NEPAL ELECTRICITY AUTHORITY
PROJECT MANAGEMENT DIRECTORATE
POWER TRANSMISSION AND DISTRIBUTION SYSTEM STRENGTHENING PROJECT
LALITPUR-BHAKTAPUR DISTRIBUTION SYSTEM REINFORCEMENT PROJECT

PMD/PTDSSP/LBDSRP-076/77-01: Design, Supply, Installation and Commissioning of Underground Distribution Network under Lagankhel, Pulchowk, Bhaktapur and Thimi Distribution Center including Reinforcement and Automation.

BIDDER'S CLARIFICATION NO. - I

S.No.	Section	Reference to Tender Clause	Description	Bidder's Queries	Employer's Response
A		**INSTRUCTIONS TO BIDDERS**			
1	1	Section 1 - Instructions to Bidders, Clause 7	The Bidder is advised to visit and examine the site where the plant is to be installed and its surroundings and obtain for itself on its own responsibility all information that may be necessary for preparing the Bid and entering into a contract for the provision of plant and services.	With regard to ongoing COVID PANDEMIC situation and the prevalent curfews in the Kathmandu Valley we are restrained of conducting the site visits, kindly take into considerations our additional queries if any at a later date post the upliftment of PANDEMIC restrictions and our subsequent site visits.	Your requests shall be sent to the Employer as per ITB Sub-Clause 7.1.
2	1	Volume-I / Section 1 - Instructions to Bidders — Clause No. 23	Submission of Bid	Due to COVID Pandemic Situation, Hard Copy Submission is very challenging because of irregular International Flight and Courier services. **We hereby requesting you to kindly allow and accept Electronically Bid Submission.**	Currently, Electronically Bid Submission is not applicable for ADB funded projects.
B.		**EVALUATION & QUALIFICATION CRITERIA**			
3	3	Section 3 - Evaluation and Qualification Criteria - 1.1.2	As per point number 1.1.2 Average Annual Turnover: Minimum average annual turnover calculated as total certified payments received for contracts in progress or completed, within the last 3 years US $ 27.83 Million	We request you to please provide us relaxation and allow up to US $ 19 Million average annual turnover in last 3 years.	No changes will be made in EQC.
4	3	Section 3 - Evaluation and Qualification Criteria - 2.4.1 Contracts of similar size and nature	As per point number **1.1.1 Contracts of Similar Size and Nature** : Participation as a contractor, JV partner, or subcontractor, in at least 1 (one) contract that has been successfully or substantially completed within the last 10 years and that is similar to the proposed contract, where the value of the Bidder's participation exceeds US$ 31.80 million. The similarity of the Bidder's participation shall be based on: 1. Design, supply, installation, commissioning of distribution network involving underground route length of at least 75 km of HT distribution line (10kV – 35kV). Must have executed one (1) contract of with a minimum value of the Partner 's participation of US$ 7.95 Million involving Design, supply, installation, commissioning of distribution network with underground route length of at least 18.75 km of HT distribution line (10kV – 35kV) within last 10 (Ten) years.	We request you to please provide us below relaxation and allow us as follows for participation. A. "Participation as a contractor, JV partner, or subcontractor, in at least 1 (one) contract that has been successfully or substantially completed within the last 10 years and that is similar to the proposed contract, where the value of the Bidder's participation exceeds US$ 22 million " B. Must have executed one (1) contract of with a minimum value of the Partner 's participation of US$ 7.95 Million involving Design, supply, installation, commissioning of distribution network route length of at least 18.75 km of HT distribution line (10kV – 35kV) within last 10 (Ten) years. **OR** B. In Case JV, one Partner of bidder must have executed one (1) contract of with a minimum value of the Partner 's participation of US$ 7.95 Million involving Design, supply, installation, commissioning of distribution network with underground route length of at least 18.75 km of HT distribution line (10kV – 35kV) within last 10 (Ten) years	No changes will be made in EQC.
5	3	Section 3 - Evaluation and Qualification Criteria - 2.4.1 & 2.4.2		Request to change EQC Criterion (2.4.1 and 2.4.2)	No changes will be made in EQC.
6	3	Section 3 - Evaluation and Qualification Criteria - 2.5 Subcontractors	Must submit the type test report carried out from IEC or STL accredited independent testing laboratory	Please confirm whether type test certificates from NABL accredited labs of India is acceptable.	Submit the type test report carried out from IEC or STL accredited independent testing laboratory..
C		**PRICE SCHEDULE**			

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7	4	Vol.-III :- Bid Price Schedule	BOQ Schedule 1 - Part A, B.1	HT cable along with straight jointing kit, outdoor & indoor termination kit	Clarification required for the basis to quantify straight jointing kit and termination kit ?	Bidder to estimate the quantity as per the contract scope. Also refer PSR. The rate of the same shall be included in the respective item of BPS. No additional payment shall be made for tha jointing and temination kit.
8	4	Vol.-III :- Bid Price Schedule	BOQ Schedule 1 - Part A, B.2	HT AB cable along with straight jointing kit, outdoor & indoor termination kit	Clarification required for basis the to quantify straight jointing kit and termination kit ?	Bidder to estimate the quantity as per the contract scope. The rate of the same shall be included in the respective item of BPS. No additional payment shall be made for tha jointing and temination kit.
9	4	Vol.-III :- Bid Price Schedule	BOQ Schedule 1 - Part A, B.3	LT cable along with terminal and necessary accessories	In case of LT cable, how to quantify end termination and straight through joint, if required?	Bidder to estmate the quantity as per the contract scope. Also refer PSR.The rate of the same shall be included in the respective item of BPS. No additional payment shall be made for tha jointing and temination kit.
10	4	Vol.-III :- Bid Price Schedule	BOQ Schedule 1 - Part A, B.4	LT AB cable along with straight jointing kit, outdoor & indoor termination kit and connectors	For LT AB cable, clarification required, how tc quantify straight jointing kit, end termination kit and piercing connectors?	Bidder to estimate the quantity as per the contract scope. The rate of the same shall be included in the respective item of BPS. No additional payment shall be made for tha jointing and temination kit.
11	4	Vol.-III :- Bid Price Schedule & Vol.-II :- Section 6.4, Construction Standard Drawing	BOQ Schedule 1 - Part A, D.1	3-ph Distribution Transformer	In drg. No. CS11-TRN-01, Installation of DTR is marked on 11 m PSC pole, whereas in BOQ, PSC pole is not available. Clarification required for type of pole use for DTR installation.	Mounting of DT shall be either on existing PSC pole or STP or Plinth (Pedestal Mounted).
12	4	Vol.-III :- Bid Price Schedule & Vol.-II :- Section 6.4, Technical Data sheet & Construction Standard Drawing	BOQ Schedule 1 - Part A, M	Service Cable	In BOQ, the sizes of service cable are not available but in tender specification technical datasheet the sizes of service cables are specified. Can we considered the tender specification sizes for service cables? Please confirm.	Refer section 6.3 of TS, Chapter C, Head C5 for size of service cable.
13	4	Vol.-III :- Bid Price Schedule & Vol.-II :- Section 6.4, Construction Standard Drawing	BOQ Schedule 1 - Part B, 1, 2, 3, 4 & 5	Erection Hardwares & Insulators, Danger Plate, Number Plate, Phase plate, cable route marker & cable joint marker	Clarification required for the basis of pre-bid estimation of quantities.	Bidder to estimate the quantity as per the Contract scope.
14	4	Bid Price Schedule : Schedule No.1 : Part 1 : Sr. No. E & Section 6.3 – Specification of Equipment and Construction Material : G. LIGHTNING ARRESTER - Clause 1.3.1		9 kV LA & The nominal discharge current shall not be less than 10kA for station class and 5 KA for distribution class lightning arrester.	We assume under this project 5 kA distribution class lightning arresters to be supplied only. Please confirm.	To be provided as per Tehcnical Specification
15	4	Section 4 - Bidding Schedules.	Item No E - 9 kV LA (3 Nos. in 1 Set) set with all accessories	9 kV LA (3 Nos. in 1 Set) set with all accessories = 100 Sets	The quantity of LA is 100 Set, however, number of Distribution Transformer is 300, Drop Out Fuse Set quantity is 300 Sets, hence LA shall also be 300 set. It is requested to please check the quantity of required LA sets.	Lightning Arrestor mentioned in the BPS Item No. E is for cable termination on the overhead structures. It is not for the new distribution transformer. For the new distribution transformers, in-built LA shall be provided.
16	4	Section 4 - Bidding Schedules.	Schedule No.1, Item No.G.- 6	5– way Distribution feeder pillar with 5 nos. outgoing MCCB 4 pole, 3phase, 415 v, 200 Amps rating each, suitable for outdoor installation in accordance with Technical Specification. (TYPE D3)	The incomer Breaker Details are not provided in BOQ description and Technical Specifications. Please provide Rating & Quantity of Incoming feeder for Type - D-3.	Incomer Breaker not envisaged for type D3
17	4	Section 4 - Bidding Schedules.	Schedule No.1, Item No.G.	LT Feeder Pillar including MS Galvanized Steel Supporting Base Structure	As per Technical Specifications of LT Feeder Pillars Section 6.3 - I - Clause 5.1.15, the Supporting Base Frame Structure shall be MS painted. Please confirm exact requirement whether MS Painted or Galvanised Structure to be supplied.	Base frame of LT Feeder shall be galvanized structure

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18	4	Bid Price Schedule : Schedule No.1 : Part 1 : Sr. No. G		As per the specified line item in BPS, the rated supply voltage for the LT panel is 415V. But as per the LT panel specification clause 1.1, the rated supply voltage is specified as 400V. Please clarify.	Please provide as per Bid Price Schedule (BPS).
19	4	Bid Price Schedule : Schedule No.1 : Part 1 : Sr. No. I-3	Auxiliary Power Supply Equipments (i) SMPS based 48 DC Power Supply System (ii) VRLA type Battery Bank for above DCPS System	Please furnish specification for referred line items.	Technical Specification of the power supply equipment is attched in the Appendix-B of this clarification.
20	4	Bid Price Schedule : Schedule No.1 : Part 1 : Sr. No. I-4	Hardware	For referred line item, request to clarify the requirement of PC/Laptop. If required, kindly confirm the quantity and specification.	Please refer 2.10.1 of Master Processor, Server/Workstation and Craft Terminal of Technical Specification of Volume II of Building Document.
21	4	Bid Price Schedule : Schedule No.1 : Part 1 : Sr. No. I-1 (ii) b	S1.1 SFP	The unit for the referred item is not available in the Price Schedule. Please indicate the same.	The unit of the item is "Nos."
22	4	Bid Price Schedule : Schedule No.1 : Part 1 : Sr. No. I-1 (i)	SDH Equipment (STM-4 MADAM upto 5 MSP protected direction)	Request to kindly clarify the requirement of 11 No. of SDH Equipment (STM-4 compatible)	Quantity of STM-4 Equipment is based on no. of feeder emanating from different substations and no. of directions in STM-4 equipment. However, same shall be finalized during detail engineering.
23	4	Bid Price Schedule : Schedule No.1 : Part 1 : Sr. No. I-2 (i)	1 RU (Rack Unit) SDH Equipment (STM-1 MADM)	Request to kindly clarify the requirement of 240 No. of Rack Unit with STM-1 compatible equipment. We assume that this rack unit shall be located with RMU / GO Switch (with FRTU). Further the STM-1 compatible equipment is required for communication of FRTUs with DCC. Hence Bidder wants clarification from customer whether STM-1 compatible equipment with network switch and fibre optic accessories can be accommodated within the FRTU chamber (within RMU / GO Switch).	1 RU STM-1 Base Equipment Equippped with 4X STM-1 Interface with redundant Crossconnect and Redundant AC Power Supply cards or with Suitable Converter for DC Power Supply along with Common cards power cabling, other hardware & accessories including sub-racks, patch cords **is considered to each RMUs**. This 1 RU Communication Equipment shall be housed in RMU / GO Switch (with FRTU) Panel. The STM-1 compatible equipment is required for communication of FRTUs with Reporting S/S and Further from Reporting S/S to DCC.
24	4	Section IV Price Schedule No.1 Sl. No. M Service Cables (Armored, XLPE and Multi-Stranded) along with Connectors and Flexible PVC Pipe as per Technical Specification	Service Cables along with all accessories required for connection of meter to service pillar 1.1 (single phase 16 A) 1.2 (single phase 30 A) 1.3 (single phase 60 A) 1.4 (3 phase phase upto 25 kVA) 1.5 (3 phase phase 25 to 50 kVA)	Quantity for the referred Items is Consumers - In view of length of the Service cable been variable for every consumer, you are requested to incorporate the Quantity of Service Cable in Mtrs.	No changes in BOQ will be made on this regard. Bidders to make their own assessment for the same.
25	4	Section 4 - Bidding Schedules. / Part - B .1 - Erection Hardware and insulators.	Item No 1.4 - Earthing.	In Bidding Schedules, Quantity of Earthing is given in LS. Kindly provide the principal/Type of Earthing for RMU, DT, LT Panel & Cable.	To be quantified by the bidder as per the relevant standard and design shall be finalized during detail engineering.
26	4	Schedule No. 4: Installation and Other Services PART A	Part A Item Sl. No. 1 - 11m Steel Tubular Pole including hardware and stay sets as required Item Sl. No. 2 - 9m Steel Tubular Pole including hardware and stay sets as required	As per the referred item there is requirement of stay set with the Steel Tubular poles kindly provide the specification and drawings of the stay set for steel tubular poles.	Necessary drawings of stay sets are provided in Chapter 3.1 of the bid document.
27	4	Schedule No. 4: Installation and Other Services PART A	Part A Item Sl. No. 1 - 11m Steel Tubular Pole including hardware and stay sets as required Item Sl. No. 2 - 9m Steel Tubular Pole including hardware and stay sets as required	Kindly confirm if any foundation required for Steel Tubular poles or shall it be as per given construction drawing CSG - 05. In case of concrete foundation kindly provide the relevant drawing & specifications.	There will be the requirement to do the concreting of foundation and details of the same shall be finalized during detail engineering.
28	4	Section IV Price Schedule No.1 & 4A Sl. No. K	Item K in Schedule No.1 & 4	It is observed that quantity for M.S galvanised items & G.I Nuts, bolts mentioned in Schedule No.1, item K as 17MT & 2 MT respectively whereas the same item listed in Schedule No.4 with a quantity of 9MT including Nuts & Bolts. Kindly clarify the quantity to be considered.	Transfomer mouting set, GO switches mouting sets installation etc. are included in the installation price of respective items. Hence, there is difference between supply and installation quantities of galvanized items.

