insulator String, Disc Insulator, Hardware, conductor, Al tube, bus-bar materials, cable trays & its support structure, clamps, spacers, connectors including equipment connectors, junction box, earthwire, buried cable trenches/ pipe, equipment & lighting for 245kV Line bay extension in Switch yard.						
A1	998731		18%		220kV line bay	Set	1		0.00	0.00	
i)	99873		18%		Earthing material Risers, Equipment earthing, structures earthing etc. inside and outside GIS Hall for complete scope of work as per technical specifications.	LS	1		0.00	0.00	
					Fire detection & Alarm System for all buildings						
B	995461		18%		245KV GIS hall Extension (90 Sq. M approx.)	LS	1		0.00	0.00	
i)	995461		18%		Illumination System				0.00	0.00	
ii)	998739		18%		245KV GIS Hall Extension (90 Sq.M app.)	LS	1		0.00	0.00	
iii)	998739		18%		Switchyard lighting (Line Bay)	LS	1		0.00	0.00	
					Air conditioning & ventilation System						
D1						Ventilation system					
i)	998736		18%		245KV GIS hall Extension Portion (Extension of Ventilation Duct by 5M approx.)	LS	1		0.00	0.00	
					POWER & CONTROL CABLES						
E.	998736		18%		Power Cables(PVC) - (1.1kV grade) for 220kV Line Bay	LS	1		0.00	0.00	
i)	998736		18%		Control Cable (PVC) - (1.1kV grade) For 220kV Line Bay	LS	1		0.00	0.00	
ii)	998736		18%		Cable glands, lugs & straight through joints for Power & Control cables	LS	1		0.00	0.00	
iii)	998736		18%						0.00	0.00	
					Part-C: Civil Works (As per Technical Specifications)						
1.0						Design, Engineering and Construction of foundation for following equipments/Structures. Note: The proposed Foundation shall match with the existing foundations of the S/Stn.					
i)						Take Off Gantry tower Structure	No.	1		0.00	0.00
ii)						Equipments structure for L.A., BPI in 220kV AIS	No.	9		0.00	0.00
					Design, Engineering and Construction of 220kV GIS Hall extension Work, inclusive of Excavation in all kind of soils, PCC, RCC, reinforcement, internal cable trench (if required) internal and external finish, including demolition of walls including Rolling Shutter, RCC and other ancillary works, installation of new Rolling Shutter, Doors etc. complete in all respects						
2.0						The Scope shall also include the extension for the EOT Crane transit system, extension of Ventilation Ducts and associated air exit system. Note: The Building shall be PEB Type and match with the existing GIS Hall.					
(a)						GIS Hall - It shall be PEB Building as per TS	Sq. M.	90		0.00	0.00
Total -4									0.00	0.00	
Grand Total of Schedule-4 (Total1+Total2+Total3+Total4)									0.00	0.00	
Total GST as confirmed by Bidder										0.00	

Note : 1) To facilitate the bidders, Employer has indicated an HSN/SAC code and rate of GST against each item in the Price Schedule except for some of lumpsum quantities/lot/Set as mentioned at ITB 11.3.2. It shall entirely be the responsibility of the bidder to check the HSN/SAC code and rate of GST given against each item. The bidder may either confirm the HSN/SAC and rate of GST or if the bidder opts to classify the item in question under a different HSN/SAC code or opts to indicate a different rate of GST, bidder may indicate the same in the columns provided. The bidder shall solely be responsible for HSN/SAC classification and the rate of GST for each item. Employer's liability for reimbursement/payment of GST shall be lower of the GST applicable at the rate as confirmed/deemed confirmed in the bid or actual GST paid/payable by the bidder for that item.

2) For Supply of plants & equipment and Services from within India, HSN/SAC has not been indicated for some of lumpsum quantities/lot/Set as each of these consists of many items for which billing break up shall be furnished during contract execution. For the purpose of evaluation, the bidder has to indicate the rate of GST applicable on these items. As it is possible that the incidence of GST on each of these items may be different, provision has been made in the price schedules for quoting the bid price in different categories based on the incidence of GST. The bidder shall accordingly quote price in different tax categories. HSN /SAC for these items shall be furnished along with billing breakup prior to payment for these items. Employer's liability for reimbursement/payment of GST shall be lower of the GST applicable at the rate as confirmed/deemed confirmed in the bid or actual GST paid/payable by the bidder for that item.

3) In case the bidder leaves the cell of confirmation of the SAC code and/or GST rate "blank", the SAC code and corresponding GST rate indicated by the Employer shall be deemed to be the one confirmed by the Bidder.

