Technical Clarification issued by End customer by considering the end customer Specifications and entire EPC players Queries

<table>
<tr><th>SL. No.</th><th>SEC/PART</th><th>Sub section</th><th>Page No.</th><th>Clause No.</th><th></th><th>Queries / Comments</th><th>NTPC's Clarification</th></tr>
<tr><td>1</td><td>Section-VI</td><td>PART-E</td><td></td><td></td><td></td><td>As per Tender documents, NTPC provided Typical Layout For BESS plant 50 MW/100 MWh and 100 MW/200 MWh only. Kindly provide the Typical Layout for BESS along with Substation area for stage wise all Seven Stations.</td><td>Typical layout drawings have been provided for reference, illustrating the required facilities for standard BESS capacities. The available area for each station is indicated in the tender documents. Based on these inputs, the bidder shall prepare and develop detailed layout drawings specific to each station location.</td></tr>
<tr><td>2</td><td>Section-VI
PART A</td><td>II</td><td>1/26</td><td>1.00.00</td><td>
<table>
<tr><th>Sl. No.</th><th>Plant</th><th>BESS (MW) rating</th><th>BESS (MWh) rating</th><th>Proposed Point of interconnection</th><th>Remarks</th></tr>
<tr><td>1.</td><td>Kudgi STPP</td><td>240</td><td>480</td><td>220kV</td><td>New Bay</td></tr>
<tr><td>2.</td><td>Mouda STPP Stage-I</td><td rowspan="2">200</td><td rowspan="2">400</td><td rowspan="2">132kV</td><td rowspan="2">New Bay</td></tr>
<tr><td>3.</td><td>Mouda STPP Stage-II</td></tr>
<tr><td>4.</td><td>Solapur STPP</td><td>132</td><td>264</td><td>132kV</td><td>New Bay</td></tr>
<tr><td>5.</td><td>Barh STPP Stage-I</td><td rowspan="2">200</td><td rowspan="2">400</td><td rowspan="2">132kV</td><td rowspan="2">New Bay</td></tr>
<tr><td>6.</td><td>Barh STPP Stage-II</td></tr>
<tr><td>7.</td><td>Nabinagar STPP Stage-I</td><td>200</td><td>400</td><td>132kV</td><td>New Bay</td></tr>
<tr><td>8.</td><td>Simhadri STPP Stage-II</td><td>70</td><td>140</td><td>400kV</td><td>New Bays</td></tr>
<tr><td>9.</td><td>Simadhri STPP Stage-I</td><td>75</td><td>150</td><td>400kV</td><td>New Bays</td></tr>
<tr><td>10.</td><td>Ramagundam STPP Stage-III</td><td>50</td><td>100</td><td>33kV</td><td>33kV Tie switchgear</td></tr>
</table>
</td><td>In tender Technical Specification (Scope of Supply and Service) Simhadri Super Thermal Power Station (290 MWh) Stage-I (75MW/150) and Stage-II (70 MW/140 MWh) are in single location or are in different locations .Please clarify.</td><td>BESS For stage-I and Stage-II are located at a single location. However, for connection to 400kV, 2 separate connections shall be considered ie. Stage-I (75MW/150) and Stage-II (70 MW/140 MWh).

For further details, please refer GLP and SLD for provided in Part E of the technical specifications.</td></tr>
<tr><td>3</td><td></td><td></td><td></td><td></td><td></td><td>Please confirm auxiliary power supply for BESS (during charging) and illumination system will be provided by NTPC at metering Point.</td><td>Auxilliary power supply arrangement for the BESS for charging, Discharging and idling periods including illumination shall be arranged by the bidder from the electrical system of the BESS as indicated in tender SLD.
No supply shall be provided by NTPC from electrical system of the host thermal power plant except for AC and DC supply of EHV switchyard bays (if applicable) under the BESS project.</td></tr>
<tr><td>4</td><td>Section-VI
PART A</td><td>III,
II</td><td>2/2,
14/26</td><td>1.00.00
2.01.00 16.</td><td>Construction power supply for the installation BESS system and associated
construction activities for each project shall be arranged independently by the
contractor.

16. CONSTRUCTION POWER
a) Bidder shall make its own arrangement for construction power for entire area of
work in its scope.
b) All necessary statutory requirements for charging construction power bidder's
network shall be in the bidder's scope.
c) All temporary cabling/wiring/switching arrangements must comply with local
regulations and will be subject to Employer's inspection and approval before
connection to supply.</td><td>Please clarify whether construction power will be provided by NTPC or to be arranged by the bidder.</td><td>Construction power to be arranged by Bidder and shall not be provided by NTPC. Please refer Clause No. 2.01.00 (16), Sub-Section II, Section VI, Part-A of Technical specifications.</td></tr>
<tr><td>5</td><td>Section-VI
PART A</td><td>II</td><td>16-17/26</td><td>2.02.01) ,2.02.02 (iii) and Tender SLD Drawings (9999-000-POE-A-001-2 & 9999-000-POE-A-001-3)</td><td>
<table>
<tr><th>Sl. No.</th><th>Plant</th><th>BESS (MW) rating</th><th>BESS (MWh) rating</th><th>Proposed Point of interconnection</th><th>Rating (Minimum)</th><th>Quantity [Working + Spare]</th></tr>
<tr><td>1.</td><td>Kudgi STPP</td><td>240</td><td>480</td><td>220kV</td><td>125MVA, 33kV/220kV</td><td>2+1</td></tr>
<tr><td>2.</td><td>Mouda STPP Stage-I and II</td><td>200</td><td>400</td><td>132kV</td><td>100MVA, 33kV/132kV</td><td>2+1</td></tr>
</table>
<table>
<tr><th>Sl. No.</th><th>Plant</th><th>BESS (MW) rating</th><th>BESS (MWh) rating</th><th>Proposed Point of interconnection</th><th>Rating of bays</th><th>Number of bays</th><th>Remarks</th></tr>
<tr><td>1</td><td>Kudgi STPP</td><td>240</td><td>480</td><td>220kV</td><td>245kV, 2000Amp, 40kA</td><td>2</td><td></td></tr>
<tr><td>2</td><td>Mouda STPP Stage-I and II</td><td>200</td><td>400</td><td>132kV</td><td>145kV, 2000Amp, 40kA</td><td>2</td><td></td></tr>
</table>
</td><td>As per tender condition,Kudgi STPP and Mouda STPP Stage –I and II quantity of Tie transformers are 2+1 no's but in tender SLD and Switchyard Bays tables it is mentioned are 2 no's at each location. Please Clarify.</td><td>One number spare transformer [Not working] has been considered at Kudgi and Mouda locations. This has been indicated in the table related to transformer ratings and quantity.

Since these are offline spares, these have NOT been considerd in the table related to switchyard/ number of bays required and in Tender SLD.</td></tr>
<tr><td>6</td><td>Section-VI
PART A</td><td>II</td><td>15/26</td><td>2.01.00 17.</td><td>17. Fire Detection and Protection System:
(a) Fire detection & protection system for BESS including automatic NOVEC/AEROSOL fire protection system with cylinders, piping, fire/gas detectors, fire control panel, fire dampers, manual call points, abort & emergency release switches, cabling & integration with fire alarm panel provided in BESS control room along with trays, switches & racks.</td><td>(a) Fire detection & protection system for BESS including automatic ~~NOVEC/~~ AEROSOL fire protection system with cylinders, piping, fire/gas detectors, fire control panel, fire dampers, manual call points, abort & emergency release switches, cabling & integration with fire alarm panel provided in BESS control room along with trays, switches & racks.