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29	4	Section IV Price Schedule No.4A Sl. No. G	Item G in Schedule No.4	As per item G, LT feeder pillar to be provided and their standard types are listed as A,B,C,D1,D2,D3 & E. Kindly provide the standard drawings for the same if any	Bidder shall design during detail engineering as per the technical specification and site requirement
30	4	Section IV Price Schedule No.4A Sl. No. M Service Cables (Armored, XLPE and Multi-Stranded) along with Connectors and Flexible PVC Pipe as per Technical Specification	Service Cables along with all accessories required for connection of meter to service pillar 1.1 (single phase 16 A) 1.2 (single phase 30 A) 1.3 (single phase 60 A) 1.4 (3 phase phase upto 25 kVA) 1.5 (3 phase phase 25 to 50 kVA)	We do not envisage any scope of meter connection / termination at consumer end, we understand the scope limits only upto laying of Service Cable upto Meter Box. Kindly Confirm.	Service cable laying, connection with the service pillar and to the energy meter terminals is in the scope of the Contractor. However, NEA authorized personnel shall extend necessary assitance to the Contractor for opening and re-fixing the seals of energy meters.
	4	Section IV Price Schedule No.4A, Sl. No. M, Service Cables (Armored, XLPE and Multi-Stranded) along with Connectors and Flexible PVC Pipe as per Technical Specification	Service Cables along with all accessories required for connection of meter to service pillar 1.1 (single phase 16 A) 1.2 (single phase 30 A) 1.3 (single phase 60 A) 1.4 (3 phase phase upto 25 kVA) 1.5 (3 phase phase 25 to 50 kVA)	Kindly clarify the scope for installation of Service cables, Method of laying & Meter connection. We do not envisage any scope of meter connection / termination at consumer end, as the meter / meter box likely will be sealed, we understand the scope limits only upto laying of Service Cable upto Meter Box. Kindly Confirm	Service cable laying, connection with the service pillar and to the energy meter terminals is in the scope of the Contractor. However, NEA authorized personnel shall extend necessary assitance to the Contractor for opening and re-fixing the seals of energy meters. However, undergrounding of service cable is to be done only on Publice Property (Road, Pedestrian Walkway etc.). Inside the private property of the consumers, the service cables shall be overhead up to the energy meters.
31	4	Bid Price Schedule	Schedule No.4, Part-C, item 7	As per Schedule No.4, Part-C, item 7, it is observed that the black topping shall be as per technical specification of road department and/or Lalitpur-Bhaktapur Municipality. Kindly provide technical specification or standard drawing for the same.	The norms of road department can be obtained from the following link: https://dor.gov.np/home/publication/standard-specification-of-roads-and-bridges/standard-specifications-for-road-and-bridge-works-2-73 Other details (as applicable) will be provided during detail engineering.
32	4	Bid Price Schedule	Schedule No.4, Part-C, item 9	As per Schedule No.4, Part-C, item 9, it is observed that chain link fencing to be provided as per technical specification and approved drawing. Kindly provide technical specification or standard drawing for the same.	Technical Specification of chain link fencing and fencing gate is attached in the Appendix-F of this clarification. The drawing shall be finalized during detail engineering.
33	4	Bid Price Schedule	Schedule No.4, Part-C, item 10	As per Schedule No.4, Part-C, item 10, it is observed that fencing gate to be provided. Technical specification for the fencing gate is not furnished in the bidding documents. Request you to provide the same. Also share the standard drawing of NEA available if any.	
34	4	Bid Price Schedule	Schedule No.4, Part-C, item 13	As per Schedule No.4, Part-C, item 13, it is observed that geo-technical/soil investigation as per technical specification listed with 150 Nos. Kindly confirm whether those quantities are covered up for the complete project locations.	BPS Schedule 4, item 13 quantity is for the complete project locations.
35	4	Section 3 - Bidding Schedules. / Schedule No.4 - Item No.14	Construction of Cubicle/Room for providing Distribution Transformer along with RMU and LT ACB including finishing but excluding excavation, RCC, Reinforcement, PCC etc as above.	Please provide the details/drawing & size so that realistic price may be estimated.	Based on the sizes of RMU, DT, LTDB, free space required for movement and maintenace of the equipment, assessment for the sizes of the cubicle/room can be made. Moreover, cable trench, ventilation system with exaust fan of appropriate capacity, windows and doors shall be provided in the cubile/room.
36	4	Bid Price Schedule	Schedule No.4, Part-C, item 14	As per Schedule No.4, Part-C, item 14, it is observed that construction of cubicle/room for providing transformer along with RMU and LT. Kindly provide the standard drawing or minimum requirement with specification for the same.	Based on the sizes of RMU, DT, LTDB, free space required for movement and maintenace of the equipment, assessment for the sizes of the cubicle/room can be made. Moreover, cable trench, ventilation system with exaust fan of appropriate capacity, windows and doors shall be provided in the cubile/room.

S.No.	Section	Reference to Tender Clause	Description	Bidder's Queries	Employer's Response
37	4	Section IV Price Schedule No.4A Part C Sl No: 14	Construction of Cubicle/Room for providing Distribution Transformer along with RMU and LT ACB including finishing but excluding excavation, RCC, Reinforcement, PCC etc as above.	Please provide the details/drawing & size so that realistic price may be estimated.	Based on the sizes of RMU, DT, LTDB, free space required for movement and maintenace of the equipment, assessment for the sizes of the cubicle/room can be made. Moreover, cable trench, ventilation system with exaust fan of appropriate capacity, windows and doors shall be provided in the cubile/room.
38	4	Section IV Price Schedule No.4A Part C Sl No: 15	Schedule No.4, Part-C, item 15	As per Schedule No.4, Part-C, item 15, it is observed that construction of double decker cubicle/room for providing transformer along with RMU and LT feeder pillar. Kindly provide the standard drawing or minimum requirement with specification for the same.	Based on the sizes of RMU, DT, LTDB, free space required for movement and maintenace of the equipment, assessment for the sizes of the cubicle/room can be made. Moreover, cable trench, ventilation system with exaust fan of appropriate capacity, windows and doors shall be provided in the cubile/room.
39	4	Section 3 - Bidding Schedules. / Schedule No.4 - Item No.15	Construction of double-decker Cubicle/Room for providing Distribution Transformer along with RMU and LT feeder pillar including finishing but excluding excavation, RCC, Reinforcement, PCC etc as above	Please provide the details/drawing & size so that realistic price may be estimated.	Based on the sizes of RMU, DT, LTDB, free space required for movement and maintenace of the equipment, assessment for the sizes of the cubicle/room can be made. Moreover, cable trench, ventilation system with exaust fan of appropriate capacity, windows and doors shall be provided in the cubile/room.
40	4	Section IV Price Schedule No.4A Part C Sl No: 15	Construction of double-decker Cubicle/Room for providing Distribution Transformer along with RMU and LT feeder pillar including finishing but excluding excavation, RCC, Reinforcement, PCC etc as above	Please provide the details/drawing & size so that realistic price may be estimated.	Based on the sizes of RMU, DT, LTDB, free space required for movement and maintenace of the equipment, assessment for the sizes of the cubicle/room can be made. Moreover, cable trench, ventilation system with exaust fan of appropriate capacity, windows and doors shall be provided in the cubile/room.
41		Section IV Price Schedule No.4A Part C Sl No: 21	Schedule No.4, Part-C, item 21	It is observed that first class local chimney made flat brick soling with sand in foundation and in trench wherever necessary to be laid. Kindly provide the minimum thickness to be provided.	One layer of flat first class brick soling with filler material (sand) shall be provided.
D	6	**PROJECT SPECIFIC REQUIREMENT**			
42	6	Project Specific Requirement, 1.1.3 Scope Activities, Note a)	Contractor may have to relocate the existing distribution transformers to the new transformer structures	Kindly quantify the referred scope as part of the bid price schedule	Quanitifaction shall be done on the basis of survey and network to be designed by the successfil bidder at the time of detail design engineering
43	6	Project Specific Requirement - Cl. 5.3	The fault level of all equipment to be supplied under present scope shall be as indicated below Voltage Level - 11KV Fault Level - 25kA for 3 Sec	As per specification of Individual Equipment i.e for RMU's, Section 6.3 – Specification of Equipment and Construction Material Sl. No. H - "Rated short time current shall be 20kA for 3 second" You are requested to confirm the fault level for RMU's. We understand it shall be as per individual specification of RMU's only i.e. 20KA for 3 Sec. Kindly confirm.	Bidder understanding is confirmed.
44	6	Chapter 6.1 – Project Specific Requirement (PSR) : ANNEXURE- IV - Clause 1.3	1.3. SIM Card Section	We assume that SIM card shall be supplied by NEA. If it is to be supplied by the Bidder, clarify the type of SIM, subscription charges for no. of years.	SIM Card will be supplied by NEA.
45	6	Chapter 6.1 – Project Specific Requirement (PSR) : ANNEXURE- IV - Clause 1.3	1.3. SIM Card Section	We are not envisaging any routers or signal boosters in our scope of supply as the same is not covered in Price Schedule.	Please refer 1.3 of SIM Card Section of Technical Specification of Volume II of Building Document

S.No.	Section	Reference to Tender Clause		Description	Bidder's Queries	Employer's Response
46	6	Chapter 6.1 – Project Specific Requirement (PSR) : ANNEXURE- IV - Clause 4.3		Multifunction meter shall be compatible for integration with the smart meter server and/or DCC with the help of GPRS or Radio modem or with the help of FRTU and SDH Equipment over the optical fibre channel. Interface equipment (as applicable) and necessary software shall be supplied by the contractor at no extra cost.	Confirm the requirement of interface equipment i.e. whether GPRS or Radio Modem is required or via FRTU and SDH Equipment over Fibre channel is required. Further to this we understand that any Software required for Integration of Data and Control Signal from the field MFM, IEDs FRTU with the existing SCADA system is not part of our scope. Bidder's scope is limited to complete Hardware Integration only. However, we will provide necessary information of our implemented system to the customer appointed SCADA/Distribution Centre system vendor for complete Signal integration.	Technical specification shall be complied.
47	6	Section 6.1 – Project Specific Requirement 2.9 Restoration of Road:		The cost associated with restoration work shall be loaded in the respective bill of quantity (BOQ) items of the bid price schedule.	We understand the BOQ Item against the road restoration works, is Item 7 under Schedule No.4, Part-C, i.e. Black topping as per Technical Specification of Road Department and/or Lalitpur-Bhaktapur Municipality. As per the Project Specific Requirement and the site conditions the top layer to be restored can also be hexagonal blocks, bricks, stones, kerb-stones etc. We presume all sort of retoration shall be measured and paid against this Item Sl. No.7 or else kindly incorporate additional restoration item for such roads.	Shall be executed as per Sub-Clause 2.9.1 and 2.9.2 of PSR
48	6	Section 6.1 – Project Specific Requirement 2.9 Restoration of Road:		The cost associated with restoration work shall be loaded in the respective bill of quantity (BOQ) items of the bid price schedule.	As per our understanding we expect concrete roads also in certain areas, We understand reinstatement of concrete roads shall be payable against respective items of Civil Works Sl. No. 1 to 6	Shall be executed as per Sub-Clause 2.9.1 and 2.9.2 of PSR
49	6	Section 6.1, Project Specific requirement	Clause - 5.3	The fault level of all equipment to be supplied under present scope shall be as indicated below: 25kA for 3 Sec.	Please note that Fault Level of equipment mentioned as 25 kA for 3 Sec shall not be applicable on the cables. E.g. the biggest conductor size of 11 kV cable is 400 Sq.mm and Short circuit of conductor for 400 sq.mm shall be 21.70 kA for 3 Sec. Hence, this shall not be applicable on the required cables. Therefore it is requested to please specify the desired fault level for cables seperately.	The Short circuit of cable shall be as per the calculation of adiabatic short circuit current carying capacity as per Clause no 3 of IEC 60949.
50	6	Section 6.1, Project Specific requirement	Clause - 11.H - Specific Requirement	The Frequency range for the earthquake spectra shall be as per IEC-62271-300 for Circuit Breaker.	Please clarify in detail the requirements as per this clause.	Refer IEC-62271-300 for Circuit Breaker
51	6	Section 6.1, Project Specific requirement	Clause - 2.6.3 - Laying of Service Cable	Supply of service cable shall include supply of other accessories required for laying of cable (Flexible PVC pipe of suitable size and strength, connectors, junction box as required).	Supply of Service Cable Termination Gland & Lugs is part of Distribution Service Pillars. Please confirm.	Lugs, Glands etc required for service cable termination on Service pillar shall be part of service cable supply. However, necessary punching in gland plate for glands shall be provided by the supplier of the service panel.
52	6	Section 6.1, Project Specific requirement	Clause - 2.11.2 - Integration with New Distribution Control Centre	The RF Communication is planned to be used for Smart Metering Communication. RMU and DTs under this project is supposed to use the Optical Fiber Communication. Some of the equipment related with the Smart meter are planned to be installed at DTs and RMU which may require optical Fiber Communication to transmit/receive the data to Control center. The Communication equipment under this project shall also be compatible for RF Communication or necessary conversion provision (RF) signal to Optical Fiber Communication) shall be provided.	In technical Specifications of RMU/FRTU the SCADA connectivity is clearly mentioned through OFC Communication. For DT's there are no details for SCADA connectivity either through OFC or RF. It is requested that in case communication equipments are to be provided compatible to both OFC & RF then please provide detailed requirement through RF communication along with all associated items. Details of communication through OFC is clear however for communication through RF there are no details available in specifications. Please clarify.	Shall be finalized during detail engineering.