4) HSN stands for Harmonized System of Nomenclature and SAC stands for Service Accounting Code, used for classification of Goods for GST purpose..

Date :		Printed Name:	
Place :		Designation:	

Annexure G to Amendment 7

TENDER PACKAGE No.:-RECTPCL/PIA/JKPD/SS-03										
Design, Manufacturing, Supply, Erection, Testing & Commissioning of New GIS Substations at Diskit & Padum and Bay extensions at existing PGCIL's GIS Substations at Phyang & Drass on Turnkey Basis associated with Strengthening of Transmission System of JKPD under PMDP Scheme-15.										
(SCHEDULE OF RATES AND PRICES)										
Bidder's Name and Address :		To: Transmission Projects Company Limited (A wholly owned subsidiary of REC, a 'Navratna CPSE' Under the Ministry of Power, Govt of India) ECE House, 3rd Floor, Annexe - II, 28 A, K G MARG, NEW DELHI - 110 001 Website: www.rectpcl.in							REC	
Name :										
Address :										
Traning Charges for Traning to be imparted .										
All Prices are in Indian Rupees.										
Sl. No.	SAC (Service Accounting Codes)	Whether SAC in column '2' is confirm. If not indicate applicable SAC*	Rate of GST applicable (in %)	Whether rate of GST in column '4' is confirm. If not indicate applicable GST*	Description	Unit	Quantity	Unit Chargers	Total Training Charges excluding GST	Total GST as Confirmed by Bidder
1	2		3		4	5	6	7	8= 6x7	
220/33kV New GIS Grid Substation at Diskit & Padum and Bay extensions at existing PGCIL's GIS Substations at Phyang & Drass										
1			18%		Design, operation and maintenance of GIS Substation including procedures for fault attending for the Power Transformer, Circuit Breaker, Isolators, Instruments Transformers, Relay & Protection system and substation automation at manufacturers'/suppliers' works for 20 personnel of Employer for 5 days	MND	100		0	0
2			18%		Further training on FO based Communication equipment at manufacturers'/suppliers' works for 10 personnel of Employer for 5 days.	MND	50		0	0
Total Traning Charges									0	
Total GST as Confirmed by Bidder									0	
Date						Printed Name:				
Place						Designation :				



Annexure G to Amendment 7

TENDER PACKAGE No.: RECTPCL/PIA/JKPDD/SS-03

Design, Manufacturing, Supply, Erection, Testing & Commissioning of New GIS Substations at Diskit & Padum and Bay extensions at existing PGCIL's GIS Substations at Phyang & Drass on Turnkey Basis associated with Strengthening of Transmission System of JKPDD under PMDP Scheme-15.

SUMMARY OF TAXES & DUTIES APPLICABLE ON PLANT & EQUIPMENT

Bidder's Name and Address :		To:	REC Transmission Projects Company Limited (A wholly owned subsidiary of REC, a 'Navratna CPSE' Under the Ministry of Power, Govt of India) ECE House, 3rd Floor, Annexe - II, 28 A, K G MARG, NEW DELHI - 110 001 Website: www.rec.co.in
Name :			
Address :			
All Prices are in Indian Rupees.			
Sl. No.	Item Nos.	Total Price (INR)	
	TOTAL GST ON GOODS		
1	Total GST for Supply of Goods (inter-alia including Type Test Charges) between the Contractor and the Employer (identified in Schedule 1') which are not included in the Ex-works price as per the provision of the Bidding Documents, as applicable.	0.00	
	TOTAL GST ON SERVICES		
2	Total GST on Installation Services (Schedule-3) , Training to be imparted in India (Schedule-4)	0.00	
	GRAND TOTAL [1+2]	0.00	
Date :		Printed Name:	
Place :		Designation :	

Click to Sch. 7



Annexure G to Amendment 7

TENDER PACKAGE No.:-RECTPCL/PIA/JKPDD/SS-03

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Design, Manufacturing, Supply, Erection, Testing & Commissioning of New GIS Substations at Diskit & Padum and Bay extensions at existing PGCIL's GIS Substations at Phyang & Drass on Turnkey Basis associated with Strengthening of Transmission System of JKPDD under PMDP Scheme-15.