Also to add
For technical details refer clause no 2.00.00 : Fire Detection, Alarm and Control System (Pg 927)

Reason:
3M has discontinued the manufacturing of NOVEC due to its environmental impact, as the product contains PFAS substances.</td><td>Automatic Fire Suppression System shall be provided as specified at clause 2.01.00 (17), Sub-Section-II, Part-A of Technical Specfication.
Further, refer Technical Amendment-01 in this regard.</td></tr>
</table>

7	Section-VI PART B	A-02	8/11	3.00.00	FFS/FSS Suppressant used : Aerosol (UL Listed)	To add: For technical details refer clause no 2.00.00 : Fire Detection, Alarm and Control System (Pg 927)	Details of Fire Detection & Alarm System is already specified in Sub-Section-D (FDPS & HVAC), Part-B of Technical Specification.
8	Section-VI PART B	D	2/11	2.00.00	Fire Detection, Alarm and Control System	To add complete specification of Aerosol as per enclosed technical details. NFPA 855 specifies BESS protection of the container should be done by dual activation condensed Aerosol UL Listed Systems. NFPA 855 standard enclosed herewith for your ready reference.	Bidder to refer clause 2.01.00 (17), Sub-Section-II, Part-A of Technical Specfication.
9	Section-VI PART B	E QA	1017/1175 (Bid doc)	Annexure-III	LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB VENDOR APPROVAL	To add another item category as follows: **Fire protection system (UL Listed Aerosol)** Proposed Sub Vendor : FirePro Country : Cyprus Reason: The sub-vendor approval list should also include the name and country for the Fire Protection System (UL Listed Aerosol) category, as specified for all accessories.	Item categorization and vendor list shall be finalized during detail engineering after award of contract.
10					Please specify the Voltage Drop of the Cables from Battery to MHTP		Voltage drop shall be as per design finalized during detailed engineering stage
11						Please do mention that are we have to use Single core Cable or Multi core cable in 33kV Power Evacuation	33kV Cables from IDT to pooling switchgear and from Pooling switchgear to BESS Tie transformer/Owners switchgear (as applicable) shall be Single core cables considering the Single phase/Earth fault current requirements.
12						Kindly provide the details of the existing Main High Tension Panel (MHTP) that is to be integrated with the Battery Energy Storage System (BESS)	MHTP/33 KV pooling switchgear is under Bidder's scope
13	Inverter Duty Transformers:			2.01.00	One number IDT with same rating shall be provided as spare forEACH location. Necessary transformer maintenance and monitoring equipment'sshall be provided.		Bidders query NOT available. Bidder to comply with specification requirements
14	Auxiliary transformer			2.01.00	Necessary redundancy shall be maintained such that there is no loss of auxiliarypower supply in case of outage of Single Auxiliary Transformer.		Bidders query NOT available.Bidder to comply with specification requirements
15					Comprehensive Annual Maintenance Contract (CAMC)		Bidders query NOT available.Bidder to comply with specification requirements
16	POWER CONDITIONING UNIT			1.05.00	Same size and same make of PCS is recommended for the whole plant.	The PCS transformer block size and PCS rating shall be determined based on the available land plot area and the DC capacity. Flexibility shall be maintained in the selection of PCS transformer block sizes to prevent excessive length and avoid over-sizing	Bidders proposal is accepted. Different rating of IDT (PCS transformer) may be considered as per design requirement, however all relevant clauses of technical specifications including provision of additional spare transformer shall be applicable for ALL ratings of IDT selected.
17	EARTHING SYSTEM			5.01.00	Earthing system network/earthmat shall be interconnected mesh of mild steel rods buried inground in the plant. All areas under contractor scope of supply shall be interconnected togetherby minimum two parallel conductors.	1. The bidder confirms that the earth strip will be provided based on the actual fault current. 2. For the ICR block earthing design, the system fault current with the device operating time has been considered as 25 kA for 250 ms. Kindly confirm if this is acceptable	Bidder to comply with requirements of technical specifications
18					"All cables upto 33kV Pooling switchgear shall be laid in cable trenches. Cables beyond 33kV pooling switchgear upto identified PoI including all EHV cables may be laid in buried arrangement. "		Bidders query NOT available.Bidder to comply with specification requirements
19	Energy Management System			11.0.0	The HSRS shall collect, store and process system data from MMIPIS data base. The data shall be saved online and automatically transferred to nonerasable long term storage media once in every 30 Days periodically for long term storage	MMIPIS Database.Please clear what is MMIPIS	MMIPIS: Man-Machine Interface and Plant Information System
20				13.0.0	HMIPIS HARDWARE The HMIPIS as specified shall be based on latest state-of-the-art Workstations and Servers and technology suitable for industrial application & power plant environment.	What is HMIPIS	HMIPIS: Human-Machine Interface and Plant Information System
21	GENERAL					Can you please confirm the width of internal roads,access roads and pheriphary roads if there are any, or can we assume with the industrial standards.	1)Bidder to refer Typical Layout of BESS plant of PART E- Tender drawing,for Internal road/ heavy duty paving width. 2)For width of approach pathway(heavy duty) connecting to existing road , Bidder to refer Technical Amendment No.01
22	TECHNICAL SPECIFICATION FOR EPC PACKAGE FOR DEVELOPMENT OF BESS AT NTPC THERMAL POWER STATIONS (Part 1 of 3)			9.00.00	All gates shall be of structural steel of minimum 3.75 metre width for single lane access road. The height of gate shall be same as that of the fence unless noted otherwise. Each gate shall have provision for wicket gate of size 1.0 m x 2.1 m.	Please specify the number of gates required.	Bidder to refer Amendment 01