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53	6	Volume-II/ Section 6.1 – Project Specific Requirement	Page No. 23-25 Clause No. 15	Service Level Agreement (SLA)	As per Volume – I /General Condition of Contract Page No. 147, Clause No. 27.2 **Defect Liability Period** is 540 days from the date of Completion of the Facilities (or any part thereof) or 1 year from the date of Operational Acceptance of the Facilities and Volume – I /Special Condition of Contract Page No. 188, Clause No. 27 **Defect Liability Period -** The critical components covered under the extended defect liability are XLPE cables, Distribution Transformers, Communication equipment, ABC Cables and RMU units and the period shall be 730 days. **We are requesting you to kindly delete the clause SLA.**	SLA will be applicable along with Defect Liability Period (DLP) and Extended DLP.
54		Vol.-II, PSR, Appendix-III			Please provide survey map (tentative area of working-UGC)	The tentative map of the UG cable route is attached in the appendix-E
E	6	**TUBULAR STEEL POLE**				
55		Section 6.3 – Specification of Equipment and Construction Material B. TUBULAR STEEL POLE		10. PROTECTION AGAINST CORROSION 10.1 Unless otherwise specified in PSR or Price Schedule, the poles shall be coated with black bituminous, paint conforming to IS: 158 – 1968 throughout internally and externally upto the level which goes inside the earth. The remaining portion of the exterior shall be painted with one coat of red oxide primer as specified in IS: 2074-1979 and thereafter minimum two coats with Aluminium paint at site, conforming to relevant IS specifications.	As per Price Schedule 1, Part 1 Item Sl. No. A, Steel Tubular Poles are Galvanized however as per specifications painting is with Black Bitumen and Aluminum Paint kindly reconfirm the requirement and in case of galvanization kindly incorporate the specification for that.	Steel Tubular Pole shall be full galvanized and the galvanization standard is IS 2629 and IS 4759 or equivalent international standard.
F	6	**CABLES (XLPE/ABC)**				
56	6	Section 6.3 – Specification of Equipment and Construction Material - C1: 11 kV XLPE POWER CABLE		1.16 The armour of cables shall consist of aluminum wires or strips.	Kindly confirm Armour Material and thickness whether it shall be wires or strips.	Galvanised steel flat wire of appropriate thickness shall be used for armour in line with IEC.
57	6	Vol. II : Section 6.3 – Specification of Equipment and Construction Material : C1. 11 kV XLPE POWER CABLE : Clause No. 1.15			Please confirm the short circuit current rating and time required for Metallic screen	Provide mettalic screen required for earthfault current carrying capacity of 2.14kA for 1 sec.
58	6	Vol. II : Section 6.3 – Specification of Equipment and Construction Material : C1. 11 kV XLPE POWER CABLE :			Please confirm the requirement of Inner Sheath, since the same is not mentioned in the referred specification. However for armoured cable it is recommended to have inner sheath. In case Inner sheath to be provided, request you to confirm the material, type of inner sheath. Further the thickness of inner sheath shall be as per relevant IEC.	Inner sheath to be provided as per IEC 60502
59	6	Vol. II : Section 6.3 – Specification of Equipment and Construction Material : C1. 11 kV XLPE POWER CABLE : Cl.No. 1.10 & Vol. II : Section 6.4 – Technical Data Sheets & Construction Standard Drawings - 11 kV XLPE Power Cable : Sr.No. 6		Conductor shall be screened with an extruded layer of semi-conducting material of 0.5mm thickness for the cables. & Thickness of Conductor Screen 0.6 mm	This two referred clause are contradicting, please confirm what shall be the thickness of conductor screen.	Thickness of conductor screen shall be 0.6mm.

S.No.	Section	Reference to Tender Clause		Description	Bidder's Queries	Employer's Response
60	6	Section 6.3 - C 1 - 11 kV XLPE POWER CABLE	Clause - 1.15 - Metallic Screen	The metallic screen shall be of plain copper wires, helically applied over the radial moisture barrier. A binder tape of annealed plain copper shall be applied in the form of an open helix over the copper wire screen. Wire screen shall be designed to meet the requirement of the system short circuit rating as specified in the bidding documents.	Please note that value of required Short Circuit is not mentioned in Bidding Documents. It is requested to please furnish the required value of Short Circuit for Metallic Screen.	Please provide mettalic screen required for earthfault current carrying capacity of 2.14kA for 1 sec.
61	6	Section 6.3 - C 1 - 11 kV XLPE POWER CABLE Section - 6.4 Technical Data Sheets	Clause - 1.16 - Outer Sheath Data Sheet - Clause - 41	The outer sheath shall consist of extruded black colored HDPE. Fire resistance treated - Yes	Please confirm whether the cables are PVC Outer sheathed with FR properties or HDPE Outer sheathed. In case, Outer sheath is provided with HDPE compound as per Specification then FR properties shall not be applicable. Please clarify.	It shall be as per Technical Specification of 11kV XLPE Cable.
62	6	Section 6.3 – Specification of Equipment and Construction Material - C2: LT XLPE POWER CABLE		Cl 9 The armour of cables shall consist of either galvanized round steel wires or galvanized steel strips.	Kindly confirm Armour Material and thickness whether it shall be steel wires or strips.	Galvanised steel flat wire/steel round wire shall be used for armour in line with IEC. Al. flat wire shall be used for armour of single core LT cable
63	6	Section 6.3 – Specification of Equipment and Construction Material : C2: LT XLPE POWER CABLE : Clause No. 2		ASTM G -53/ DIN 56687 - UV Testing for XLPE insulation	UV Testing shall only be applicable for Outer sheath (which only gets exposed, to direct Sun light throughout cables life span) as per ASTM G 154. Hence testing shall not be applicable for insulation. Please confirm	Confirmed, UV testing not required for XLPE insulation.
64	6	Section 6.3 - C2 - LT XLPE POWER CABLES	Clause - 2 - Standards	ASTM G- 53/DIN 56687 - UV testing of XLPE insulation.	UV Testing shall only be applicable for Outer sheath (which gets exposed to direct Sun light) as per ASTM G 154. Thereby, testing shall not be applicable for insulation. Please confirm.	Confirmed, UV testing not required for XLPE insulation.
65	6	Section 6.3 - C2 - LT XLPE POWER CABLES	Clause - 6 - Core identification (for multiple core cables).	Individual core of multi-core cables shall be color coded and/or numbered for proper identification. All cores insulation shall be black colored. For cores identifications, a XLPE colored line (1mm width X 0.5 mm height) shall be extruded over the insulation.	Core identification for multi core cables shall be provided as per applicable Standars. Please confirm.	Core identification shall be provided and the same shall be decided during detail engineering.
66	6	Section - 6.4 Technical Data Sheets	Clause - 17	Operating Capacitance = 0.2 µF/km	The value of Capacitance cannot be same for different sizes of cable. We shall provide the data in Technical Data Sheets along with the bid. Please accept.	Bidder to provide the data for different cable size in the relevant data sheet
67	6	Section - 6.4 Technical Data Sheets	General	Inner Sheath	Inner sheath detail is not available in the technical specification. Inner sheath is necessary as the required cables are armoured. We will provide PVC inner sheath as per IEC 60502 P-2. Please confirm.	Inner sheath to be provided as per IEC 60502.
68	6	Vol. II : Section 6.3 – Specification of Equipment and Construction Material : C3: LAYING AND INSTALLATION of HT and LT Cable : Clause No. 29.1		viii) A.C. long duration breakdown voltage ix) Impulse break-down voltage xvi) Over-sheath - oil-proof xvi) Over-sheath - non-inflammability xvi) Over-sheath - thermal deformation xvi) Over-sheath - hardness	viii) A.C. long duration breakdown voltage - Not Applicable as per IEC 60502-2 ix) Impulse break-down voltage - Not Applicable as per IEC 60502-2 xvi) Over-sheath - oil-proof - Not Applicable as per IEC 60502-2 xvi) Over-sheath - non-inflammability - Not Applicable as per IEC 60502-2 xvi) Over-sheath - thermal deformation - This test is not mentioned in IEC 60502-2, please clarify xvi) Over-sheath - hardness - As per IEC 60502-2, Determination of hardness is applicable for HEPR insulation not XLPE insulation and PVC sheaths. Please confirm.	Relevant test as per IEC 60502-2 shall be required

S.No.	Section	Reference to Tender Clause		Description	Bidder's Queries	Employer's Response
69	6	Volume-II / Section 6.3 – Specification of Equipment and Construction Material	Page 128-155 TS Page 368-377 Chapter 3.1 Technical Data Sheet	XLPE Cables	1. Please provide copper wire screen area requirement (In case of HT cables).	Screen shall be designed as per the short circuit current rating (2.14kA for 1 sec.) in line with the Technical Specification.
					2. Please confirm if conductor is required water tight type or not (In case of HT cable).	Conductor of the HT cable shall be constructed as per IEC.
					3. In case of HT cables, colored strips will be provided above copper tape for core identification, Please confirm.	Core identification shall be provided and the same shall be decided during detail engineering.
					4. In case of LT cables, core identification will be done by coloured core i.e. for ex Red, Yellow, Blue & Black in case of 4 core, Please confirm.	Core identification shall be provided and the same shall be decided during detail engineering.
					5. In case of LT cables, core identification will be done by coloured core i.e. for ex Red, Yellow, Blue & Black in case of 4 core, Please confirm.	Core identification shall be provided and the same shall be decided during detail engineering.
					6. Sr No. 25 of GTP format mentions the requirement of "Copper tape along with copper wire" and Thickness of Screen is mentioned as 0.1mm. We understand that 0.1mm is thickness of Copper Tape which is applied over Copper Screen as Binder. Kindly clarify the area of copper wire screen which is required for mentioned cables.	Screen shall be designed as per the short circuit current rating (2.14kA for 1 sec.) in line with the Technical Specification.
					7. Sr No. 41 of GTP format mentions the requirement of Fire resistance treated as Yes. Kindly note that HDPE Outersheath is required as per TS & GTP. This clause shall not be applicable for mentioned cables as HDPE is not fire resistant.	It shall be as per Technical Specification of 11kV XLPE Cable.
					8. Please specify which one to follow specifications or customer's Technical Data Sheets (in case of all cables).	Both technical specification and technical data sheet to be followed. However, technical specification shall prevail
70	6	Section 6.3 – Specification of Equipment and Construction Material : D1. HV AERIAL BUNDLED CONDUCTOR (ABC) - Clause 2.6		The metallic part shall be applied over the individual cores and shall consist of copper tape, in the thickness about 0.1 mm. A table binding tape shall be applied over the copper tape.	Please confirm the short circuit current rating and time required for Metallic screen	Provide mettalic screen required for earthfault current carrying capacity of 2.14kA for 1 sec.
71	6	Section 6.3 – Specification of Equipment and Construction Material : D1. HV AERIAL BUNDLED CONDUCTOR (ABC) - Clause 2.7		Every 2 meters of outer covering of the cable shall also be embossed with length of the cable.	Please confirm whether Printing instead of embossing is acceptable or not.	It will be confirmed during detail design engineering.
72	6	Section 6.3 - D1. HV AERIAL BUNDLED CONDUCTOR (ABC)	Clause - 3 - Phase Identification	The identification of the conductors shall be provided by means of ribbing on the external surface of the insulation. R, Y and B phase conductors shall have one, two, and three ribs respectively. Space between the ribs in R, Y and B phases shall be 5 mm. Ribs shall be in rounded form.	Ridges shall be provided instead of ribs on cores as per IEC and NFC. Ridges on the external surface of the insulation shall not be in Circular formation, instead it shall be in triangular form on core/s as per NFC. Please confirm.	Core identifcation can be done using ribbing or by providing ridges on cores.
73	6	Section 6.3 - D2. LV AERIAL BUNDLED CONDUCTOR (ABC)	Clause - 3 - Phase Identification	The identification of the conductors shall be provided by means of ribbing on the external surface of the insulation. R, Y and B phase conductors shall have one, two, and three ribs respectively. Space between the ribs in R, Y and B phases shall be 5 mm. Ribs shall be in rounded form. The neutral messenger conductor shall be plain without any ribs.	Ridges shall be provided instead of ribs on cores as per IEC and NFC. Ridges on the external surface of the insulation shall not be in Circular formation, instead it shall be in triangular form on core/s as per NFC. Please confirm.	Core identifcation can be done using ribbing or by providing ridges on cores.
74		Section 6.3 – Specification of Equipment and Construction Material : D2. LV AERIAL BUNDLED CONDUCTOR (ABC)		This Specification covers the design, manufacture, factory test and supply of 0.6/1 kV cross-linked polyethylene (XLPE) insulated with insulated neutral messenger conductor supporting aerial bundled conductors (ABC) for use in the construction of 400/230V, 3-phase, 1-neutral, 1-street lighting, distribution systems.	Thickness shall be as per relevant IEC or equivalent standard. Please confirm.	Confirmed