(GRAND SUMMARY)

Bidder's Name and Address :		To:	REC Transmission Projects
Name :		Company Limited	(A wholly owned subsidiary of REC, a 'Navratna CPSE' Under the Ministry of Power, Govt of India)
Address :		ECE House, 3rd Floor, Annexe - II, 28 A, K G MARG, NEW DELHI - 110 001 Website: www.rectpcl.in	
Sl. No.	Description	Total Price (INR)	
	TOTAL SCHEDULE NO. 1	0.00	
1	Ex-works price of Plant and Equipment including Type Test Charges		
	TOTAL SCHEDULE NO. 2	0.00	
2	Local Transportation, In-transit Insurance, loading and unloading		
	TOTAL SCHEDULE NO. 3	0.00	
3	Installation Charges		
	TOTAL SCHEDULE NO. 4	0.00	
4	Training Charges		
	TOTAL SCHEDULE NO. 5	0.00	
5	Taxes and Duties		
	TOTAL SCHEDULE NO. 7		
6	Type Test Charges		
	GRAND TOTAL [1+2+3+4+5]	0.00	

Date : --

Printed Name :

Place :

Designation :

Annexure G to Amendment 7

TENDER PACKAGE No.:-RECTPCL/PIA/JKPDD/SS-03		Schedule-6(After Discount)
Design, Manufacturing, Supply, Erection, Testing & Commissioning of New GIS Substations at Diskit & Padum and Bay extensions at existing PGCIL's GIS Substations at Phyang & Drass on Turnkey Basis associated with Strengthening of Transmission System of JKPDD under PMDP Scheme-15.		
(GRAND SUMMARY: AFTER DISCOUNT)		
Bidder's Name and Address :		To: REC Transmission Projects Company Limited
Name :		(A wholly owned subsidiary of REC, a 'Navratna CPSE' Under the Ministry of Power, Govt of India)
Address :		ECE House, 3rd Floor, Annexe - II, 28 A, K G MARG, NEW DELHI - 110 001 Website: www.rectpcl.in
Sl. No.	Description	Total Price (INR)
1	TOTAL SCHEDULE NO. 1	0.00
	Ex-works price of Plant and Equipment including Type Test Charges	
2	TOTAL SCHEDULE NO. 2	0.00
	Local Transportation, In-transit Insurance, loading and unloading	
3	TOTAL SCHEDULE NO. 3	0.00
	Installation Charges	
4	TOTAL SCHEDULE NO. 4	0.00
	Training Charges	
5	TOTAL SCHEDULE NO. 5	0.00
	Taxes and Duties	
6	TOTAL SCHEDULE NO. 7	
	Type Test Charges	
	GRAND TOTAL [1+2+3+4+5]	0.00
Date : --	Printed Name :	
Place :	Designation :	

Annexure G to Amendment 7

TENDER PACKAGE No.: RECTPCL/PIA/JKPPD/SS-03										Schedule-7	
Design, Manufacturing, Supply, Erection, Testing & Commissioning of New GIS Substations at Diskit & Padum and Bay extensions at existing PGCIL's GIS Substations at Phyang & Drass on Turnkey Basis associated with Strengthening of Transmission System of JKPPD under PMDP Scheme-15.											
(SCHEDULE OF RATES AND PRICES)											
Bidder's Name and Address :						To:					
Name :						REC Transmission Projects Company Limited (A wholly owned subsidiary of REC, a 'Navratna CPSE' Under the Ministry of Power, Govt of India)					
Address :						ECE House, 3rd Floor, Animesh - II, 28 A, K G MARG, NEW DELHI - 110 001 Website: www.rectpl.in					
TYPE TESTS CHARGES											
All Prices are in Indian Rupees.											
Sl. No.	(SAC) Service Accounting Code	Whether SAC in column '2' is confirm. If not indicate applicable SAC	Rate of GST Applicable (%)	Whether rate of GST in column '4' is confirm. If not indicate applicable GST*	Item Description	Unit	Qty.	Unit Ex-works price(excluding GST)	Total Ex-works price(excluding GST)	Total GST as confirmed by Bidder	
1	2	3	4	5	6	7	8	9	10= 8*9		
1					Not Applicable						
TOTAL EX-Works PRICE											
Total GST as confirmed by Bidder											



Annexure G to Amendment 7

TENDER PACKAGE No.: -RECTPCL/PIA/JKPDD/SS-03

Letter of Discount

LETTER OF DISCOUNT

To:

REC Transmission Projects Company Limited
 (A wholly owned subsidiary of REC, a 'Navratna CPSE'
 Under the Ministry of Power, Govt of India)
 ECE House, 3rd Floor, Annexe – II,
 28 A, K G MARG, NEW DELHI – 110 001
 Website: www.rectpcl.in

Click to Bid 

Subject:

Design, Manufacturing, Supply, Erection, Testing & Commissioning of New GIS Substations at Diskit & Padum and Bay extensions at existing PGCIL's GIS Substations at Phyang & Drass on Turnkey Basis associated with Strengthening of Transmission System of JKPDD under PMDP Scheme-15.