23	GENERAL					please specify the size of security cabin and height of the watch tower if any.	Watch tower is not scope of bidder. Bidder to refer technical amendment no.01 in regards to Guard Room / Security Cabin / Watchman Cabin.
24	GENERAL					please specify the number of security cabin and watch tower if any or can we assume it with industrial standards	Watch tower is not scope of bidder. Bidder to refer technical amendment no.01 in regards to Guard Room / Security Cabin / Watchman Cabin.
25	GENERAL					Please specify the size of MCR or can we assume according to industrial standards.	Bidder's query is not clear. Bidder to comply with the Technical Specifications.
26	GENERAL					Please specify the size of storage area if any or can we assume it with industrial standards of 150 open fence.	Construction stores (covered) & open stores are temporary facilities . Bidder to refer clause 2.00.00 of Part A,Sub-Section IIA, , Section VI of Techncial Specification
27	GENERAL					Pls specify the size of switch yard or can we assume it according to the industrial standards.	Size of switchyard shall be asper number of bays, CEA technical standards for construction and Sub-Section B-11A, Part B, Section VI of Technical Specification
28	GENERAL					For the of calculation can we consider leveling 300mm from NGL please confirm	Bidder to refer the Amendment No-1
29	GENERAL					Please specify the size of car parking. or how many car parking we have to provide. car parking roof will be solar or Normal shed. ?	Car parking is not scope of the Bidder
30	GENERAL					Please share the kmz file. or the BESS area coordinates.	The identified BESS locations are situated within existing NTPC plant premises. The grid references with local coordinates are clearly marked in the GLP document included in the tender drawings.
31	TECHNICAL SPECIFICATION FOR EPC PACKAGE FOR DEVELOPMENT OF BESS AT NTPC THERMAL POWER STATIONS (Part 1 of 3)			13.04.00	Peripheral drains by side of plinth protection around building shall have perforated precast RCC covers of minimum 50mm thickness with provision of openable steel grating cover at about 4.0m interval. In areas where vehicular loads would be coming precast RCC covers of suitable thickness without perforations and designed for the vehicular loading shall be provided	Kindly allow to the earthern drain or PCC trapezoidal drain with chicken mesh that will help bidder to optimize the cost	Bidder's proposal is not acceptable. Bidder to comply Technical Specification
32	TECHNICAL SPECIFICATION FOR EPC PACKAGE FOR DEVELOPMENT OF BESS AT NTPC THERMAL POWER STATIONS (Part 1 of 3)			9.00.01	The RCC precast/cast in situ reinforced concrete columns and footing shall be minimum 1500mm below finished formation level with suitable foundation designed for horizontal and vertical loads. The precast reinforced concrete panels/ cast in situ RCC panels shall be at least 600m below formation level. The RCC precast concrete columns/ cast in situ RCC panels of minimum size 300mmX350mm shall be provided with two grooves of minimum size 115mmX50mm, so as to receive Precast Concrete RCC panels spanning from column to column with minimum width of 600mm and minimum thickness of 100mm as filler wall. The grade of concrete for all precast/cast in situ work shall be of M30 grade conforming to IS 456.	Kindly verify whether the pheriphary boundary will be chain link or pre cast	If the BESS is located outside the plant boundary, a precast boundary wall shall be constructed around it as per the applicable technical specifications. However, if the BESS is situated within the plant boundary, it shall be enclosed with chain link fencing.
33	GENERAL					please specify the fire wall locations and width	Shall be finalized during detail engineering based on the GA of transformer and as per Statutory requirement
34	TECHNICAL SPECIFICATION FOR EPC PACKAGE FOR DEVELOPMENT OF BESS AT NTPC THERMAL POWER STATIONS (Part 1 of 3)			3.03.02	Bidder shall provide Complete sewerage system including Sewage Treatment Plant for facilities within the BESS area. Bidder shall provide 'Decentralized Sewage Treatment' units. The capacity of the Decentralized Sewage Treatment' unit should be as per the design requirements, subject to minimum combined capacity of 10 Cum/day.	Kindly specify whether we are required to construct a **Sewage Treatment Plant (STP)**, or if a **septic tank** system would be sufficient for the project.	Bidder has to provide packaged Sewage Treatment Plant as per Technical Specification.
35	GENERAL					Kindly provide with the RFP of fire protection system.	Requirements of Fire Detection & Protection System are already specified in Part-A and Part-B of Technical Specification.
36	GENERAL					Kindly confirm whether a **water treatment system** is required for this project.	Water treament System is not included in bidder's scope of work.
37	GENERAL					Kinldy Confirm Local Content % for Inverteres.	Bidder to comply with requirements of technical specifications as indicated in clause 18.00.00 of Part C, section VI of the technical specifications
38						Kindly clarify whether Black Start capability is a mandatory requirement for the BESS project. If yes, please provide the technical and operational expectations regarding the implementation, including modes of operation, system integration, and any applicable standards or guidelines to be followed	Black start capability is mandatory function requirement. Requirements have been covered in sub section A-01, Part B section VI of the technical specifications

39						Please confirm whether type testing is mandatory for the Battery Energy Storage System (BESS) and Power Conversion System (PCS). If mandatory, kindly specify the applicable standards, the required type tests, and the validity period of test reports as per NTPC guidelines	1. Requirement of Type testing shall be as per Clause 2.02.06 andClause 7.01.00 of Sub Section-II, Part A, Section VI of the technical specifications. Further, it shall be the responsibility of the Contractor to substantiate the compliance for CEA Regulations as applicable. 2. Type testing shall be as per standards identified in the relevant chapters of the BESS system under Section VI, Part-A and Part-B of the Technical Specifications, or other applicable and latest revisions of relevant IEC/IS standards. 3. Validity of Type Test reports shall be as per Clause 2.02.06 of Sub Section-II, Part A, Section VI of the technical specifications
40						Please confirm the NTPC pre-approved vendor list specifically for the IDT transformer. If such a list exists, we request access to the most recent version to ensure compliance during planning and procurement	The sub-vendor for the IDT transformer may be proposed by the successful bidder during detailed engineering after finalisation of required rating, subject to meeting the technical specification requirement, sub-QR clearance and successful type testing, as applicable. The proposed sub-vendor shall be assessed as per NTPC standard procedures.
41						Kindly confirm if there is a mandatory list of spare parts for the Battery Energy Storage System (BESS), Power Conversion System (PCS), and Energy Management System (EMS). If such a list is available, please share the document or guidelines to ensure accurate estimation and procurement	No specific mandatory spares list for these items has been provided in specifications however bidder is advised to maintain sufficient spare of all system/equipment under BESS to support the bidder in statisfactorily fulfilling its oblications as specified under Functional Guaranteess during trial run and CAMC periods.
42						Please confirm whether the LV switchgear control system is required to be integrated with the Energy Management System (EMS). If integration is mandatory, kindly provide details regarding the interface requirements, communication protocols, and any specific functionalities that need to be supported	The integration of EMS/SCADA with LV Switchgear shall be as per Clause no. 1.07.00 (iv) of Sub-Section A-04, Part B, Section VI of the Technical Specifications. Any additional integration of the LV system with EMS/SCADA as required for the safe and reliable operation of the BESS system shall also be included in the bidder's scope. Please refer Clause 2.01.00 (10), Sub-Section-II, Part-A of Technical Specification. Further details shall be finalized during detailed engineering.
43						We seek clarification on the provenness criteria mentioned in the tender specification. Specifically, are we required to disclose the details of the OEMs involved in the scope of supply? Additionally, please confirm if any supporting documentation must be submitted along with the bid to validate the OEM's provenness record	For all equipments indicated in the provenness criteria, necessary documents have to be shared with the employer in the format placed as Attachment 3K placed in the tender documents by the successful bidder during detailed engineering.
44						We request confirmation of the exact metering point for auxiliary power measurement. This will help us ensure accurate planning and compliance with the metering scheme specified in the tender. Clarification on whether the metering is to be done in the specific location	Bidder shall draw auxuilliary power from electrical system of BESS as indicated in the tender SLD. At all such drawl points, metreting arrangement is required to be provided by bidder to measure the total auxuilliary power consumed by BESS.
45						Kindly confirm whether the auxiliary power for the BESS (Battery Energy Storage System) project will be provided through a separate dedicated source or if it needs to be drawn from the same Point of Interconnection (POI) where the BESS is being integrated. Additionally, please clarify whether the RTE (Round Trip Efficiency) should be calculated considering the auxiliary power supplied separately, or from the POI supply. Furthermore, we request confirmation of the exact metering point for auxiliary power that will be used for RTE calculation in the BESS project.Please confirm the communication details for the BESS plant EMS to AGC of NTPC	Bidder shall draw auxiliary power from electrical system of BESS as indicated in the tender SLD. At all such drawl points, metreting arrangement is required to be provided by bidder to measure the total auxuilliary power consumed by BESS. RTE specified in the documents is inclusive of BESS auxiliary power requirement. Communication media from AGC to EMS may be hardwired/OFC and shall be decided during detailed engineering stage as per technical feasibility.