S.No.	Section	Reference to Tender Clause		Description	Bidder's Queries	Employer's Response
G	6	GANG OPERATED LOAD BREAK SWITCH				
75	6	Section 6.3 – Specification of Equipment and Construction Material : F. GANG OPERATED LOAD BREAK SWITCH		Auxiliary Power Supply	Please confirm whether 230 Volts AC auxiliary power supply shall be provided by NEA or an Auxiliary Transformer of suitable VA rating to be provided by the bidder.	AC power shall be extended by the contractor by tapping existing LT line as per clause no 4 of Chapter F. GANG OPERATED LOAD BREAK SWITCH
76		Section 6.3 - F - Gang Operated Load Break Switch	Clause - 4. G.O. Switch Operation & Operating Mechanism	The GO Switch shall be suitable for remote operation through SCADA via Optical Fiber or RF communication or GSM.	Please confirm the specific mode of communication for remote operation of GO Switch whether through Optical Fiber or RF communication or GSM.	Communication mode for remote operation of GO Switch shall be primarily Optical Fiber, if optical fiber is not availabe GSM communication mode shall be applied.
H	6	LIGHTNING ARRESTER				
77		Section 6.3 – Specification of Equipment and Construction Material : G. LIGHTNING ARRESTER - Clause 1.3.2		The active part of the lightning arresters shall be accommodated in porcelain insulators	Kindly confirm whether Polymer type Lighting Arrester is also acceptable. Please confirm.	It shall be of porcelain type as per TS
I	6	RING MAIN UNIT				
78	6	Section 6.3 – Specification of Equipment and Construction Material : H. RING MAIN UNIT (RMU) - Clause 7.5		The mechanism has fuse- tripping device.	Since RMU consist of LBS & VCB only, hence trip fuse device is not applicable. Please confirm.	Bidder understanding is in order
79	6	Section 6.3 – Specification of Equipment and Construction Material : H. RING MAIN UNIT (RMU) - Clause 6.15.1 & 6.15.2		the Din Rail should have space to mount the MFM's provided by SIA & Multifunction meter (MFM) to be provided along with RMU which should have the provision of mapping all the signals with RS485	MFM shall be provided by NEA. Space of 96 x 96 sq. mm shall be provided in RMU to mount the MFM.	MFM to be provided alongwith RMU as per TS clause 6.15.2.
80	6	Section 6.3 – Specification of Equipment and Construction Material : H. RING MAIN UNIT (RMU) - Clause 6.15.1		The CT/PT should provide metering grade core for connecting MFM (Multi function Meter) provided with FRTU.	Metering CTs are provided in each Breaker Module. Metering CTs are not provided in LBS. Metering Bus PT shall be provided. Metering CTs are Low Burden CTs having VA burden of 2.5VA and shall be mounted inside cable chamber of breaker module. Please confirm.	CT shall be provided with each breaker module. Moreover, calculation for the burden of the CT shall be provided during detail engineering.
81	6	Section 6.3 - H - Ring Main Unit (RMU) Section 3 - Bidding Schedules.	Clause - 6.1 Bidding Schedule Item No - F.5 - One Way RMU	Each RMU shall include its own power supply unit (including auxiliary power transformer, maintenance free batteries, and battery charger), which shall provide a stable power source for the RMU. The RMU will also supply 24VDC 500VA for FRTU and 48V DC Power for Communication Equipment.	Kindly note that as per specification of RMU, Power supply through Aux. PT shall be provided but One Way RMU can not have this feature. Therefore it is requested to please confirm the requirement of power supply unit for One Way RMU.	Bidder understanding is in order.
82		Section 6.3 - H - Ring Main Unit (RMU)	Clause - 6.15.1 - SCADA Connectivity	Provision shall be made in all the RMUs with necessary take off terminal units for automations and connectivity with FRTU. All RMUs shall be motorized type and compatible for SCADA operation. All the I/O signals need to be brought to the Terminal Strip on a Din Rail, also the Din Rail should have space to mount the MFM's provided by SIA.	We presume that SIA/NEA will provide the required MFM as free issue item. Please confirm.	MFM shall be provided by bidder along with RMU as per TS clause 6.15.2
J	6	LT FEEDER PILLAR				
83	6	Section 6.3 – Specification of Equipment and Construction Material : I: LT Panel - Clause 5.3.5		Current density should not be more than 1A/mm2 for Service pillar.	We assume that the current density should not be more than 1A/Sq.mm. for Distribution Feeder Pillars also. Please confirm.	Max allowed current density is specified for service pillar. Further it has to be designed as per the requirement specified in the bid document including the service condition.
84		Section 6.3 - I - LT Panel	Clause - 5.2.24 (Table)	Metering Required(ACB): Provision for following measurement functions shall be made on the ACB i) 3 phase current ii) 3 phase voltage iii) kWh iv) kVAh v) Power Factor vi) Max. demand (kVA) vii) Fault History	Please confirm whether the Metering feature is required on Microprocessor release or separately on MFM.	Please Refer Annexure-IV: Metering Arrangement of Chapter 6.1 Project Specific Requirement (PSR).

S.No.	Section	Reference to Tender Clause		Description	Bidder's Queries	Employer's Response
K	6	**DISTRIBUTION TRANSFORMER**				
85	6	Section 6.1, Project Specific requirement Section 6.3 - M - Distribution Transformer	Clause - 5.2 Meteorological data: Clause - 2, Service Condition	Altitude above sea level: 1450 m Altitude: Up to 2000m above the mean sea level	The altitude level as mentioned in Project specific requirement is 1450m above mean Sea Level, however as per Specification of Distribution Transformers Clause 2, it mentioned as 2000m above mean sea level. We presume that the values given in Project Specific Requirement i.e. Altitude = 1450m above mean sea level is correct. Please confirm.	Project specific requirment (section 6.1) shall prevail.
86	6	Section 6.1, Project Specific requirement and Section 6.3 - M - Distribution Transformer	Clause - 2.5.2	For new DT (Completely Self Protected and SCADA enabled), the contractor shall provide necessary Switches, Connectors and other provisions for connection such that it is ready for connection with Distribution control center.	Please note that in Section 3 - Specifications of Distribution Transformers, no such requirement is mentioned. Please confirm whether this feature is required or not. In case such feature is required then please provide details of communication required for DTR.	Completely Self Protected (CSP) and SCADA enabled Distribution Transformer is not required as per Chapeter 6.3, M: Distribution Transformer.
87		Section 6.3 - M - Distribution Transformer	Clause -9, Additional Safety Feature.	The polymer-housed lightning arresters of gapless metal-oxide type (Disconnector type) of high surge capacity of 9 kV (Vrms), 10 kA (8/20 micro wave shape) for 11 kV class transformers conforming to IEC 60099 shall be mounted on the HV bushings of transformer, clamped securely to the tank, to protect the transformer and associated line equipment from the occasional high voltage surges resulting from lighting or switching operations.	Please note that since HV cable is terminating inside cable boxes therefore mounting of LA inside the cable box is not possible. Also we presume that Lightning Arresters for this additional safety feature is covered under Bid Price Schedule Item No E, hence inbuilt LA inside Cable Boxes is not required. Please confirm.	Lightning Arrestor mentioned in the BPS Item No. E is for cable termination on the overhead structures. It is not for the distribution transformers. For the distribution transformer, in-built LA shall be provided.
L	6	**COMMUNICATION SYSTEM**				
88	6	Volume-II / Section 6.3 – Specification of Equipment and Construction Material/J. Fibre Optic Cable And PLB Duct	Page No. 236 Annexure-I	Section - 01 Specifications for Underground Fibre Optic Cabling and associated hardware & fittings	On S.No. 3 Tube **OD** for 12 Fiber = 1.9 + 0.1mm, 24 Fiber = 1.9 + 0.1 mm, 48 Fiber = 1.9 + 0.1 mm and 96 Fiber = 2.0 + 0.1 mm Please confirm tube OD tolerance is ± 0.1 mm as specified above.	This is to confirm that tolerance in OD is ± 0.1
					On S.No. 13 Cable **Diameter** for 12 Fiber = 12.8+ 0.5 mm, 24 Fiber = 13.2+ 1.0 mm, 48 Fiber = 13.2 + 1.0 mm and 96 Fiber = 14.5 + 1.0 mm Please confirm Diameter tolerance of ± 1 mm and 0.5 mm as specified above.	This is to confirm that tolerance in diameter is ± 1 For 13.2mm & 14.5mm diameter and for 12.8mm diameter tolerance is ± 0.5
89	6	Volume-II / Section 6.3 – Specification of Equipment and Construction Material/J. Fibre Optic Cable And PLB Duct	Page No. 222 Clause 1.2.3 Page No. 236 Annexure-I	Section - 01 Specifications for Underground Fibre Optic Cabling and associated hardware & fittings	In Clause 1.2.3 Strength Member- The size of FRP shall be as per Annexure – I. Size of FRP not mentioned in Annexure – I., Please provide the FRP Size	Updated Annexure -I has been attached with this reply at Appendix-C. Which also covered FRP details.
90	6	Volume-II / Section 6.3 – Specification of Equipment and Construction Material/J. Fibre Optic Cable And PLB Duct	Page No. 238-248 Caluse 2.1.6, 2.3, 2.3.8	Section-02 Specifications for Metal Free ADSS Fibre Optic Cable and associated hardware & fittings	Please confirm and elaborate, the requirement of cable type whether TEC GR TEC/GR/TX/OFC-022/02/MAR-17 Type III A or Type III B.	ADSS Cable shall be complied as per TEC GR TEC/GR/TX/OFC-022/02/MAR-17 Type III A
91	6	Volume-II / Section 6.3 – Specification of Equipment and Construction Material/J. Fibre Optic Cable And PLB Duct	Page No. 248 Annexure-II	Section-02 Specifications for Metal Free ADSS Fibre Optic Cable and associated hardware & fittings	Dry Dry Core Cable Design Please confirm whether the requirement is for TEC GR TEC/GR/TX/OFC-022/02/MAR-17 Type III A or Type III B. and Kindly Correct aramid yarn quantity. Cable Diameter & Weight of cable also don't seem to match with the cable type accordingly.	ADSS Cable shall be complied as per TEC GR TEC/GR/TX/OFC-022/02/MAR-17 Type III A. Updated Annexure-II for ADSS parameters has been attached at Appendix-D

S.No.	Section	Reference to Tender Clause	Description	Bidder's Queries	Employer's Response
92	6	Section 6.3 – Specification of Equipment and Construction Material : Section 1-2 - Clause 2.1	The equipment supplied shall support existing network for Power system operational requirements	Please provide communication architecture drawing of existing network.	Existing communication architecture will be provided during detail engineering.
93	6	Section 6.3 – Specification of Equipment and Construction Material : L. FIBER OPTIC BASE COMMUNICATION EQUIPMENT	The Contractor shall make ready all the equipment like RMU. DTs, FPI and GO switch to connect with the new distribution centre without any problems, like data acquisition from distribution field level (until Distribution Transformers) till monitoring and controlling of the overall electrical distribution network including Ring Main Units (RMUs), GO Switches, Distribution Transformers and FPIs (Fault passage Indicators) within the network.	We assume the design and construction of Data control centre or New distribution centres are not in the scope of this tender. For Integration with Existing NEA Network, our scope shall be limited to laying of Fibre optic cable up to the FO termination point of customer (NEA) scope. Please confirm	Design and construction of Data Control Centre or new distribution centres are not in the scope of this tender. For Integration with Existing NEA Network, Bidder's scope shall be laying of Fibre optic cable, Installation of FODP, Installation and Commissioning of Communication Equipment and Integration with exising Customer Equipment up to the Reporting Station. Moreover, coordination shall be done with DCC to ensure that necessary data reaches up to DCC.
94	6	Section 6.3 – Specification of Equipment and Construction Material : Section 1-2 : Network Configuration and Equipment Characteristics - Clause 2.2.3.1	The Contractor shall synchronize the existing equipment and all the new equipment under the contract using existing Master clock, if available. The Contractor shall provide the additional clocks as required under the set of clocks indicated in BPS. In addition to GPS input reference, the synchronization clock must have provision to take INPUT reference coming from another clock.	For the referred clause, we do not envisage supply of additional clocks since the same is not covered in BPS. Also referring to the Specification Clause, we understands that the GPS Master Clock (NTP Server) with GPS Antenna is existing in the Distribution Control Centre (DCC). Accordingly, Bidder assumes that the additional Clocks mentioned in the Specification is Digital Slave Clocks which shall sync with the GPS Master Clock based upon receipt of the Pulse input. Bidder also wants to understand whether, Layer-2 Network Switch indicated as part of the SDH Equipment shall sync with the GPS Master Clock.	Confirmed
95		Section 6.3 – Specification of Equipment and Construction Material : Section 1-2 : Network Configuration and Equipment Characteristics - Clause 2.5 & Section 6.3 – Specification of Equipment and Construction Material : APPENDIX – A - A.2	This TMN shall provide the capability to monitor, reconfigure and control elements of the telecommunications network from a centralized location and at each node of the network where equipment is located. & Further the spare fibres of installed UGFO cable are proposed to be used for telecom services in future and is not part of the scope of this specification.	The referred clauses are contradicting. Please clarify the elements of the telecommunication network that need to be monitored, reconfigure and controlled under the scope of this tender.	All the Communication Equipment Supplied in bidding documents will be monitored.
M	8	**SPECIAL CONDITIONS OF CONTRACT**			
96	8	Section 8 - Special Conditions of Contract 13.3.5	The amount of performance security, as a percentage of the Contract Price for the Facility or for the part of the Facility for which a separate Time for Completion is provided, shall be: 10% of the Contract Price and, if required, additional amount due to seriously unbalanced or front loaded bid (in accordance with ITB 39.5) and/or abnormally low bid (in accordance with ITB 40.4 (b).	With reference to the said Clause you are requested to kindly confirm the procedure of determining the additional amount of Bid security. The total cost estimate of NEA for the tender may please be provided wrt which reference to lower bid shall be considered.	The cost estimate of the project will not be provided. The Bid security amount is fixed and mentioned in the BDS. However, for Abnormally Low Bid, the performance security will be determined based on ITB Sub-Clauses 40.2 to 40.4.
97	8	Section 8 - Special Conditions of Contract 14. Taxes and Duties - G	Income tax assessed in accordance with the prevailing Income Tax Act of Nepal and as per the provision of any specific Double Taxation Agreement, shall be imposed on the Contractor, its sub-contractors and nominated sub- contractors. An advance income tax as per the prevailing income Tax Act and Finance Act shall be deducted from the monthly progress payment of the Contractor.	Kindly confirm no Income Tax shall be payable on income by contractor for the supplies of Plant & Equipment to be Supplied from Abroad i.e. for which Custom Duty Benefit shall be availed i.e. as per Sch. 1 of BPS. And there will not be any deductions in the payment of such supplies. We envisage that for only Supplies of Goods and services which are within the employers country and payable in "NPR" , TDS Shall be deducted. Kindly Confirm.	An advance income tax (as per the prevailing Income Tax Act and Finance Act) as applicable at the time of payment shall be deducted from the payment of the Contractor.