Dear Sir

With reference to the subject tender, we hereby offer unconditional discount on the prices quoted by us as per details given here below :

1	Discount on lum-sum basis on the Schedules as given below : [The discount shall be proportionately applicable on all the relevent items of the respective Schdules.] In Percent (%)		
	Schedule-1: Ex Works prices	In Percent %	
	Schedule-2 : Freight & Insurance	In Percent %	
	Schedule-3 : Erection Charges	In Percent %	
	Schedule-4 : Training Charges	In Percent %	
	Schedule-7 : Type Test Charges	In Percent %	

Please consider this letter of discount as the integral part of our price bid.

Yours faithfully,

For and on behalf of

Date :

Printed Name :

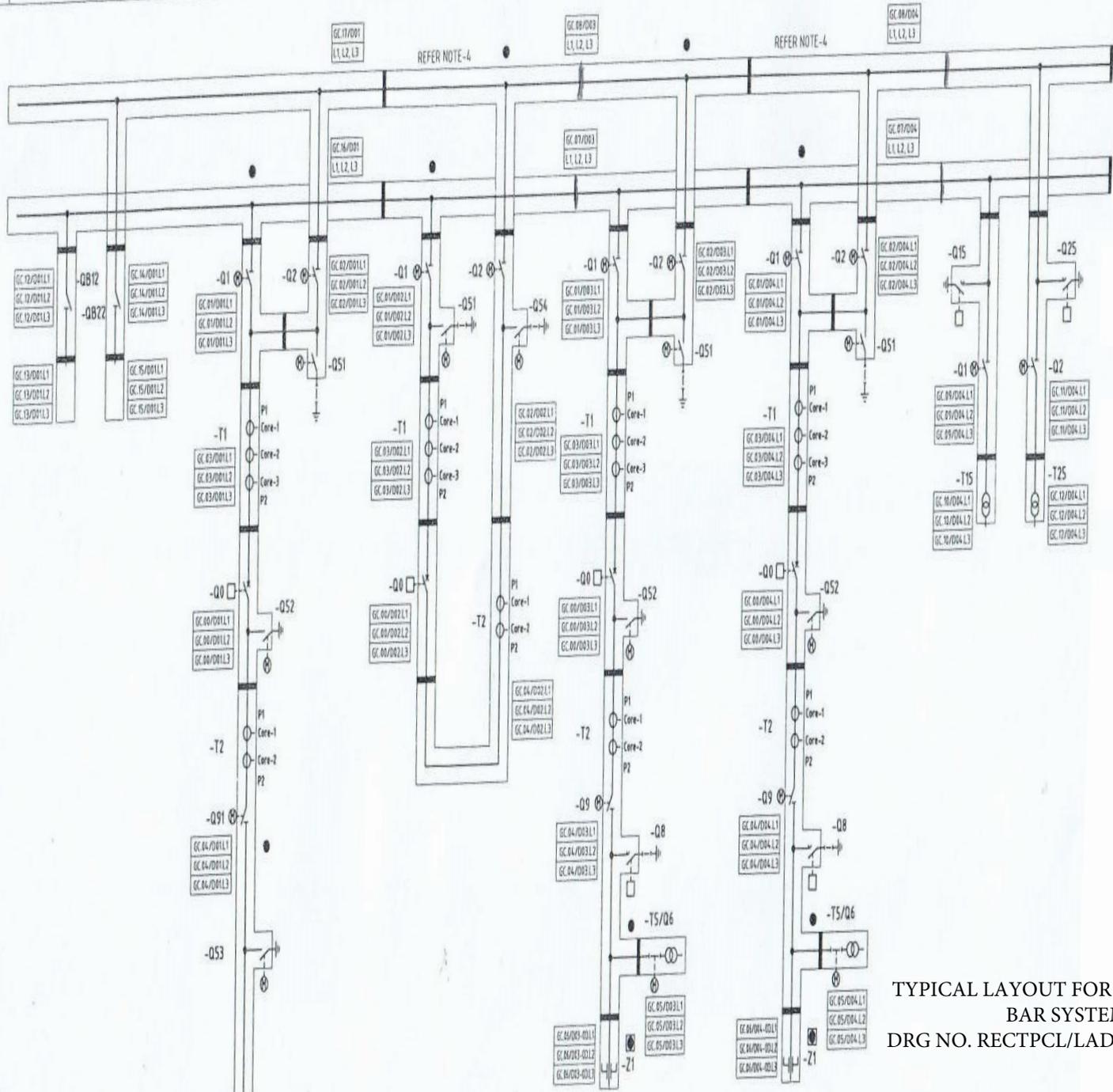
Place :

