ANNEXURE I

Technical Quality Audit Parameters: Power Transmission

Pre-Implementation Stage

Sr. No.	Parameters	Benchmark	Reference Document	Indicator	Sub-Indicators	Maximum Marks	Weightage (%)
1	Planning and Design	Technical framework and comprehensive planning	DPR	1.1) Integrated planning for load growth estimation	1.1.1) Analysis of the existing Transmission network within a radius of 5-10 km of proposed site, its operational parameters, including loading conditions in reference to transmission and Distribution planning proposal.	3	25%
					1.1.2) Analyze quantitative and qualitative historical data for at least last 5 years and future assessment for at least 5 years in consultation with all stake holders to determine expected future load growth, considering both long and short term projections including specific scenario, if any.	3	
					1.1.3) Adequacy of design sub-station capacity incorporating for future expansion based upon 1.1.1, and 1.1.2 above	3	
					1.1.4) Adoption of technological intervention including automated tools such as adequate Communication system and IT infrastructure like SCADA, DMS, OMS, AMI etc.	3	
					1.1.5) Adoption of latest simulation software.	2	
				1.2) Load Flow Studies and short circuit, stability analysis	1.2.1) Determination of appropriate Substation capacity, and other system parameters and voltage levels considering maximum loading of Network and equipment based on load flow studies.	4	
					1.2.2) System operation within permissible limits both under normal as well as after probable credible contingencies.	4	

				1.3) Administrative approval of the individual/ Integrated Planning.	1.3.1) Approval of Integrated Planning by WTDs UHBVNL & DHBVNL / competent authority.	3	
				1.4) Selection of land	1.4.1) Selection of land keeping in view ROW.	3	
					1.4.2) Transfer of ownership of Government/Gram Panchayat land in the name of department.	2	
					1.4.3) Soil bearing capacity report, contour sheet and fixation of FGL of Sub Station before preparation of detail BOQ (Civil)	2	
					1.4.4) Walk over survey of transmission line based on HARSAC submission	2	
					1.4.5) Gazette notification of route of transmission lines.	2	
					1.4.6) Aesthetics and Horticulture Planning in the spare land of Substation	2	
				1.5) SS Design, layout, equipment design and drawings	1.5.1) Selection of grid sub-station is as per site condition such as indoor, outdoor, underground, Air Insulated (AIS), Gas Insulated (GIS) or Hybrid etc.	3	
					1.5.2) Selection of design parameters viz fault level analysis, protection scheme, Civil Design/Electrical Design as per Maximum capacity, Voltage level, fault level, etc. as per the latest CEA guidelines.	6	
					1.5.3) Grounding/earthing design as per site condition to ensure safety of equipment and personnel	2	
					1.5.4) Provision for equipment maintenance without interrupting the entire supply.	4	

				1.6) Design of transmission line/Sub Station considering quality and reliability of supply, functionality, maintainability and simplicity of operation	1.6.1) Protection grading, coordinated configuration to ensure the minimum zones are impacted by faults	4	
					1.6.2) Independent circuit breaker control of incoming and outgoing feeders.	2	
					1.6.3) Provision of two or more incoming feeders from two different sources for meeting N-1 contingency for reliability considerations.	4	
					1.6.4) Provision of two or more transformers for meeting N-1 contingency for reliability considerations	5	
					1.6.5) Provision of spare bay for catering to future load growth.	4	
					1.6.6) Provision of additional transformer of sufficient capacity for future load growth.	2	
					1.6.7) SS to cater to power quality parameters, viz voltage regulation, harmonics, and reactive power within the standard limits.	4	
				1.7) Cost analysis, budget planning, and timeline estimates.	1.7.1) Preparation of detailed BOQ as per scope of work approved by Planning wing based on site/GELO data	3	

					1.7.2) Cost Estimate (civil and electrical) based on BOQ (Capital and Operational Expenditure)	3	
					1.7.3) Financial implication with cost index upto implementation period	3	
				1.8) Award of work (Turnkey project) administrative and technical approval from the competent authority	1.8.1) Administrative and Technical approvals from the competent authorities	3	
					1.8.2) DNIT preparation, approval and call of tender.	4	
					1.8.3) Evaluation of tender, based on technical and financial bid analysis, and allotment of work order maintaining transparency.	6	
					TOTAL	**100**	

IMPLEMENTATION STAGE

Sr. No.	Parameters	Benchmark	Reference Document	Indicator	Sub-Indicators	Maximum Marks	Weightage (%)
2	Execution and implementation, inspection and testing	Technical Methodology for implementation	Contract Agreement	2.1) Detailed/final survey its verification on actual geographical conditions before permit to work	2.1.1) Joint survey by Construction Wing along with contractor before permit of work	5	40%
					2.1.2) Verification of regularity compliances by the contractor.	2	
					2.1.3) Coordination and clearances with government departments/private that may be necessary.	4	
					2.1.4) Timely handing over of hindrance free land to the executing agency	6	
				2.2) Execution of all Civil and Horticulture Works	2.2.1) Approval of all civil design drawings by the competent authority.	6	
					2.2.2) Placing of Purchase Order for various material by the contractor/department	6	
					2.2.3) Execution of civil work such as control room building, Tower/ Equipment foundations, earthing, fencing, cable trenches, horticulture, etc. as per technical specifications and approved design and as per site condition and corresponding standards.	6	
					2.2.4) Use of quality materials from approved source and required plant and machinery.	5	
					2.2.5) Inspection and testing of material at the supplier's works by Nigam Officer/TPA and quality checks as per relevant standards.	5	