46						Please provide confirmation and detailed specifications regarding the communication interface required between the BESS plant's EMS (Energy Management System) and the AGC (Automatic Generation Control) system of NTPC. This includes communication protocol, data points, communication medium (fiber, Ethernet, etc.), and any cybersecurity requirements, if applicablePlease confirm the space allocation details only for the BESS systems and the separate space available in the substation for the bay and power transforme	Please refer Clause 2.01.00 (6), Sub-Section-II, Part-A of Technical Specification. Further details (if any) shall be finalized during detailed engineering. Latest Cyber security guidelines of GoI and as notified by CEA/NLDC shall be applicable Space shall be made available in the switchyard for extension of bays in switchyard as indicated in technical specifications. Location of Power transformer is within the BESS block except for Simadhri where transformer is proposed to be located infront of switchyard bay.
47						Kindly confirm the space allocation details specifically designated for the BESS systems. Additionally, please confirm whether separate dedicated space is available within the substation premises for the installation of the associated bay and power transformer.	Location of BESS at each plant is indicated in the tender drawings. space shall be made available in the switchyard for extension of bays in switchyard as indicated in technical specifications. Location of Power transformer is within the BESS block except for Simadhri where transformer is proposed to be located infront of switchyard bay.
48						Please clarify whether it is necessary to install additional Air Circuit Breakers (ACBs) between the Power Conversion System (PCS) and the Interfacing Distribution Transformer (IDT), even if the PCS units are already equipped with inbuilt output ACBs. This is critical for finalizing the protection scheme and system design	Bidders proposal of providing ACB's as part of PCS is technicaly accepted
49						Kindly confirm the approved method for cable laying in this project. Specifically, whether the power and control cables are required to be laid in separate cable trenches or if direct burial in the soil is permissible, considering safety and maintenance accessibility	Bidders Query NOT specefic. Different types and voltage grades have been considered/specified with different laying configurations in the technical specifications. Kindly refer subsection II of part A and Subsection B-07 of Part B of section VI of technical specifications formore details
50						Please confirm whether the firefighting system for the new BESS installation can be integrated with the existing firefighting system at the substation, or if a completely independent firefighting arrangement is required for the BESS infrastructure	No integration with existing fire detection & protection system is envisaged. A completely independent firefighting arrangement is required for the BESS infrastructure as per specification. Bidder to comply with specification requirements.
51						Kindly Provide Point of interconnition for each Thermal Power Stations	Point of interconnection at ech project are already indicated in technical specifications
52						Kindly Provide Size of the land for BESS Other than Ramagundam & Kudgi	Bidder to refer Sub Section IB (Project Information) of Part A, Section VI of Technical Specfication in this regard
53	TECHNICAL SPECIFICATION PART-A	SUB SECTION I-A PROVENNESS, Cl. 1.00.00			BATTERY SYSTEM: If the bidder itself has not manufactured or supplied Batteries for grid interactive battery energy storage system of cumulative installed capacity of minimum 20 MWh, out of which at least one grid interactive battery energy system should be of 5 MWh capacity or higher, in that case the bidder shall associate/collaborate for procurement/ sourcing of batteries from Battery Manufacturer who has manufactured and supplied Batteries.....	Bidder understands "the bidder shall associate/collaborate for procurement/ sourcing of batteries from Battery Manufacturer who has manufactured and supplied Batteries" means bidder may not directly procure BESS battery from Battery Manufacturer and can make such procurement from an intermediary entity also which in turn can procure the battery from Battery Manufacturer who has manufactured and supplied Batteries of cumulative capacity of minimum 20 MWh for grid interactive battery energy storage system(s), out of which at least one reference grid interactive battery energy storage system should be of minimum 5 MWh capacity supplied in a single order. NTPC may clarify and confirm.	Bidder's understanding is not correct. Bidder to comply with technical specification requirements.
54	TECHNICAL SPECIFICATION PART-A	SUB SECTION I-A PROVENNESS, Cl. 3.00.00			ENGINEERING CONSULTANT/ SYSTEM INTEGRATOR: If the bidder itself has not done integration of grid interactive battery energy storage system of cumulative installed capacity of 20 MWh or higher, out of which at least one project should be of 5 MWh capacity or higher, in that case the bidder shall employ Engineering Consultant/ system integrator who should have done integration of grid interactive battery energy storage system of cumulative installed capacity of 20 MWh or higher, out of which at least one project should be of 5 MWh capacity or higher.	Bidder understands that the ENGINEERING CONSULTANT/ SYSTEM INTEGRATOR employed by the bidder should have done design/engineering of grid interactive plant of capaciity specified by NTPC. NTPC may clarify whether the ENGINEERING CONSULTANT/ SYSTEM INTEGRATOR employed by the bidder should have done "have done integration of grid interactive battery energy storage system of cumulative installed capacity of 20 MWh or higher, out of which at least one project should be of 5 MWh capacity or higher" or it should have done design/engineering of grid interactive battery energy storage system of cumulative installed capacity of 20 MWh or higher, out of which at least one project should be of 5 MWh capacity or higher.	Refer technical amendment-01

<table>
<tr>
<td>55</td>
<td>TECHNICAL SPECIFICATIONS
SECTION VI, PART-A</td>
<td>SUB SECTION I-B
PROJECT INFORMATION

Cl. 1.07.00
OTHER DETAILS</td>
<td></td>
<td></td>
<td>The following clearances shall be arranged by bidder. However, necessary documentations/ applications shall be in the name of NTPC.
<table>
<tr><th>SL</th><th>ITEM</th><th>DETAILS</th></tr>
<tr><td>1</td><td>MOEF Clearance</td><td>Shall be arranged by NTPC, wherever applicable</td></tr>
<tr><td>2</td><td>PCB Clearance (SPCB/CPCB)</td><td>Application by NTPC.
Inputs for application & processing to be facilitated by bidder</td></tr>
<tr><td>3</td><td>MNRE Clearance</td><td>To be facilitated by bidder</td></tr>
<tr><td>4</td><td>Chief Electrical Inspector Clearance</td><td>To be facilitated by bidder</td></tr>
<tr><td>5</td><td>Tree Cutting Permission</td><td>To be facilitated by bidder</td></tr>
<tr><td>6</td><td>Section 68, 164 and RoW clearance</td><td>Application by NTPC.
Inputs for application & processing to be facilitated by bidder</td></tr>
<tr><td>7</td><td>Clearance from Directorate of Factories, if applicable</td><td>To be facilitated by bidder</td></tr>
</table></td>
<td>Bidder understands all these clearances/approvals shall be obtained by NTPC. Bidder requests NTPC to clarify the meaning of "facilitation by bidder" and clearly specify the activities to be undertaken by contractor for NTPC to obtaine the required clearances. Any delay in obtaining such clearances shall be the solely attributable to NTPC without any financial/time implications to contractor.</td>
<td>Refer technical amendment-01</td>
</tr>
<tr>
<td>56</td>
<td>TECHNICAL SPECIFICATIONS
PART-A</td>
<td>SUB SECTION IV
FUNCTIONAL GUARANTEES & LIQUIDATED DAMAGES

Cl. 01.03.00

Cl. 2.02.01</td>
<td></td>
<td></td>
<td>Commencement of PG Test: The PG Test shall commence only upon the Contractor successfully demonstrating the following at the point of interconnection (PoI):
(i) Power output capability (MW) and energy storage capacity in MWh as per
Table-1 of Sub-Section-II of Part A of technical specifications.
(ii) Frequency response of BESS.
(iii) Ramping capability as per design.
(iv) Reactive power at the PoI as specified in technical specifications.
The start of 'Year-1' shall be the date of commencement of PG Test.