S.No.	Section	Reference to Tender Clause		Description	Bidder's Queries	Employer's Response
98	8	Volume-I / Section-8: Special Conditions of Contract	clause No. 14.5	Withhold money	Under the current contract structure and modus operandi (wherein supplies are billed from India and construction services from Nepal), withholding tax implications are as follows – @1.5% on contractual payments against construction invoices. This can be set-off against the final corporate tax liability in Nepal. A tax return needs to be filed in Nepal to claim TDS credit. @5% on supply invoices if supply done from India however if supply is done from Nepal with VAT then 1.5% withholding will be applicable. We have been served with recovery notices from the client NEA for recovery of TDS @5% on supply invoices which are billed from India. Accordance with the India-Nepal tax treaty no TDS should be applicable against supply invoices. However, Tribunal has given their ruling in favour of NEA that if billing is done from Nepal by charging VAT only then the withholding is 1.50 %. Matter is now pending at court at Nepal. **Sir, we want clear views on this matter.**	An advance income tax (as per the prevailing Income Tax Act and Finance Act) as applicable at the time of payment shall be deducted from the payment of the Contractor.
N	9	**CONTRACT FORMS**				
99	9	Appendix 1 -Terms and Procedures of Payment		Terms and Procedures of Payment	Kindly confirm the Terms and Procedures of Payment for the Price adjustment component payable on 11KV & LT XLPE Cables	LC will be set up by the Employer in fovour of the Contractor for the base rate amount of Schedule-1 (Plant and Equipment including Mandatory Spares to be supplied from abroad) of the BPS. If the adjusted price will be higher than the base price then the additional amount will be paid through WITHDRAWAL NOTICE and if adjusted price will be lower than the base price then the differential amount will be deducted from next consecutive interim bill of the Contractor.
100	9	Volume-I / Section 9 – Contract Forms	Page No. 199-201 Appendix 2	Price Adjustment	Price adjustment shall be permitted only on the Aluminium component of 11kV XLPE Cables (400mm2, 300mm2 and 150mm2) and LT XLPE Cables (630 mm2 single core, 300mm2 3.5 Core, 185mm2 3.5 Core). Prices of all other items of supply and construction activities, for all purpose, will remain 'FIRM' in all respects. **We are requesting you to Kindly amend the clause as per IEEMA Circulars and allow price adjustment on all other major equipments like HT Cable, LT Cable. AB Cables, Distribution Transformers, Steel Structure, STP Poles, MV & LV Switchgears.**	No such changes (as requested by the bidder) in Appendix-2 (Price Adjustment) will be made.
101	9	Appendix 2 - Price Adjustment 1.3.1.2		BASE INDICES: AI0 - as applicable for 60 days prior to the deadline for submission of the Bid	For price adjustment of LT XLPE Cables kindly reconfirm the Base Indices to be considered as applicable for 60 days prior to the deadline for submission of the bid or 28 days prior to the deadline for submission of the bid.	AI_0 - as applicable for 28 days prior to the deadline for submission of the Bid.
102		Section 4 - Bidding Forms Tables of Adjustment Data		Tables of Adjustment Data	With reference to the Appendix 2 kindly confirm the fields for tables of adjustment data to be provided with the bid.	AI_0 - Average LME settlement price of Aluminum bars as applicable on the base date shall be filled and the commodity exchange shall be London Metal Exchange. The base date is 28 days prior to the deadline for submission of the Bid. Aforementioned price shall be Quoted in the bidding foms (Table of Adjustment Data) (Table B: Foreign Currency).
O		**OTHERS**				

S.No.	Section	Reference to Tender Clause	Description	Bidder's Queries	Employer's Response
103			General	In case of discrepancies between Technical specification, drawings and Bid Price schedule, Bid price schedule shall be considered as final. Please confirm	Bid Price Schedule shall prevail unless clarified/ammended. However, this is the turnkey contract, the bidder has to fullfil all obligations for successful operation of the facilities.
104			General	Please provide Typical Architecture indicating the Integration of New Sub systems with existing Communication System based on SDH network of the Customer	Typical Architecture of Integaration is attached along with this clarification in Appendix-A.
105				Is it possible to get the bidding documents firstly and then we afford the electric bank transfer voucher to you through this email address?	To get the bidding document (hardcopy), you have to pay first a non-refundable fee of NRs. 20,000.00 or an equivalent amount in US$ by bank voucher to the Account No. 00101500014600000104 (NEA-PROJECT MANAGEMENT DIRECTORATE) at the NMB Bank Limited, Babarmahal, Kathmandu, Nepal. Along with the confirmation of the transfer of the aforementioned amount to our bank account, you are requested also to send the authorization letter with your representative to purchase the hard copy of the bid document.
106				If we afford the electric bank transfer voucher, what else information should we provide?	The following information will be good enough to transfer the aforesaid amount to our bank account for the purchase of bid document. Bank: NMB Bank Limited, Babarmahal, Kathmandu,Nepal. Account No. 00101500014600000104 Account Name: NEA-PROJECT MANAGEMENT DIRECTORATE Swift Code: NMBBNPKA
107				1. Is consortium is allowed or we have to go for JV.	Refer ITB Clause 4: Eligible bidder for the same.
				2. Please confirm whether we need to form a JV company or only register JV will be accepted.	Refer ITB Clause 4: Eligible bidder for the same.
				3. Invoicing will be done by Lead bidder on behalf of JV. Please confirm.	Invoice shall be in the name of JV company
				4. How the payment will be done to JV partners. Will it be directed through Lead bidder only? Or each partner will bill separately to NEA as per their scope of work and get their respective payment. Please confirm.	Payment will be made on the the name of JV company
				5. EMD BG and PBG will be provided by lead partner only. Please confirm.	Shall be on the name of JV company
				6. Is ESCROW account is to be opened for payment? Please confirm.	Not required. Payment will be made to the JV company.

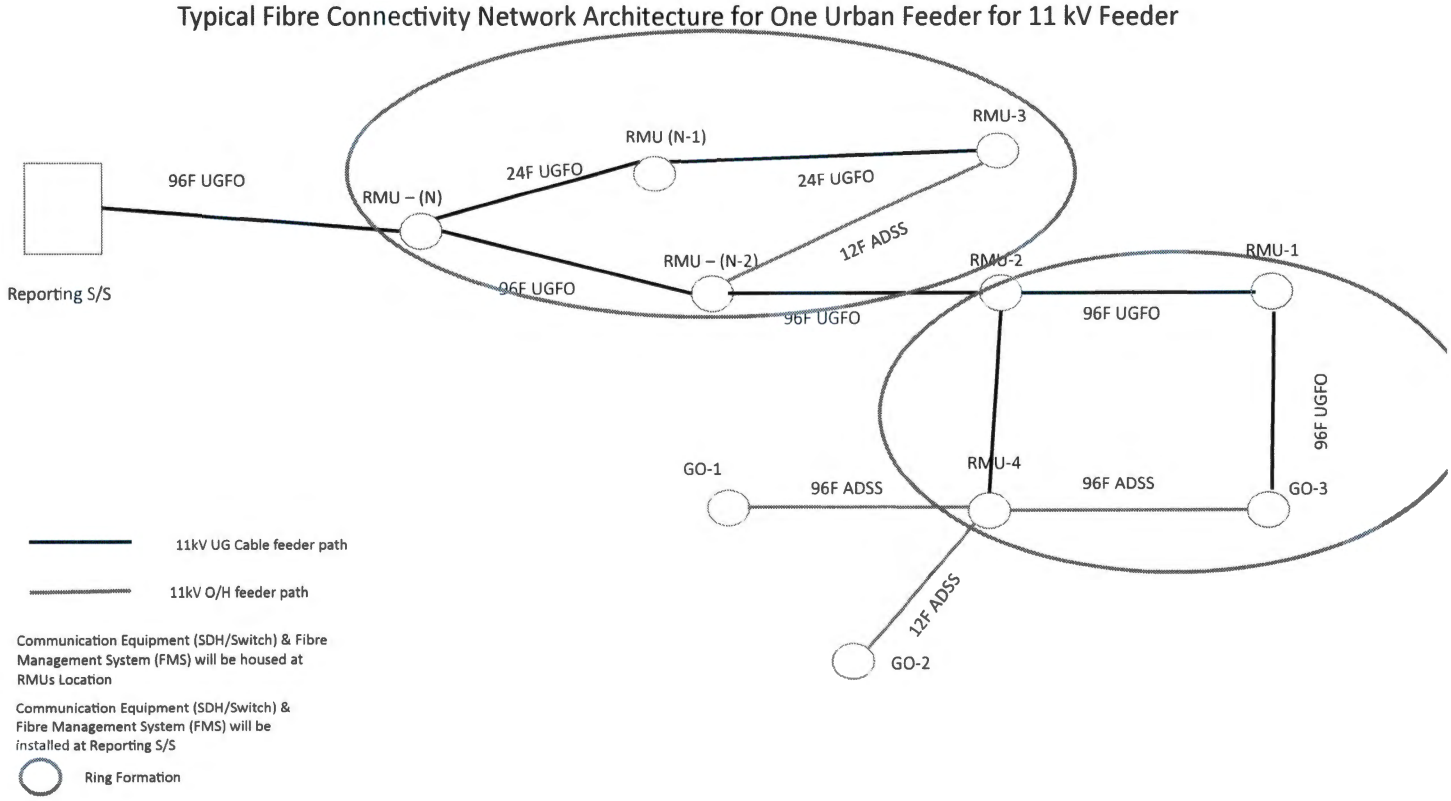
APPENDIX - A


नेपाल विद्युत प्राधिकरण
स्थापित २०१२
ESTD. 1985
NEPAL ELECTRICITY AUTHORITY

Typical Block Diagram for Fibre Optic Communication Network for Distribution System

नेपाल विद्युत प्राधिकरण
स्थापित २०४२
ESTD. 1985
NEPAL ELECTRICITY AUTHORITY

Typical Fibre Connectivity Network Architecture for One Urban Feeder for 11 kV Feeder



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स्थापित २०४२
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Appendix-B

Appendix-B

DC Power Supply System Requirements

In order to provide reliable power supply to communication equipment at various locations, 48 V DC Power Supply (DCPS) system is to be provided as a part of this project. This section describes the technical requirement of DC power supply & associated Battery.

The DC Power Supply system shall be capable of meeting the load requirements for various Telecom equipment's. The required load (in Amps) for each location along with the Battery capacity is indicated in the Appendices. The rating of offered SMPS modules shall meet Employer's requirements of DCPS system as stipulated in the BoQ.

The DC Power supply system shall have a single DCPS system as per conceptual configuration diagram given in Fig.1-1, shall be supplied.

Surge protection devices shall be installed in the DCPS panel to provide adequate protection against current and voltage transients introduced on input mains AC due to load switching and low energy lightning surges. These protection devices shall be in compliance with IEC 61312, IEC 61024 and VDE 0100-534 for following surges:

It shall be provided with Class 'B' & 'C' type surge protection device. The device must be provided with Class B type lightning current arrester (Switching Type) with a discharge current capacity of at least 50 kA, 10/350 µs, and Class C type surge arrester (linear device) as per IEC 61643-1. The blind spots shall be avoided in accordance to IEC 61312. The Class 'C' surge protection device should be pluggable type, equipped with features of thermal disconnection, & health indication and potential free contacts for surge arrestors connected between phase & neutral.

The surge protection device shall comply to IEC 61643.

a) Lightning Electromagnetic impulse and other High Surges (Class B):

Between	**Requirement**
Ph & N	$I_{imp} \geq$ 50 kA, 10/350 µS for each phase
N & PE	$I_{imp} \geq$ 100 kA, 10/350 µS

I_{imp}= Value of Lightning Impulse Current
Rated input voltage of Class 'B' surge arrestors shall not be less than 320 V.

b) Low Voltage Surges (Class C)

Between	**Requirement**
Ph & N	$I_n \geq$ 10 kA, 8/20 µS for each phase
N & PE	$I_n \geq$ 20 kA, 8/20 µS

I_n= Value of Nominal Discharge Current.

Voltage rating of Class 'C' surge arrestors shall be minimum 320 V.

The Class'B' & 'C' Surge protection devices shall work in tandem and in perfect co-ordination to give complete protection to the DCPS system against lightning and switching surges.

1.1 General Technical Requirements for SMPS based DC power supply units

SMPS based DC power supply system is to be used in Auto Float-cum-Boost Charge mode as a regulated DC Power source. DCPS system is to be installed indoors and shall be provided with IP21 panels. The System shall consist of the following:

(a) SMPS modules
(b) Controller module to control and monitor all DCPS modules.

The Panel, Distribution/Switching arrangement shall be provided for the ultimate system capacity. Ultimate System capacity is defined as 150% of the present capacity specified in BoQ. The ultimate capacity is over and above the requirement of redundancy wherever specified. All factory wiring for the panel shall be for the ultimate capacity so that only plugging-in of SMPS module shall enhance the DC power output.

The size of fuses, MCBs, switch, bus etc. shall be suitable for the ultimate capacity.

The system shall be sufficiently flexible to serve any load depending on manufacturer's design, rating and number of SMPS modules used in panel and system configuration. To cater for higher load requirements, same type of SMPS modules mounted in the same rack or different racks shall be capable of working in parallel load sharing arrangement. The SMPS modules of DCPS system shall be suitable for operation from single phase A.C. mains/DG set supply. However, the input AC mains supply to DCPS system shall be 3-phase, 4 wire which shall be evenly distributed among all the offered SMPS modules.

1.1.1 Operational/Component Requirements

The basic modules shall operate at specified ratings and conform to requirements stipulated in this specification. The DCPS system shall meet requirement of the latest TEC specification / IEC/BS for other parameters as applicable. The component parts of the equipment shall be of professional grade of reputed manufacturer to ensure prompt and continuous service and delivery of spare parts. The component shall confer to relevant IEC/IS standards. The contractor shall obtain Employers approval of major component before procurement of the same.

1.1.2 Wiring

All insulated conductors except those within the confines of a printed circuit board assembly shall be of the rating enough to withstand the maximum current and voltage during fault and overload. All insulated conductors/cables used shall conform to IS 1554 or equivalent international standard.

All wiring shall be neatly secured in position and adequately supported. Where wires pass through any part of metal panel or cover, the hole through which they pass shall be suitably secured.

1.1.3 Bus Bars

High conductivity Cu bus bar shall be provided and shall be sized to take care of the current of ultimate DCPS system capacity for which it is designed. However, it shall not be less than 25mm X 5mm.

1.1.4 Earthing

Two earth terminals shall be provided in the frame of the system. The Contractor shall connect these earth terminals to the earth bus. All modules and devices shall be connected to these earth terminals. The hinged door, if provided shall be connected to the panel with braided Cu at two points at least.

1.1.5 Finish and Painting

The finish of Steel/Aluminium alloy structure and panels shall conform to relevant IS specification (or equivalent international specifications). The colour code scheme for Panel & Door (if provided) shall be decided during detailed engineering.

1.1.6 Marking and Labelling of Cables

The Contractor shall propose a scheme for marking and labelling the inter panel cables by Halogen & Silicon free labels of polyamide ensuring scratch proof labelling with the use of solvent free ink & latest UV Technology making it environment friendly printing with a WIPE RESISITANCE according to DIN EN 61010-1/VDE 0411-1 and get it approved from the Employer. A cabling diagram, screen printed or any other better arrangement ensuring better life expectancy shall be placed in the inside of the front door or any other convenient place for ready reference of the maintenance staff.