					2.2.6) Sampling of material at site for testing in NABL accredited lab, if required.	2	
					2.2.7) Checking of test results by execution authority and action thereof.	2	
					2.2.8) Preparation of site inspection and quality control register and concrete register	2	
					2.2.9) Execution of all Civil and Horticulture Works as per the plan within specified time period.	6	
					2.2.10) Rectification of defects on regular basis and keeping the record	4	
				2.3) Execution of electrical works as per work order.	2.3.1) Approval of electrical drawings and SOMP of each equipment.	5	
					2.3.2) Placing of Purchase Order for the material/equipment by the contractor/department and inspection/testing of the same at the manufacturer's works by the department/TPA.	6	
					2.3.3) Preparation of site inspection and quality control register.	2	
					2.3.4) Joint verification report of all electrical material in form of MRC	5	
					2.3.5) Sampling and testing of material/equipment in NABL accredited lab, if required.	2	
					2.3.6) Checking of test results by execution authority and action thereof.	2	
					2.3.7) Execution of work as per guidelines laid down by Nigam and inspection by Quality Control Wing of Nigam	6	
					2.3.8) Monitoring of project by XEN/TS (project manager) on regular basis	4	

					2.3.9) Execution of work as per plan within specified time period.	4	
					2.3.10) Rectification of defects on regular basis and maintaining the record	3	
					TOTAL	**100**	

COMMISSIONING

Sr. No.	Parameters	Benchmark	Reference Document	Indicator	Sub-Indicators	Maximum Marks	Weightage (%)
3	Commissioning and Handover	Guidelines for Commissioning and handover of sub-station	Completion report. As per built drawings manuals	3.1) Testing complete functionality of substation and all its equipment.	3.1.1) Witness pre commissioning test of equipment by M&P as per standard guidelines.	15	15%
					3.1.2) Clearance of complete installation from the CEI (Chief Electrical Inspector)	10	
					3.1.3) Commissioning of sub-station as per check list/M&P observations	15	
					3.1.4) Post commissioning test of all electrical equipment as per work order/relevant equipment code	10	
					3.1.5) Handover of the sub-station to the department by the contractor	10	
				3.2) Submission of asset management plan and	3.2.1) Adherence to project timelines and Cost Projections	15	
					3.2.2) Completion certificate, plan and manuals submission	10	
					3.2.3) Guarantee against defective design, workmanship, and manufacturing defects. withhold of security amount	15	

				completion certificate and adhering to approved timelines and budget			
					TOTAL	**100**	

SAFETY AND SECURITY

Sr. No.	Parameters	Benchmark	Reference Document	Indicator	Sub-Indicators	Maximum Marks	Weightage (%)
4	Safety and Security	**Proper safety and security measures**	Safety Plan	4.1) Adherence to safety standards and regulations	4.1.1) All electrical safety requirements, electrical clearances, fire detection & extinguishing system, earthing & ventilation etc. as per standards.	20	5%
					4.1.2) Conformance to safety requirements by adhering to appropriate design standards.	15	
					4.1.3) To adopt regular safety and reliability audits of all major equipment of the network.	15	
				4.2) Provision of safety measures for workers and users	4.2.1) Provision of First aid kit, personnel protective equipment (PPE) viz safety helmet, safety glass, gloves, safety shoes, high visibility clothing, etc, Grounding, clearances, fire protection, fencing, etc).	15	
					4.2.2) Conducting regular mock drills to check the response system.	5	
					4.2.3) Work permit and authorization	5	
					4.2.4) Incident response and reporting	10	
					4.2.5) Provision of surveillance to curb unauthorized access	10	

					4.2.6) Display of all important safety instructions, precautions, exist signs, important telephone numbers, etc.	5	
					TOTAL	**100**	

OPERATION AND MAINTENANCE

Sr. No.	Parameters	Benchmark	Reference Document	Indicator	Sub-Indicators	Maximum Marks	Weightage (%)
5	Operation and Maintenance	Procedure for Effective Maintenance	Assets Management Plan	5.1) Regular operation and maintenance and replacement of material/equipment by contractor as per Work Order for specified period. Compliance to prescribed deliverable	5.1.1) Inspection and maintenance schedule development and its compliance	10	100%
					5.1.2) Use of software for maintenance scheduling and updates	10	
					5.1.3) Ensuring quality of power and other operational parameters as per SOMP.	10	
					5.1.4) Regular operation and maintenance and replacement of material/equipment by contractor as per Work Order for specified period	10	
				5.2) Timely rectification of defects	5.2.1) Emergency response planning	10	
					5.2.2) Availability of spare parts	5	
					5.2.3) Compliance of maintenance schedule	5	
					5.2.4) Grievance redressal and record keeping.	5	
				5.3) Regular operation	5.3.1) Adhering to material/equipment guarantee/warranty	10	
					5.3.2) Deployment of skilled manpower for O&M	5	

				and maintenance by Nigam after warranty period adhering to material/equipment guarantee/warranty	5.3.3) Deployment of manpower for general maintenance and security	5	
					5.3.4) Sub station O&M as per SOMP	5	
					5.3.5) Training and capacity building	5	
					5.3.6) Equipment maintenance and surveillance using latest technology such as thermal camera to detect hotspot, SCADA, etc	5	
					TOTAL	**100**	

Marking Criteria and Weightage

Sr. No.	Parameter	Marking Criteria	Weightage (%)	Marks Obtained
1.	Planning, Design		25*	
2.	Execution and implementation and inspection and testing		40*	
3.	Commissioning and Handover		15*	
4.	Safety and Security		5*	
5.	Project management	Adherence to project timelines and cost projection	5	
6.	Environmental Measures	Consideration of environmental factors like sustainability, eco-friendly construction practices	5	
7.	User Feedback	Feedback from beneficiaries, stack holders to access their satisfaction levels	5	
		TOTAL	**100**	
8.	Operation and Maintenance	Provision of a detailed maintenance plan post-construction	100	