Conclusion of the PG Test: The PG Test shall conclude after completion of one (1) year from its commencement.

Commencement of CAMC Period: The CAMC Period shall commence upon the completion of PG Test and shall continue for a period of eleven (11) years thereafter.</td>
<td>Bidder understands that 1year PG test shall commence immediately after completion of demonstartion tests to NTPC. The CAMC Period shall commence upon the completion of PG Test and shall continue for a period of eleven (11) years thereafter and that there is no Trial run period is in between the PG test and CAMC. NTPC to confirm. Also, NTPC may confirm that commencement of CAMC shall not be linked to Operational Acceptance after completion of PG test by NTPC. NTPC may confirm.</td>
<td>Trial Operation shall be completed before the start of One year PG test period.

CAMC period is proposed to start immediately after the completion of 1-year PG test period. For details regarding start and end of PG test and start of CAMC period, please refer Sub Section IV, Part-A, Section VI of the Technical Specifications.</td>
</tr>
<tr>
<td>57</td>
<td>TECHNICAL SPECIFICATIONS
PART-A</td>
<td>SUB SECTION IV
FUNCTIONAL GUARANTEES & LIQUIDATED DAMAGES</td>
<td></td>
<td></td>
<td>General Notes:
i) Each of the Liquidated damages specified above shall be independent and these liquidated damages shall be levied concurrently as applicable.</td>
<td>Bidder requests NTPC to review and relax the imposition of LDs duet RTE, Availabilty and Capacity degradation and these are interrelated performance factors. Deterioration of 1 factor itself affects the achivement of other factors. Eg. Availability itself shall impact the RTE.
In such scenario, imposition of LDs concurrently is resulting in double penalisation of the contractor.
Bidder request NTPC to review and relax the said Clause.</td>
<td>Liquidated damages have been considered in line with the losses occuring to owner incase BESS system does not meet the requisite performance guaranteess during the operation period. Accordingly, bidder to comply with the technical specification requirements.</td>
</tr>
<tr>
<td>58</td>
<td>TECHNICAL SPECIFICATIONS
PART-A</td>
<td>SUB SECTION IV
FUNCTIONAL GUARANTEES & LIQUIDATED DAMAGES

Terms of Payment:
K. Schedule-6:
Payment Terms for Year-wise Comprehensive Annual Maintenance Contract (CAMC)</td>
<td></td>
<td></td>
<td>General Notes:
iv) The LD recovery in respective CAMC year shall be limited to the percentage of Comprehensive Annual Maintenance Contract value (Third Contact) as defined in the table below.
<table>
<tr><th>Year after completion of PG Test</th><th>%age of CAMC</th></tr>
<tr><td>Year-1</td><td>7%</td></tr>
<tr><td>Year-2</td><td>7%</td></tr>
<tr><td>Year-3</td><td>7%</td></tr>
<tr><td>Year-4</td><td>7%</td></tr>
<tr><td>Year-5</td><td>9%</td></tr>
<tr><td>Year-6</td><td>9%</td></tr>
<tr><td>Year-7</td><td>9%</td></tr>
<tr><td>Year-8</td><td>9%</td></tr>
<tr><td>Year-9</td><td>12%</td></tr>
<tr><td>Year-10</td><td>12%</td></tr>
<tr><td>Year-11</td><td>12%</td></tr>
<tr><td>Total</td><td>100%</td></tr>
</table>
v) Contractor's aggregate liability to pay liquidated damages for failure to attain the functional guarantee shall not exceed twenty five percent (25%) of the Total Contract Price.

The percentage in which CAMC charges shall be paid to the contractor is as follows:
<table>
<tr><th>Year after completion of PG Test</th><th>%age of CAMC</th></tr>
<tr><td>Year-1</td><td>7%</td></tr>
<tr><td>Year-2</td><td>7%</td></tr>
<tr><td>Year-3</td><td>7%</td></tr>
<tr><td>Year-4</td><td>7%</td></tr>
<tr><td>Year-5</td><td>9%</td></tr>
<tr><td>Year-6</td><td>9%</td></tr>
<tr><td>Year-7</td><td>9%</td></tr>
<tr><td>Year-8</td><td>9%</td></tr>
<tr><td>Year-9</td><td>12%</td></tr>
<tr><td>Year-10</td><td>12%</td></tr>
<tr><td>Year-11</td><td>12%</td></tr>
<tr><td>Total</td><td>100%</td></tr>
</table></td>
<td>1. As per the tender conditions against LD during CAMC and Terms of Payment for CAMC, bidder undertands that the maximum limit of LD during CAMC period shall be limited to 100% of CAMC contract value. NTPC may kindly confirm.

2. Also, as per Cl. No. 5.2 of Section -II, BDS, the price for Comprehensive Annual Maintenance (quoted in Schedule 6) should not be less than 11% of the Total Contract price (excluding price for Comprehensive Annual Maintenance quoted in Schedule 6). However,NTPC has also indicated that the aggregate libility in LD shall not be more than 25% of Total contract Value. NTPC may clarify how 25% LD will be paid when the CAMC contract value is on 11%.

3. NTPC is also requested to clairfy whether 25 % max LD in inclusive of 5% max LD in case of delay in commissioning of project.</td>
<td>1. Bidder's understanding is correct.

2. The LD limit of 25% of the Total Contract Value is the overall cumulative cap up to completion of PG Tests and for the CAMC period combined. However, during the CAMC period, the LD shall be limited to a maximum of 100% of the CAMC contract value.

3. Bidder's understanding is not correct. Bidder to comply with the requirements of bidding documents.</td>
</tr>
</table>