1.1.7 Name Plate

A name plate etched, engraved, anodized or any other better arrangement ensuring better life expectancy shall be suitably fixed on each panel /module and contain at least the following information:

(a) Specification Number
(b) Type of the Unit
(c) Manufacturer's Name and identification
(d) Model No
(e) Unit serial No
(f) Input voltage and phase
(g) Output Voltage and Current
(h) Year of manufacture

1.1.8 System and Panel Configuration

The mechanical and electrical requirements of the Panel are described as below:

1.1.9 System Configuration

The SMPS modules shall be accommodated in panels. The system shall employ a modular configuration to provide flexibility, keeping in view the future load requirements of DC Power. The system shall be configured for ultimate capacity as brought out in Section 5.1. The Control, Monitoring, Alarm arrangement and DC & AC distribution shall be provided suitably in the panel.

The SMPS modules shall be provided as per the load requirement stipulated in the Appendix,

BOQ. The DCPS system shall comprise of N+2 Modules. In case of DCPS system having N=1, the SMPS shall comprise of N+1 modules. Here N refers to number of SMPS modules to meet the load requirements specified BOQ and battery charging current. The current rating of each module shall be considered as output current of the SMPS module at nominal voltage (48V).

Total current = load current + battery charging current

Where, battery charging current is equal to the 20 % AH of the battery supplied.

$$N = \frac{\text{Total Current}}{\text{Current rating of each SMPS module at 48 V}}$$

The Distribution/switching/Alarm unit shall be provided for the ultimate system capacity. All AC, DC or control/alarm cabling/wiring shall be pre-wired for the ultimate capacity so that mere plugging-in of SMPS module shall add to the DC power output.

It shall be possible to easily mount/remove the modules from the front side of the panel. The SMPS modules/SMPS module sub-racks shall be designed to slide into the panels and fixed securely by a suitable mechanical arrangement.

1.1.10 Constructional Features of Panel

Panel (Enclosure) shall be freestanding type of design, in case if specifically it is not mentioned in the relevant section. Cable entry shall be from the bottom/top of the enclosures (to be finalized during detailed engineering). For the enclosures/panel, the front door (if provided) shall not be wider than 80 cm and rear door may be of hinged or removable type with locking as per standard design of the manufacturer. Keyed locking is required with identical keys for all enclosures. The enclosures shall not exceed 220 cm in height. The thickness of the structural frames and load bearing members shall be minimum 2.0 mm and for others shall be minimum 1.6 mm. The panels/boards shall be equipped with necessary cable gland plates. The Contractor shall state the type, size, and weight of all enclosures and indicate the proposed manner of installation. The degree of protection of DCPS enclosures shall preferably be IP21, however in case no door is provided then the top of the enclosure/panel shall be fully covered except for proper ventilation and bus bar or cable entries.

Wiring within panel shall be neatly arranged and securely fastened to the enclosure by non-conductive fasteners. Wiring between all stationary and moveable components, such as wiring across hinges or to components mounted on extension slides, shall allow for full movement of the component without binding or chafing of the wire. Conductors in multi conductor cables shall be individually colour coded, and numbered at both ends by Halogen & Silicon free labels of polyamide ensuring scratch proof labelling with the use of solvent free ink & latest UV Technology making it environment friendly printing with a WIPE RESISITANCE according to DIN EN 61010-1/VDE 0411-1within enclosures.

The enclosures shall be painted inside and outside. The finish colour of all enclosures shall be an aesthetically pleasing and shall be approved by the Employer. Further, finish colour of external surfaces shall be preferably of same colour for all enclosures/panels.

Each panel shall be supplied with 240 VAC, 50Hz single-phase sockets with switch and lighting lamp for panel illumination.

The manufacturer so as to ensure the uninterrupted use of the equipment shall do proper thermal engineering of hardware design. The Panel shall be designed to allow cooling preferably by natural convection. The Contractor shall submit detail design of proposed Panel/enclosure and heat dissipation calculations during detailed engineering. Forced cooling is permitted (DC Fans are permitted in the Panel or SMPS module) for equipment mounted indoors (buildings/rooms/shelters). If cooling is provided at Panel level it shall be provided with additional fan with facility for manual switch over. Proper filtering shall be provided to control dust ingress. There shall be an arrangement for automatic Switching-OFF of fans during AC input failure. The required individual modules may be separated by air baffle to provide effective convection. The manufacturer shall also ensure that the failure of fan does not cause any fire hazards. The failure of any of the fans shall draw immediate attention of the maintenance staff.

1.1.11 Electrical Requirements:

AC input supply: The nominal input frequency is 50 Hz, which may vary from 47.5-52.5Hz. The input voltage shall be as mentioned below:

Field Site Application – Three phase/4Wire (Nominal 415/240 V): 415 + 10 % - 15%. However, at site the voltage may vary from 160V to 300V (Ph-N). An Auto-Mains Changeover unit shall be provided for each field site DC power supply system. The Auto-Mains Changeover unit shall accept input from two AC sources and extend any one of the available healthy sources to the DC Power supply system.

The suitable HVD (High Voltage Disconnector) Protection shall be provided at input of each DCPS system. This HVD protection shall protect the SMPS modules of DCPS system against the sustained over voltage at the input.

There shall be an automatic arrangement for shutting off of the SMPS module whenever the input voltage is beyond the specified operating limits with suitable alarm indication. The SMPS module shall resume normal working automatically when the input is restored within the working limits. Hysteresis within specified working limits shall not cause shutting down of the SMPS. A tolerance of ±5V may be acceptable for protection & alarm operation.

1.1.12 DC output Characteristics of Modules

The module shall be capable of operating in "Auto Float-cum-Boost Charge" mode depending on the condition of the battery sets being sensed by the Control unit.

(a) The float voltage shall be continuously adjustable & pre-settable at any value in the range of –48 to –56V or as per battery manufacturer recommendations either at the module or may be set from the common controller configuration. Further, the prescribed float voltage setting shall be based on recommendations of the battery supplier.

(b) In Boost charge mode, DCPS shall supply battery & equipment current till terminal voltage reaches set value, as recommended by the battery supplier & shall change over to constant voltage mode

(c) The DC output voltage variation shall not be more than 2% for load variation from 25% load to full load.

1.1.13 Current Limiting (Voltage Droop)

The current limiting (Voltage Droop) shall be provided in DCPS SMPS modules in float and boost charge modes of operation. The float/boost charge current limiting shall be continuously adjustable between 50 to 100% of rated output current for output voltage range of –44.4 volts to –56 Volts or as per manufacturer's specified catalogue.

The float and boost charge current limit adjustment shall be provided in the DCPS system. The SMPS modules shall be fully protected against short circuit. It shall be ensured that short circuit does not lead to any fire hazard.

1.1.14 Soft/Slow Start Feature

Soft/Slow start circuitry shall be employed such that SMPS module input current and output voltage shall reach their nominal value within 10 seconds.

The maximum instantaneous current during start up shall not exceed the peak value of the rectifier input current at full load at the lowest input voltage specified.

1.1.15 Voltage Overshoot/Undershoot

The requirements of (a) to (c) given below shall be achieved without a battery connected to the output of SMPS modules.

(a) The SMPS modules shall be designed to minimize DC output voltage Overshoot/Undershoot such that when they are switched on the DC output voltage shall be limited to ± 5% of the set voltage & return to their steady state within 20 ms for load variation of 25% to 100%.

(b) The DC output voltage overshoot for a step change in AC mains as specified in clause 5.1.11 Electrical Requirements shall not cause shut down of SMPS module and the voltage overshoot shall be limited to ± 5% of its set voltage and return to steady state within 20ms.

(c) The modules shall be designed such that a step load change of 25 to 100% and vice versa shall not result in DC output voltage Overshoot/Undershoot of not more than 5% and return to steady state value within 10 ms without resulting the unit to trip.

1.1.16 Electrical Noise

The Rectifier (SMPS) Modules shall be provided with suitable filter at output with discharge arrangements on shut down of the modules. The Psophometric Noise (e.m.f weighted at 800Hz) with battery connected across the output should be within 2 mV at full load at nominal input AC supply. For test purposes, this shall be taken as equivalent to 4mV when the battery is not connected and in accordance to ITU-T Rec. O.41.

Voltage at the output of the Rectifier (SMPS) module, without battery connected, shall not exceed 300 mV at the switching frequency measured by an Oscilloscope of 50/60 MHz bandwidth (Typical).

1.1.17 Parallel Operation

SMPS modules shall be suitable for operating in parallel with one or more modules of similar type, make and rating, other output conditions remaining within specified limits.

The current sharing shall be within ± 10% of the average current per rectifier module individual capacity of each rectifier module in the system (mounted in the same or different Panels) when loaded between 50 to 100% of its rated capacity for all other working conditions.

1.1.18 Protection

The SMPS module, which has failed (for any reason) shall be automatically isolated from the rest of the modules and an alarm shall be initiated for the failure.

1.1.19 DC Over voltage protection

DCPS shall be fitted with an internal over voltage protection circuit.

In case output DC voltage exceeds –57V or as per the recommendations of the manufacturer of batteries, the over voltage protection circuit shall operate & shut off the faulty module. A tolerance of ± 0.25V is permitted in this case.

Shutting off of faulty SMPS module shall not affect the operation of other SMPS modules operating in the Panel. Operation of over voltage shut down shall be suitably indicated and extended monitoring/control unit. The circuit design shall ensure protection against the discharge of the Battery through the SMPS module in any case. The over voltage protection circuit failure shall not cause any safety hazard.

1.1.20 Fuse/Circuit Breakers

Fuses or miniature circuit breakers (MCB) shall be provided for each SMPS module as follows:

1. Live AC input line
2. Control Circuit

All fuses/circuit breaker used shall be suitably fault rated.

1.1.21 AC Under/Over Voltage Protection

AC input Under/Over voltage protection shall be provided as per clause 5.1.11 for Electrical Requirements. The DC side of the SMPS should also be provided with surge protection device to protect the SMPS in case of transients being generated by the loads or due to induction in the DC line from the AC line running parallel together. The Surge protection device should be able to discharge a current of at least 10 kA of 8/20 µs (Class 'C' surge arrestor), pluggable and should have indication to show its health to facilitate the replacement on fault condition.

1.1.22 Over Load/Short Circuit Protection

The SMPS shall be protected for Over load/Short circuit as per clause 5.1.13 Current Limiting (Voltage Droop).

1.1.23 Alarms and indicating lamps

Visual indications/display such as LEDs, LCDs or a combination of both shall be provided on each SMPS module for detection of SMPS module failure.

1.1.24 Termination

Suitable termination arrangements shall be provided in the panel for termination of inter cubicle cables from other equipment such as Employers ACDB, Telecom and other associated equipment's and alarm cables. All the termination points shall be easily accessible from front and top. AC and DC terminals shall be separated by physical barriers to ensure safety. All the terminals except AC earth shall be electrically isolated.

1.1.25 DC Terminations

All terminations including through MCBs shall be through lock and screw type terminations. Load and batteries shall be connected to DCPS through appropriate MCBs. The isolation of any of the battery from the load shall create an alarm. DC distribution shall be provided with adequate no. of feeders with appropriate MCBs (6 Amp thru 32 Amp) for termination of the loads. Actual rating of the MCBs shall be finalized during the detail engineering. The no. of feeders shall be minimum 10 (ten) nos.

DC distribution may be done either on wall mounted panel or on the DCPS panel. The proper rated MCB shall be provided at the combined output of the SMPS modules (if not provided at each SMPS module). All the AC, DC and Control/alarm cabling shall be supplied with the Panel. All DC +ve and –ve leads shall be clearly marked. All conductors shall be properly rated to prevent excessive heating.

1.1.26 Earthing Cables

Earthing cables between equipment and grounding bus bars shall be minimum size 70 mm^2 stranded conductors copper/copper strip, rated at 300 volts. All hinged doors shall be earthed through flexible earthing braid. Signal and Safety earthing shall be provided separately.

1.1.27 Alarms

Following Visual indications/display such as LEDs, LCDs or a combination of both shall be provided to indicate :

Functional Indications for local monitoring:

a) Mains available
b) DCPS/SMPSs in Float charge Mode
c) DCPS/SMPSs in Boost Charge Mode

Alarm Indication for local monitoring:

a) Load Voltage High /Low
b) DCPS module/SMPS fail
c) Mains out of range

d) System Over Load
e) Mains "ON"/Battery Discharge
f) Battery fail/isolated

All the protections/alarms shall be within tolerance of 0.25V in case of DC voltage, 1% in case of DC current and ± 5V for AC voltage

Alarm Indication for remote monitoring:
a) Input AC mains supply fail alarm
b) Battery low voltage (Pre cut off) alarm
c) DCPS module fail

Potential free Contacts in two numbers for each of the above remote monitoring alarms (one for remote alarm interfaced through communication equipment's and one redundant for local monitoring at suitable location) shall be provided. All these potential free contacts are to be wired and terminated at the suitable location for interfacing purpose.

1.1.28 Digital Meters/Display Unit

There shall be provision to monitor the following parameters through digital meters or digital display units:

(a) Input AC voltage.
(b) Output DC voltage
(c) Output DC current of charger
(d) Battery current
(e) Load current.

The Digital display of meters or LCD based display unit shall be with minimum $3^1/_2$ digital display of height 12mm and shall have accuracy 1.5% or better.

1.2 Cabling & Enclosure Requirements

The contractor shall supply, install and commission all power cables, control cables, network interface cables and associated hardware (lugs, glands, cable termination boxes etc.) as required for all equipment. The contractor shall be responsible for Cable laying and termination at both ends of the cable. The Contractor shall also be responsible for termination of feeder cables at contractor's equipment end including supply of suitable lugs, glands, terminal blocks & if necessary cable termination boxes etc. All cabling, wiring, and interconnections shall be installed in accordance with the following requirements.

1.2.1 Power Cables

All external power cables shall be stranded Aluminum conductor, armored XLPE/PVC insulated and sheathed, 1100V grade as per IS 1554 Part-I.

1.2.2 Enclosure/Panel Earthing

Each enclosure shall include suitable earth networks within the enclosure. Earth network shall be a copper bus bar, braid or cable inside enclosures.