Designation :

Annexure G to Amendment 7

Bid Form 2nd Envelope															
BID FORM (Second Envelope)															
Bid Proposal Ref. No.															
To Additional Chief Executive Officer, REC Transmission Projects Company Limited (A wholly owned subsidiary of REC, a 'Navratna CPSE' Under the Ministry of Power, Govt of India) ECE House, 3rd Floor, Annexe - II, 28 A, K G MARG, NEW DELHI - 110 001 Website: www.rectpcl.in															
Name of Contract :	Design, Manufacturing, Supply, Erection, Testing & Commissioning of New GIS Substations at Diskit & Padum and Bay extensions at existing PGCIL's GIS Substations at Phyang & Drass on Turnkey Basis associated with Strengthening of Transmission System of JKPDD under PMDP Scheme-15.														
Dear Ladies and/or Gentlemen,															
1.0	In continuation of First Envelope of our bid, we hereby submit the Second Envelope of the Bid, both of which shall be read together and in conjunction with each other, and shall be construed as an integral part of our Bid. Accordingly, we the undersigned, offer to design, manufacture, test, deliver, install and commission (including carrying out Trial Operation, Performance & Guarantee Test as per provision of Technical Specification) under the above named package in full conformity with the said Bidding Documents for the sum of Rs (In below mentioned cell)														
	<table border="1"> <tr> <td style="text-align: center;">0.00</td> <td style="text-align: center;">Fill the Amount in words</td> <td style="background-color: #d4edda;"></td> </tr> </table>	0.00	Fill the Amount in words												
0.00	Fill the Amount in words														
	or such other sums as may be determined in accordance with the terms and conditions of the Bidding Documents. The above amounts are in accordance with the price schedules attached herewith and are made part of this bid.														
2.0	Price Schedules														
2.1	In line with the requirements of the Bidding documents, we enclose herewith the following Price Schedules, duly filled - in as per your proforma:														
	<table border="1"> <tr> <td>Schedule 1</td> <td>Plant and Equipment (Including Mandatory Spare Parts) to be supplied, including Type Test Charges.</td> </tr> <tr> <td>Schedule 2</td> <td>Local Transportation, In-transit Insurance, loading and unloading</td> </tr> <tr> <td>Schedule 3</td> <td>Installation Charges.</td> </tr> <tr> <td>Schedule 4</td> <td>Training charges for training to be imparted.</td> </tr> <tr> <td>Schedule 5</td> <td>GST not included in Schedule 1 & 3</td> </tr> <tr> <td>Schedule 6</td> <td>Grand Summary [Schedule 1 to 5]</td> </tr> <tr> <td>Schedule 7</td> <td>Break-up of Type Test Charges for Type Tests to be conducted</td> </tr> </table>	Schedule 1	Plant and Equipment (Including Mandatory Spare Parts) to be supplied, including Type Test Charges.	Schedule 2	Local Transportation, In-transit Insurance, loading and unloading	Schedule 3	Installation Charges.	Schedule 4	Training charges for training to be imparted.	Schedule 5	GST not included in Schedule 1 & 3	Schedule 6	Grand Summary [Schedule 1 to 5]	Schedule 7	Break-up of Type Test Charges for Type Tests to be conducted
Schedule 1	Plant and Equipment (Including Mandatory Spare Parts) to be supplied, including Type Test Charges.														
Schedule 2	Local Transportation, In-transit Insurance, loading and unloading														
Schedule 3	Installation Charges.														
Schedule 4	Training charges for training to be imparted.														
Schedule 5	GST not included in Schedule 1 & 3														
Schedule 6	Grand Summary [Schedule 1 to 5]														
Schedule 7	Break-up of Type Test Charges for Type Tests to be conducted														

Bay	Annexure H to Amendment 7 FOR FUTURE EXTENSION	=D01 (Trafo Fdr)	=D02 (Bus Coupler)	=D03 (Line Fdr -4)	=D04 (Line Fdr -3)	=D04
Serial No.						BBM + BBE



TYPICAL LAYOUT FOR DOUBLE BUS
BAR SYSTEM
DRG NO. RECTPCL/LADAKH/GSLD/13

SF6 to Air Bushing