59	SECTION - VI	PROVENNESS CRITERIA 1.00.00 BATTERY SYSTEM			BATTERY SYSTEM If the bidder itself has not manufactured or supplied Batteries for grid interactive battery energy storage system of cumulative installed capacity of minimum 20 MWh, out of which at least one grid interactive battery energy system should be of 5 MWh capacity or higher, in that case the bidder shall associate/collaborate for procurement/sourcing of batteries from Battery Manufacturer who has manufactured and supplied Batteries of cumulative capacity of minimum 20 MWh for grid interactive battery energy storage system(s), out of which at least one reference grid interactive battery energy storage system should be of minimum 5 MWh capacity supplied in a single order. The reference grid interactive battery energy storage system of 5 MWh or higher capacity should have been successfully commissioned at least six (6) months prior to the date of techno-commercial bid opening.	Bidder understanding is Battery Manufacturer includes Battery System integrator/Manufacturers (from Racks to containers and assembling containers with BMS , HVAC , FFS , etc). Customer may confirm.	Bidder's understanding is correct.
60	SECTION - VI	APPENDIX - 4 to SUB SECTION I-B			Corrosive Category C3- All Projects (Except Simhadri & Dadri) C5- for Simhadri and Dadri Project	Bidder understaning is Dadri BESS is not in LOT1 NTPC BESS tenders Customer may confirm.	Confirmed
61	SECTION - VI				For Bongaigaon TPP, separate 220V DC battery and Charger is to be provided which shall meet the load requirements of GIS switchyard also.	Bidder understaning is Bongaigaon TPP BESS is not in LOT1 NTPC BESS tenders Customer may confirm.	Confirmed. Refer Technical amendment-1.
62	SECTION - VI	22. CCTV:			The minimum quantities of CCTV cameras shall be 15 of which 5 cameras shall be of PTZ type. The exact location shall be finalized at site during detail engineering/commissioning. The CCTV system shall be integrated with EMS system.	CCTV camera's will be provided as per site requirment. Since all the projects are within site premises ,customer may accept the same.	Specification requirement is clear. Bidder to comply with the Technical Specification.
63	SECTION - VI				Rating and Quantity of BESS Tie Transformers applicable for each project are indicated in the table below:	NTPC may provide the ratings of the BESS Tieup power transformers including reactive compensation and other requirements if any.	1. Ratings and quantity of BESS tie transformer for each project are indicated in the tender documents 2. The requirement and sizing of reactive power compensation shall be based on system studies to be carried out by the bidder and shall comply with CEA (Technical Standards for Connectivity to the Grid) Regulations and applicable grid code provisions. Accordingly, suitable reactive power compensation devices shall be provided by the bidder.
64	SECTION - VI				400kV Transmission Line: Material including Towers, conductors, OPGW, Hardware, Earthing Material etc. complete in all respect [only for BESS at Bongaigaon STPP]. OPGW shall have minimum 24 cores.	Bidder understanding is Bongaigaon TPP BESS is not in LOT1 NTPC BESS tenders Customer may confirm.	Confirmed
65	SECTION - VI				The CAMC scope covers all equipment up to and including 33 kV pooling switchgear including but not limited to the battery system, Battery Management System (BMS), Energy Management System (EMS) and SCADA, Power Plant Controller (PPC), Power Conditioning System (PCS), inverter duty transformers, protection and communication systems, auxiliary power systems, UPS/SA systems, monitoring & control systems, temperature scanning systems, fire detection & protection systems, HVAC/battery cooling systems, and all associated materials and accessories necessary for trouble-free operation.	Bidder understanding is during CAMC period i.e after pg test completion - "After 33kV pooling HT Switchgear . i.e Switchyard and related equipments/ accessories" - Operation and maintenance is in NTPC scope. (BESS TIE transformers CAMC for a period of 60 months from Date of Commercial operation of the BESS project is in Bidder scope is understood) If any issues in Switchyard and related equipments/ accessories - accordingly suitable compensation in RTE , availability , Energy calculations will be provided by NTPC. Customer may confirm.	Confirmed
66	SECTION - VI	c. Cumulative BESS Annual Availability:				Bidder understansing is -"if the schedule planned for one cycle in any particular day , accordingly DCi , SGi , ADi ll be taken for one cyle". Customer may confirm.	Confirmed
67	SECTION - VI	12.02.00 ROUTE AND TERRAIN:			Right of way and way leave clearance shall be arranged by the Owner.	Bidder understanding is entire plant including switchyard is wthin NTPC premises , ROW and related works is no included in bidder scope. Owner/Customer may confirm.	Confirmed
68	SECTION - VI	general				Customer is requested to provide approx distance from BESS area to Switchyard area for EHV cable calculations for all the projects location.	Location of BESS block and Switchyard are indicated in tender GLP for each project. Bidders is requested to assess the requirement related to distance/EHV cables etc. accordingly afterb taking into account all existing thermal plant facilities. bidder is expected to assess and provision cable lengths based on site conditions.
69	SECTION - VI	general				Customer is requested to provide minimum EHV cable size requirement for all the Projects location.	EHV cable sizes shall be finalized duting detail engineering
70	SECTION - VI	general				Bidder understanding is BESS Swithyard CRP panels SAS panels , related components will be placed in already exisiting NTPC switchyard control room. Customer may confirm.	BESS Swithyard CRP panels SAS panels , related components will be placed in AC kiosk detail specifications for which are indicated in sub section B11A part B section VI of the technical specifications.

71	SECTION - VI	general				Bidder understanding is control supply for BESS Swithyard CRP panels SAS panels , related components will be tapped from already exisiting NTPC switchyard control room control supply. Customer may confirm.	Confirmed
72	SECTION - VI	general				Bidder understanding is PSSE/E , PSCAD studies scope in limited till 33/132/220/400KV POI (bidder scope of supply , I&C). Customer may confirm.	Confirmed
73	SECTION - VI	general				Bidder undestanding is during CAMC all renewals are in customer scope. Customer may confirm.	Bidder's understanding is not correct. Bidder may please refer Clause 1.07.00 of SUB SECTION I-B, Part-A and Clause 6.00.00 of Sub Section E-04, Part-B, Section VI of Technical Specifications.
74	SECTION - VI	general				Bidder undestanding is UPS Batteries shall be either Ni-Cd type or Stationary Lead Acid Plante high discharge type. Customer may confirm.	Confirmed
75	SECTION - VI	general				Main Control room model Drawings , Fencing other civil related drawings may be provided by customer.	Design, Drawings and detailed engineering are in Bidder' s scope.
76	SECTION - VI	general				Customer may provide the minimum Losses Breakdown S no Losses breakdown Equipment min Losses 1 DC cables (batteries to PCS) 1a. PCS 2 MV transformer (PCU V/33kV) 3 LV AC cable between PCS and MV Transformer 4 MV cables and MV switchgear (33kV) 5 Main power transformers (400KV/220KV/132KV /33kV) 6 400KV/220KV/132KV Cable uptoPOI metering point 7 Aux. DC/AC load for BoS equipment 8 Feeder Bay Equipments 9 lighting load etc.	Losses breakdown shall be as per bidders design but shall be suitable to demonstrate the performance guarantee of RTE at PoI
77	Sec-VI (TS) Part 1 of 3			1.00.00 Page 9 of 1175	SUB-SECTION -I-A PROVENNESS 1.00.00 BATTERY SYSTEM If the bidder itself has not manufactured or supplied Batteries for grid interactive battery energy storage system of cumulative installed capacity of minimum 20 MWh, out of which at least one grid interactive battery energy system should be of 5 MWh capacity or higher, in that case the bidder shall associate/collaborate for procurement/sourcing of batteries from Battery Manufacturer who has manufactured and supplied Batteries of cumulative capacity of minimum 20 MWh for grid interactive battery energy storage system(s), out of which at least one reference grid interactive battery energy storage system should be of minimum 5 MWh capacity supplied in a single order. The reference grid interactive battery energy storage system of 5 MWh or higher capacity should have been successfully commissioned at least six (6) months prior to the date of techno-commercial bid opening.	1. Bidder's understanding is that, this provenness criteria is to be meet at the time of sourcing of battery & not a part of QR at the time of bidding. Kindly confirm. 2. So far very few BESS installation has happened, so there will be very limited sources of battery. So it is requested to remove this criterion of BESS.	1. Bidder's understanding is correct. 2. Bidder's proposal is not acceptable. Bidder to comply with the requirements of Technical specifications
78	Sec-VI (TS) Part 1 of 3			1.01.02 Page 300 of 1175	SUB SECTION II SCOPE OF SUPPLY AND SERVICES 1.01.02 To maintain the required minimum dispatchable energy at the metering/delivery point for the respective plant, the Contractor shall undertake any required replenishment or augmentation of the BESS system. However, such replenishment or augmentation shall strictly be carried out at the start of the respective CAMC year only. No capacity addition, replenishment, or augmentation shall be permitted during the PG Test period or in-between any CAMC year, except in the event of an "Interruption of the PG Test Due to Fault/Failure" as defined in Clause 1.05.00 of Sub-Section IV of Part A of the technical specifications. Monthly/Yearly MW/MWh capacity of BESS should be automatically logged in the configured performance monitoring system/EMS of BESS Plant.	As bidder is committed for min dispatchable energy, therefore such restriction should not be applied. Request to amend the clause.	Refer Technical Amendment-01
79	Sec-VI (TS) Part 1 of 3			1.01.25 Page 303 of 1175	SUB SECTION II SCOPE OF SUPPLY AND SERVICES 1.01.25 All preventive and annual maintenance activities, up to and including the 33 kV pooling switchgear, shall be in the Contractor's scope for the entire Performance Guarantee (PG) Test period (Year-1). Thereafter, Comprehensive AMC (CAMC) for a further period of eleven (11) years shall also be in the Contractor's scope. The scope of CAMC shall be as defined elsewhere in the technical specifications.	Mentioned PG test period of 1 year is too huge & 5% payment is linked to PG test. Therefore it is requested to minimize the PG test period to say 1 month. Also requested to make a provision of release of payment at PG test via BG mechanism.	Bidder's proposal is not acceptable. Bidder to comply with the requirements of tender documents.