The safety earth network shall terminate at two/more studs for connecting with the earthing grid. Safety earthing cables between equipment and enclosure grounding bus bars shall be minimum size 6 sq. mm, stranded copper conductors, rated at 300 volts. All hinged doors (if provided) shall be earthed through flexible earthing braid.

For all enclosures requiring AC input power, the green earthing wire from the AC input shall be wired to the safety earthing stud. The Contractor shall provide all required cabling between enclosures for earthing. The contractor shall connect safety and signal earths (as applicable) of each enclosure to the Employer provided nearest earth grid/earth riser through suitable 50X6 sq. mm. GI strips or suitably sized copper cable.

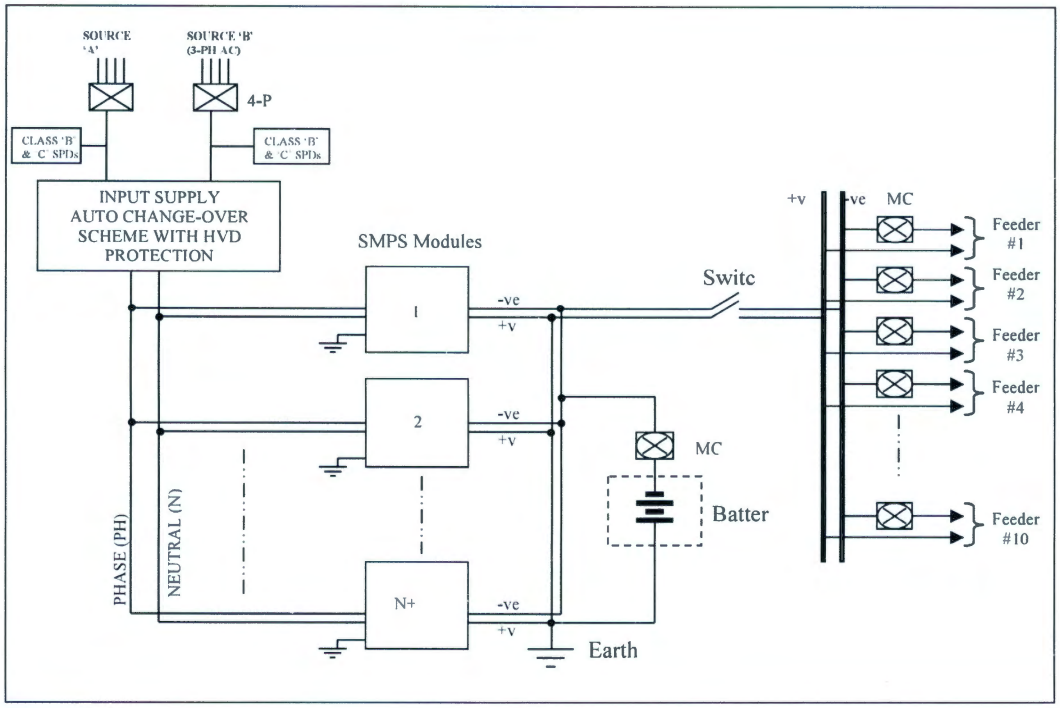
The signal earthing network shall terminate at a separate stud connection, isolated from safety ground. The stud connection shall be sized for an external earthing cable equipped with a suitable lug.

All earthing connections to equipment shall be made directly to each equipment chassis via earthing lug and star washer. Use of the enclosure frame, skins, or chassis mounting hardware for the earthing network is not acceptable.

1.3 Temperature Compensation for Battery

There shall be provision for monitoring the temperature of battery and consequent arrangement for Automatic temperature compensation of the SMPS output voltage to match the battery temperature dependent charge characteristics. The output voltage of the rectifier in Float/Charge operation shall decrease or increase at the rate of 72 mV (3mV/cell, 24 cell battery) per degree increase or decrease in temperature over the set voltage or as may be recommended by the VRLA Battery supplier. A tolerance of +/- 5mV may be acceptable over the specified rate of 72 mV/degree C. The output voltage shall decrease till the open circuit voltage of the battery is reached. The open circuit voltage range shall be settable between 2.1V/cell to 2.2V/cell. The increase in output voltage due to decrease in temperature has been taken care of by the tripping of the unit due to output voltage high (57V) protection. Failure of temperature compensation circuit including sensors shall create an alarm and shall not lead to abnormal change in output voltage. The nominal distance between the battery & DCPS system may be 20 metres. The Contractor shall provide the necessary sensor and cord for the purpose with DCPS system to sense the Battery temperature.

FIG. 1-1 : CONCEPTUAL CONFIGURATION OF DC POWER SUPPLY (DCPS) SYSTEM (For Field Sites Locations)



1.4 Battery Requirements

1.4.1 Valve Regulated Lead Acid (VRLA) maintenance free Battery

The contractor shall supply Valve Regulated Lead Acid (VRLA) maintenance free Battery. Each battery set shall have sufficient capacity to maintain output at full rated load as indicated in BOQ. The battery shall be capable of being recharged to 90% State of Charge (SOC) from the fully discharged condition (1.75V/cell) within 10 hrs. In all cases, the battery is normally not allowed to discharge beyond 80% of rated capacity (80% DOD) at 10 hours rate of discharge.

The supplier, supplying the cells/batteries as per this document shall be responsible to replace/repair free of charge, the battery/cell becoming faulty, owing to defective workmanship or material as per the provisions of the bid document

1.4.1.1 Constructional Requirements

The design of battery shall be as per field proven practices. Partial plating of cells is not permitted. Paralleling of cells externally for enhancement of capacity is not permitted. Protective transparent front covers with each module shall be provided to prevent accidental contact with live module/electrical connections.

1.4.1.2 Containers

The container material shall have chemical and electro-chemical compatibility and shall be acid resistant. The material shall meet all the requirements of VRLA batteries and be consistent with the life of battery. The container shall be fire retardant and shall have an Oxygen Index of at least 28%. The porosity of the container shall be such as not to allow any gases to escape except from the regulation valve. The tensile strength of the material of the container shall be such as to handle the internal cell pressure of the cells in the worst working condition. Cell shall not show any deformity or bulge on the sides under all working conditions. The container shall be capable of withstanding the rigours of transport, storage and handling. The containers shall be enclosed in a steel tray.

1.4.1.3 Cell Covers

The cell covers shall be made of suitable material compatible with the container material and permanently fixed with the container. It shall be capable to withstand internal pressure without bulging or cracking. It shall also be fire retardant. Fixing of Pressure Regulation Valve & terminal posts in the cover shall be such that the seepage of electrolyte, gas escapes and entry of electro-static spark are prevented.

1.4.1.4 Separators

The separators used in manufacturing of battery cells, shall be of glass mat or synthetic material having high acid absorption capability, resistant to sulphuric acid and good insulating properties. The design of separators shall ensure that there is no misalignment during normal operation and handling.

1.4.1.5 Pressure Regulation Valve

Each cell shall be provided with a pressure regulation valve. The valve shall be self re-sealable and flame retardant. The valve unit shall be such that it cannot be opened without a proper tool. The valve shall be capable to withstand the internal cell pressure specified by the manufacturer.

1.4.1.6 Terminal Posts

Both the +ve and –ve terminals of the cells shall be capable of proper termination and shall ensure its consistency with the life of the battery. The surface of the terminal post extending above the cell cover including bolt hole shall be coated with an acid resistant and corrosion retarding material. Terminal posts or any other metal part which is in contact with the electrolyte shall be made of the same alloy as that of the plates or of a proven material that does not have any harmful effect on cell performance. Both +ve and –ve posts shall be clearly and unambiguously identifiable.

1.4.1.7 Connectors, Nuts & Bolts, Heat Shrinkable Sleeves

Where it is not possible to bolt the cell terminals directly to assemble a battery, separate non-corroding lead or copper connectors of suitable size shall be provided to enable connection of the cells. Copper connections shall be suitably lead coated to withstand corrosion due to sulphuric acid at a very high rate of charge or discharge.

Nuts and bolts for connecting the cells shall be made of copper, brass or stainless steel. Copper or brass nuts and bolts shall be effectively lead coated to prevent corrosion. Stainless steel bolts and nuts can be used without lead coating.

All inter cell connectors shall be protected with heat shrinkable silicon sleeves for reducing the environmental impact including a corrosive environment.

1.4.1.8 Flame Arrestors

Each cell shall be equipped with a Flame Arrestor to defuse the Hydrogen gas escaped during charge and discharge. Material of the flame arrestor shall not affect the performance of the cell.

1.4.1.9 Battery Bank Stand

All batteries shall be mounted in a suitable metallic stand/frame. The frame shall be properly painted with the acid resistant paint. The suitable insulation shall be provided between stand/frame and floor to avoid the grounding of the frame/stand.

1.5 Capacity Requirements

When the battery is discharged at 10 hour rate, it shall deliver 80% of C (rated capacity, corrected at 27°Celcius) before any of the cells in the battery bank reaches 1.85V/cell.

All the cells in a battery shall be designed for continuous float operation at the specified float voltage throughout the life. Float voltage of each cell in the string shall be within the average float voltage/cell $\pm$0.05V band.

The capacity (corrected at 27°Celcius) shall also not be less than C and not more than 120% of C before any cell in the battery bank reaches 1.75V/cell. The battery voltage shall not be less than the following values, when a fully charged battery is put to discharge at C/10 rate:

(a) After Six minutes of discharge : 1.98V/cell
(b) After Six hours of discharge : 1.92V/cell
(c) After 8 hours of discharge : 1.85V/cell
(d) After 10 hours of discharge : 1.75V/cell

Loss in capacity during storage at an average ambient temperature of 35° Celsius for a period of 6 months shall not be more than 60% and the cell/battery shall achieve 85% of its rated capacity within 3 charge/discharge cycles and full rated capacity within 5 cycles, after the storage period of 6 months. Voltage of each cell in the battery set shall be within $\pm$0.05V of the average voltage throughout the storage period. Ampere hour efficiency shall be better than 90% and watt hour efficiency shall be better than 80%.

1.6 Expected Battery Life

The battery shall be capable of giving more than 1200 charge/discharge cycles at 80% Depth of discharge (DOD) at an average temperature of 27° Celsius. DOD (Depth of Discharge) is defined as the ratio of the quantity of electricity (in Ampere-hour) removed from a cell or battery on discharge to its rated capacity. The battery sets shall have a minimum expected operational life of 5 years at normal operating conditions or 1200 charge/discharge cycles (whichever is early).

1.7 Routine Maintenance of Battery system

For routine maintenance of battery system, the contractor shall supply one set of following tools:

a. Torque wrench.
b. Tool for opening /closing of pressure regulation valve of battery.

1.8 Testing requirements

The Contractor shall submit type test reports for the battery for the same make, model & rating as offered as per the IEC 60896 or equivalent IS/EN/BS/TEC standards. In the event, the type test reports for exact rating is not available, the Contractor shall submit type test reports for higher rating Battery.

1.9 Type Testing of DCPS

The test reports for Immunity, Emission and safety must be in accordance with relevant IEC/CISPR standards shall be submitted. The Contractor shall submit the DCPS type test reports of earlier conducted tests on the same make, model, type & rating which shall include the following tests listed in Table 7-9.

Table 1-1 Type Tests on DCPS	
1	Surge immunity (Level 4- as per IEC 61000-4-5)
2	Electrical Fast Transients/Burst (Level 4 – as per IEC 61000-4-4)
3	Electrostatic Discharge (Level 4 – as per IEC 61000-4-2)
4	Radiated Electromagnetic Field (Level 3 – as per IEC 61000-4-3)
5	Conducted disturbances induced by radio-frequency field (Level 3 – as per IEC 61000-4-6)
6	Damped oscillatory magnetic field (Level 3 – as per IEC 61000-4-10)
7	Voltage dips, short interruptions and voltage variations (Level 2 – as per IEC 61000-4-11)
8	Conducted Emission (Level - Class A, Group 1 as per IEC CISPR 11)
9	Radiated Emission (Level - Class A, Group 1 as per IEC CISPR 11)
10	Safety Tests (as per IEC 60950)

1.10 Testing requirements of Battery

Table 1-2
List of tests for VRLA battery

Sl. No.	Test	Type Test As per IEC 60896	FAT	SAT
1.	Verification of marking - Visual observation - Dimensional inspection - Polarity checking	√	√	√
2.	Capacity test	√	√	√
3.	Suitability for floating battery operation	√		

Sl. No.	Test	Type Test As per IEC 60896	FAT	SAT
4.	Endurance in discharge/charge cycles	√		
5.	Charge Retention	√		
6.	Short-circuit current and internal resistance	√		
7.	Mechanical Tests -Vibration Test (procedure as per IEC 60068-2-6) - Free Fall Test (procedure as per IEC 60068-2-32)	√		
NOTE : The batteries shall meet the general requirements as per IEC 60896 or equivalent.				

1.11 FAT/SAT of DCPS

The factory/site tests to be carried out on DCPS system/module in the factory and site are listed respectively in Table below.

Table 1-3

Lists of tests for FAT/SAT of DCPS

S. No.	Test	FAT	SAT
Tests on DCPS System			
1.	Mechanical & Visual Check Tests	√	√
2.	Insulation Test.	√	
3.	High Voltage Withstand Test	√	
4.	Switch On Test	√	√
5.	DCPS Low voltage & High voltage limits check Test	√	√
6.	Pre-alarm test for Battery Voltage Low	√	√
7.	Battery Low Voltage Disconnect Level Test	√	√
8.	AC Input Low and High voltage limits check Test	√	
9.	Rectifier Fail Alarm Test	√	√
10.	Voltage Regulation Test	√	
11.	Current Sharing Test	√	
12.	Total Output Power Test	√	√
13.	Hot Plug In Test (if applicable)	√	√
14.	Calibration & Parameter settings	√	√
15.	Automatic Float cum Boost Charge Mode Change Over Test	√	√
16.	Battery Path Current Limiting Test	√	√
17.	Battery Charging and full load Current Test	√	√
18.	Total Harmonic distortion Test	√	
19.	Burn in Test at 50 ° C (for 8 hrs duration)	√	

Table 1-3 Lists of tests for FAT/SAT of DCPS			
S. No.	**Test**	**FAT**	**SAT**
Tests on SMPS module			
20	Mechanical & Visual Check Test	√	
21	Module-On Test	√	
22	Input low/high voltage cut-off test	√	
23	Voltage Drop Test	√	
24	Voltage Regulation Test	√	
25	Power Output & Current Limit Test	√	
26	DC High Voltage Test	√	
27	O/P Voltage Ripple Test	√	
28	Psophometric Noise Test	√	
29	Efficiency Test	√	
30	Power Factor	√	
31.	Input Current Limit	√	
32.	Input AC Frequency Range Test	√	
33.	Rectifier Dynamic Response	√	
34.	Output Short Circuit Test	√	
35.	Hold up Time Test	√	

Appendix-C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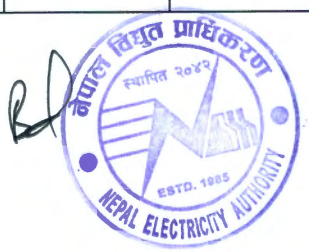
Appendix-C

Annexure-I

The following parameters of the component parts of the cable are to be taken in to account while designing and manufacturing the optical fibre cables of the required fibre count. These parameters shall be checked during evaluation of the OF cables.