80	TS-1 SUB SECTION-II SCOPE OF SUPPLY AND SERVICES Page 301 of 1175			1.01.08	BESS shall be designed for minimum 12-year life, considering two cycle operation per day for BESS BESS shall be designed for charging/discharging time of 2 hrs or less (0.5 C or higher).	Please clarify whether 2 cycle operation with 2 hour discharging per day?	The BESS shall be capable of performing two full charge–discharge cycles per day. Each discharge cycle shall be of 2 hours duration (0.5C or higher rate). BESS shall be designed for minimum 12-year life considering the above two-cycle-per-day operation.
81	TS-I SUB SECTION-II SCOPEOF SUPPLY AND SERVICES Page & 301 of1175				<table><tr><th>Sl. No.</th><th>Plant</th><th>BESS (MW) rating</th><th>BESS (MWh) rating</th><th>Proposed Point of interconnection</th><th>Remarks</th></tr><tr><td>1</td><td>Kudgi STPP</td><td>240</td><td>480</td><td>220kV</td><td>New Bays</td></tr><tr><td>2</td><td>Mouda STPP Stage-I & II</td><td>200</td><td>400</td><td>132kV</td><td>New Bays</td></tr><tr><td>3</td><td>Solapur STPP</td><td>132</td><td>264</td><td>132kV</td><td>New Bays</td></tr><tr><td>4</td><td>Barh STPP stage-I & II</td><td>200</td><td>400</td><td>132kV</td><td>New Bays</td></tr><tr><td>5</td><td>Nabinagar STPP Stage-I</td><td>200</td><td>400</td><td>132kV</td><td>New Bays</td></tr><tr><td>6</td><td>Simhadri STPP Stage-II</td><td>70</td><td>140</td><td>400kV</td><td>New Bays</td></tr><tr><td>7</td><td>Simadhri STPP Stage-I</td><td>75</td><td>150</td><td>400kV</td><td>New Bays</td></tr><tr><td>8</td><td>Ramagundam STPP Stage-III</td><td>50</td><td>100</td><td>33kV</td><td>33kV Tie switchgear</td></tr></table>	Please clarify where AIS and GIS bay to be considered, also clarify if Bay extension is required at any place.	All projects have AIS bays except ramagundam where PoI is 33kV owners switchgear. Incase of NOn availability of spare bays, Bay Extensionshall be required for integration of BESS tie transformer at PoI.
82	TS-I SUB SECTION-II SCOPE OF SUPPLY AND SERVICES PaGE 315 0f 1175				The scope of work comprises of design, supply, erection, testing and commissioning of 400kV/220kV/132kV AIS/GIS, Switchyard/bays as shown in single line diagram associated with each project [except for BESS located at Ramagundam-III and FGUTP-IV]. The scope includes the extension / addition of bays in existing service switchyards envisaged for power evacuation and charging of BESS system except for Bongaigaon BESS. For Bongaigaon BESS system a new 400kV GIS switchyard with associated Nos of bays shall be considered as indicated in single line diagram. The switchyard bay(s) arrangement and switching scheme of respective project shall be as indicated in single line diagram.	Bongaigaon is not mentioned in project list. Please clarify.	It is clarified that Bongaigaon is NOT included in Lot-1 tender. Any refrences specepit to BESS at Bongaigaon TPP in the technical specifications may be omitted.
83	TS-1 SUB SECTION-II SCOPE OF SUPPLY AND SERVICES Page 315 of 1175			2.02.02	Note#1 (Simhadri STPP-II): No switchyard is envisaged with Simhadri Stage-II Note#2 (Simhadri STPP-1): Complete DIA is to be provided under Simhadri Stage-I BESS package.	Is power transformer not in bidder's scope for Simhadri STPP-II. Please elaborate the requirement for Simhadari STPP-1 and 2.	YES. BESS Tie transformer is applicable for Simadhri STPP-II new 400kV DIA with 2 BESS Tie Transformer bays is to be considerd for connection of BESS at Siamdhri.
84	TS-1 SUB SECTION-II-A SCOPE OF SUPPLY AND SERVICES-CIVIL Page 325 of 1175	SCOPE OF SUPPLY AND SERVICES (CIVIL)			iii) Removal and disposal of roots of trees of all girths (including trees of girth less than 30cm or more) and other vegetation is in Bidder's scope.	Please provide the lead distance for the disposal of roots of trees of all girths & excess earth/debris from site location.	Bidder to refer Amendment-01
85	TS-1 SUB SECTION-II-A SCOPE OF SUPPLY AND SERVICES-CIVIL Page 325 of 1175	SCOPE OF SUPPLY AND SERVICES (CIVIL)			iv. Site Preparation: Site grading including slope protection, ground preparation/filling/levelling (if required), Ground improvement (if required) of the identified area.	Bidder understanding is that No Major Area Grading and Levelling is in the scope of Bidder except micro levelling. Please provide the detail technical specification for Site grading/levelling/Slope protection etc.	Bidder to refer Technical Amendment No.01 .
86	TS-1 SUB SECTION-II-A SCOPE OF SUPPLY AND SERVICES-CIVIL Page 325 of 1175	SCOPE OF SUPPLY AND SERVICES (CIVIL)			viii. Storm water drain in BESS area and connecting the same with existing Nearby drain.	Please share the existing Flood assessment report, ground water assessment and Hydrology report for our reference during Prebid engineering.	Detail Hydrology survey report is not available. However,Storm water drains of BESS area to be connected to nearest owner's drainage system. The bidder shall be responsible for assessing the groundwater table and acquiring any supplementary geotechnical data necessary for the foundation system, beyond what is provided in the Geotechnical Chapter of the Technical Specifications
87	TS-1 SUB SECTION-II-A SCOPE OF SUPPLY AND SERVICES-CIVIL Page 326 of 1175	SCOPE OF SUPPLY AND SERVICES (CIVIL)			xv. All culverts (i.e. pipe culverts/ duct-banks, pull pit) at the crossing of cable trenches/drains with roads, rail cum roads and drains, etc. as required.	Please provide the detail technical specification of culvert for bidding purpose.	Bidder to refer clause 3.00.00 of subsection C , Part B of Technical Specification and Amendment No. 01
88	TS-1 SUB SECTION-C CIVIL Page 895 of 1175	3.03.02 BESS-Service Building and Switchgear Room			i) The building shall have RCC framed super structure and RCC Slab with Bricks/concrete blocks masonry wall.	Bidder is requested to provide the Preliminary Drawings/Execution Drawings with Architectural and Structural design for the proposed building.	Bidder's query is not clear. However, detail engineering as per Technical Specification is in scope of Bidder.
89	TS-1 SUB SECTION-C CIVIL Page 900 of 1175	9.00.00 CHAIN LINK FENCING			Fencing with gate shall be provided around areas wherever necessary due to security, safety, and statutory requirements	Bidder is requested to provide GA of fencing & gate for better understanding.	Bidder's query is not clear. However, bidder can refer Typical Layout of BESS plant
90	General	General			General	Bidder is requested to provide contour drawing for the project.	Topography survey is in scope of the bidder
91	General	General			General	We understand in our scope only drainage design inside the proposed PV plant is to be considered with the exception of the connecting the outfall to the owner's main drain. Capacity check of the Owners drain is not in our scope.	Bidder's Understanding is correct
92	General	General			General	Kindly clarify is there any requirement for modification/ extension/ improvement to existing road? If it is required than provide existing G.A & Layout of road for better understanding & for pre bid purpose.	Bidder to refer Amendment-01
93	General	General			General	Please confirm if any ground improvement is required at the site.	Bidder to refer site specific SOIL DATA AND FOUNDATION SYSTEM chapter of Technical Specification for better clarity.