SN	Parameter	Unit	12 Fibre OF cable	24 Fibre OF cable	48 Fibre OF cable	96 Fibre OF cable
1	FRP Rod EAA Coated	Mm	2.0+0.1/-0.0	2.0+0.1/-0.0	2.0+0.1/-0.0	3.5+0.1/-0.0
2	Tube ID (min)	mm	1.2	1.2	1.2	1.4
3	Tube OD	mm	1.9± 0.1	1.9± 0.1	1.9± 0.1	2.0 ± 0.1
4	No of fibre /tube	No	4	4	8	12
5	Color of fibre		BL,OR,GR, NAT	BL,OR,GR,NAT	BL,OR,GR,BR,SL SL WH, RED, NAT	BL,OR,GR,BR, SL WH, RED, BK, YL,V, PK, NAT
6	No of loose tubes	No	3	6	6	8
7	Colour of loose tubes		BL,OR,GR	BL,OR,GR,BR,SL,WH	BL,OR,GR,BR,SL,WH	BL,OR,GR,BR,SL,WH, RD, BK
8	No of dummy cord	No	3	0	0	0
9	Tube stranding lay over length	mm	90-110	90-110	90-110	100-120
10	Inner Sheath Thickness (Min.)	mm	1.2	1.2	1.2	1.2
11	Qty. of Impregnated Glass roving (min.)	Kg	20	20	20	20
12	Outer Sheath Thickness (Min.)	mm	1.6	1.6	1.6	1.6
13	Cable diameter	mm	12.8±0.5	13.2±1.0	13.2±1.0	14.5±0.5
14	Nominal cable weight	Kg/ km	140	140	140	175
15	Cable to be designed to Fibre strain value of.	%	0.1	0.1	0.1	0.1
16	Excess fibre length	%	0.65	0.65	0.70	0.70
17	Cable to be tested at defined load for fibre strain value of	%	0.25	0.25	0.25	0.25



Appendix-D

Annexure-II

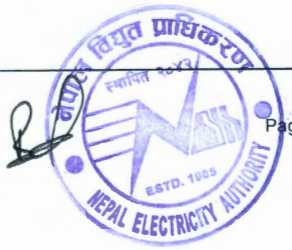
DRY DRY CORE CABLE DESIGN (Without Ice Loading)

The following parameters of the component parts of the cable are to be taken in to account while designing and manufacturing the optical fibre cables of the required fibre count. These parameters shall be checked during evaluation of the OF cables:

S N	Parameter	Unit	12 Fiber OF Cable	24 Fiber OF Cable	48 Fiber OF Cable	96 Fiber OF Cable
1	FRP Rod EAA Coated	mm	2.3+0.1/-0.0	2.3+0.1/-0.0	2.5+0.1/-0.0	3.0+0.1/-0.0
2	FRP up jacketing thickness	mm	0	0	0	0.6
3	Tube ID (min)	mm	1.4	1.4	1.7	1.7
4	Tube OD	mm	2.2 ± 0.1	2.3 ± 0.1	2.4 ± 0.1	2.4 ± 0.1
5	No of fibre / tube	No	4	4	12	12
6	Color of fibre		BL, OR, GR, NAT	BL, OR, GR, NAT	BL, OR, GR, BR, SL, WH, RD, , NAT	BL, OR, GR, BR, SL, WH, RD, BK, YL, VI, PK, NAT
7	No of loose tubes	No	3	6	4	8
8	Color of loose tubes		BL, OR, GR	BL, OR, GR, BR, SL, WH	BL, OR, GR, BR, SL, WH	BL, OR, GR, BR,SL,WH,RD,BK
9	No of dummy cord	No	3	0	2	0
10	Tube stranding lay over length	mm	90-110	90-110	90-110	100-120
11	Aramid Yarns-Min	Kg/Km	10	10	10	13

12	Cable diameter	mm	14.0 ± 0.5	14.0 ± 0.5	14.5 ± 0.5	16.0 ± 0.5
13	Nominal cable weight	Kg/Km	135-160	135-160	140-170	185-210
14	Cable to be designed to Fiber strain value of.	%	0.1	0.1	0.1	0.1
15	Excess fibre length	%	0.7	0.7	0.7	0.7
16	Cable to be tested at defined load for fiber strain value of	%	0.25	0.25	0.25	0.25

** In case of 96F use of FRP with 4.2mm± 0.1mm diameter can also be allowed in place of up coating option.



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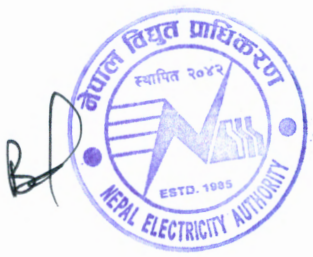
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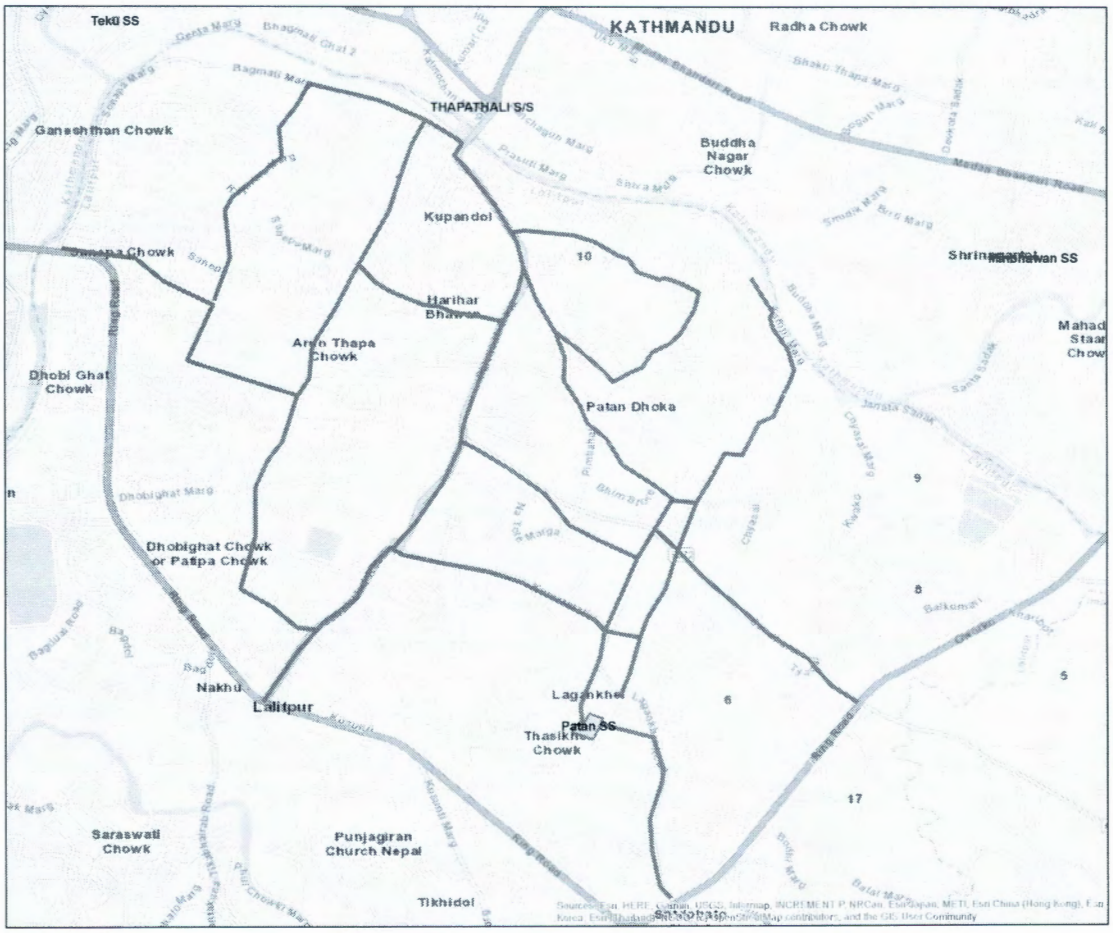
TENTATIVE STREET ROUTE OF LALITPUR



Legend

- TENTATIVE UG_LINE
- Minbhawansubstation
- Patansubstation
- Tekusubstation
- thapathaliswitchingstation
- World Street Map

0 0.225 0.45 0.9 1.35 1.8 Kilometers

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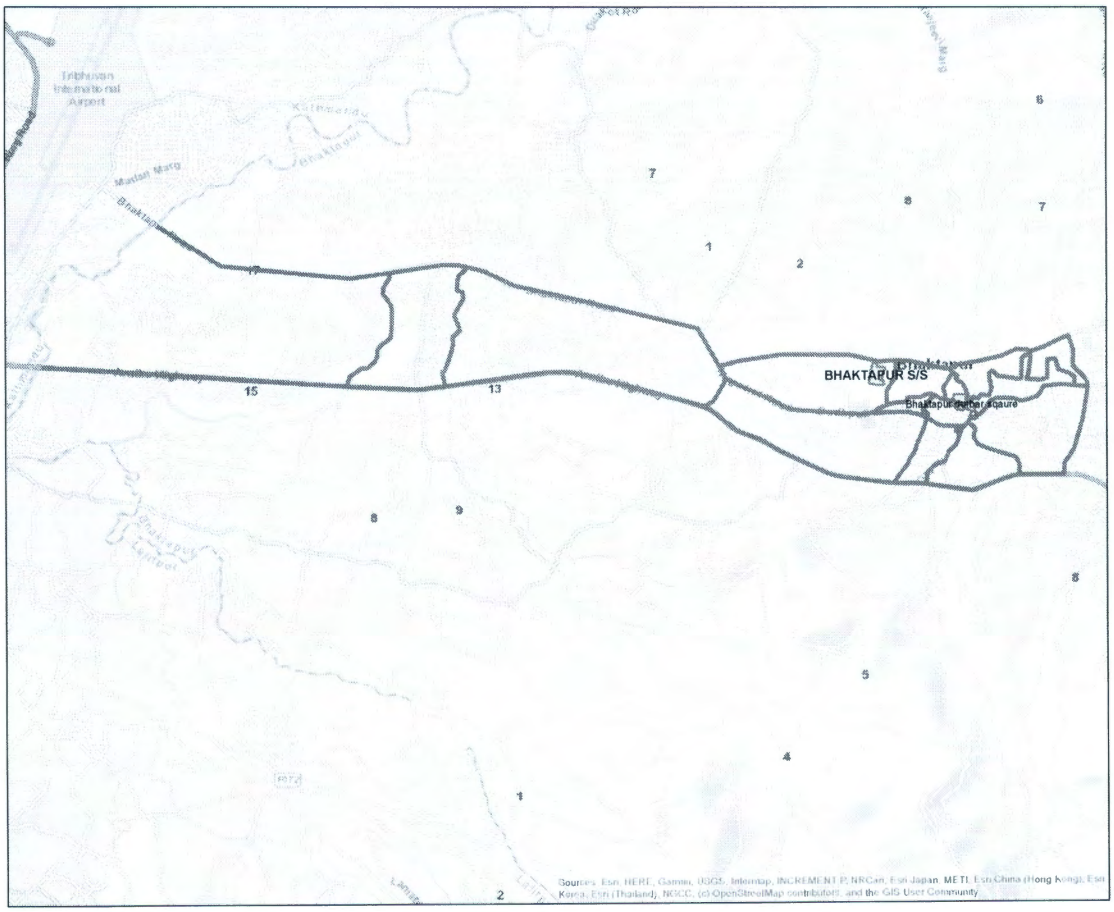
TENTATIVE STREET ROUTE OF BHAKTAPUR



N
W E
S

Legend

- TENTATIVE UG_LINE
- BHAKTAPUR_DURBAR_SQUARE
- BHAKTAPUR_SUBSTATION
- World Street Map

Kilometers

0 0.45 0.9 1.8 2.7 3.6

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Appendix-F


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Appendix-F

CHAINLINK FENCING AND GATE

General

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

Areas requiring Fencing

12.2.1 Fencing shall be provided to enclose the equipment area.

12.2.2 Internal fence surrounding the various equipment (if) mounted on ground and live part exposed to the surrounding. Necessary gates shall be provided for each area so surrounded.

Product materials

The minimum requirements are as follows:
Chain link fence fabric (galvanization) in accordance to relevant Indian standard codes (IS Codes)/ equivalent International Standards.

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 relevant Indian standard codes (IS Codes)/ 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 as per IS 2629 and IS 4759. The purity of zinc shall be 99.95% as per relevant BS.

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.

Installation

Post holes shall be excavated by approved method.
All posts shall be 3.0m apart measured parallel to ground surface.
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.
Fence fabric shall not be installed until concrete has cured a minimum of 7 days.
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.

Gate

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.
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.
The gates shall be provided with suitable locking arrangement welded on 4 mm thick MS plate on the gate leaf.

The main gate shall be 2.5.0m wide and shall be of double leaf.
Steel roller shall be provided with the gate.
Gate shall be installed in location from where the equipment's can easily be transported.
The vertical post of gate shall be embedded in PCC foundation of 500X500X1250 mm deep size.

Payment

Payment for the Contract item "Chain link fence including entrance gate" shall be made as the Price Schedule, the bid price shall include full compensation for all costs incurred in procurement of all materials, structural steel supports, Gates (double & single leaf), labour and all other operations, tools and tackles, and other operations related to the scope of work.