94	General	General			General	Please specify the grid and contour interval to be maintained during topography survey	Bidder to refer Technical Amendment no.01
95	General	General			General	Kindly clarify is there any provision for security room & store room in this project. If it is required than provide approx. size of security room & store room.	One Guard Room / Security Cabin / Watchman Cabin shall be provided within the BESS area as part of the bidder's scope of work. Further, Bidder to refer Amendment in this regard. For store room bidder to refer clause 2.00.00 of subsection IIA , Part A of Technical Spefication
96	General	General			General	Please clarify which type of fencing is considered. As in technical specification both chain link fencing and pre cast fencing is given.	If the BESS is located outside the plant boundary, a precast boundary wall shall be constructed around it as per the applicable technical specifications. However, if the BESS is situated within the plant boundary, it shall be enclosed with chain link fencing.
97	General	General			General	While carrying out construction activities below ground level, if we meet any obstruction e.g. presence of any drainage pipe / water or fire pipeline, any leftover foundation concrete, live wire etc., the owner shall arrange to remove the same & we shall be freed by the owner from any such obstruction for conducting our works. Please confirm	Bidder's Understanding is not correct. Bidder to refer point v, clause 1.00.00 of Subsection IIA of Part A of Technical Specification
98	General	General			General	We presume no any trees are available in the project area, if not kindly provide the details. Also, if available statutory approval for cutting of trees shall be taken by the employer.	Bidder to refer Technical Amendment no.01
99	General	General			General	We request kindly to provide the locations and invert level of drain outfall in-order to plan the drain layout & design with respect to the requirements.	Details are to be worked out during detailed engineering. Further, bidder is advised to visit the site for better understanding of the quantum of civil work required before bidding.
100	General	General			General	We presume that area provided for each unit in the tender document is 100% usable. No any hindrances available at site. Please confirm.	Bidder to refer S.No. V of Cl. 1.00.00 of Sub Section-IIA, Part-A of Technical Specifications.
101	General	General			General	Please mark the exact location of switchyard where new bay need to installed.	Location of BESS block and Switchyard are indicated in tender GLP for each project. Bidders is requested to assess the requirement related to distance/EHV cables etc. accordingly after taking into account all existing thermal plant facilities.
102	General	General			General	Equipment associate with new switchyard bay (CRP, SAS, Battery, and charger etc). Please confirm, whether we can install at owner's control room or we need to install at bidder's s control room.	BESS Swithyard CRP panels SAS panels , related components will be placed in AC kiosk detail specifications for which are indicated in sub section11A part B section VI of the technical specifications.
103	TECHNICAL SPECIFICATION PART-A	SUB SECTION I-A PROVENNESS			PROVENNESS CRITERIA Different Systems	Kindly clarify whether the Indian Subsidiary of a Foreign entity meeting the proveness criteria eligible under this proveness criteria.	Bidder's understanding is correct.
104	SECTION - II (ITB)	2.0 BRIEF SCOPE OF WORK			BESS Implementation at NTPC thermal stations, interconnection with the existing thermal power facilities as defined in the Technical Specifications and Comprehensive Annual Maintenance Contract (CAMC) of the BESS system for a period of 11 years from the date of successful completion of Performance Guarantee (PG) Test. The BESS shall comprise of Battery System, Battery Management System (BMS), Energy Management System (EMS) and SCADA, Power Conversion System (PCS), Inverter Duty Transformer (IDT), 33 kV pooling switchgear, Protection system, Communication System, HT & LT System, Auxiliary power system, Fire Fighting, remote control and monitoring, and all other associated materials and accessories necessary for trouble free operation and maintenance of the BESS system	1. Kindly confirm weather any boundary wall , land development, ROW etc is in the scope of the bidder or not. 2. Kindly confirm the soil report is required during the execution.	1.Bidder's to refer the clause no 1.00.00 of technical specifcation,Section-VI,Part-A,Sub Section II-A Scope of Supply and Services - Civil. Area marked for BESS is with NTPC. 2.Bidder's to refer the clause no 1.00.00 of technical specifcation,Section-VI,Part-A,Sub Section IB Project Infornation Appendix-9
105				Section VI, Part B page 450		Kindly confirm the estimated or required length of XLPE cable from the BESS system to the Point of Interconnection (POI) for each site. Additionally, please clarify whether NTPC will provide the final cable routing and termination details during detailed engineering or if the bidder is expected to assess and provision cable lengths based on site conditions.	Location of BESS block and Switchyard are indicated in tender GLP for each project. Bidders is requested to assess the requirement related to distance/EHV cables etc. accordingly after taking into account all existing thermal plant facilities. Bidder is expected to assess and provision cable lengths based on site conditions.
106				General		Do we need to consider a Diesel Genset for Aux power to BESS yard, in case of total blackout at site, backup power for the startup of the plant is required.	Black start capability has been specified as a functional requirement for BESS. As such No DG set has been considered.
107						Do we need to consider a separate feeder from POG for auxilary supply or it will be provided by NTPC, please clarify.	Auxilary supply for BESS shall be drawn from electrical system of BESS and NO separate supply shall be provided by NTPC
108				page no -209		Sample SLD is attached for IDT 22KV and again stepdown for auxiliary and same will step down and step up for 33KVa this multiple transformer use or follow as per standard SLD is attached. Kindly confirm on the same, whether this needs to be considered or not?	Bidder proposal SLD not available. Bidder to comply with technical specification requirements

109				1.01.02	the Contractor is required to ensure year-wise minimum dispatchable energy (MWh) at the Point of Interconnection, considering battery degradation. Table-2 outlines the minimum dispatchable energy percentages from Year-1 to Year-12. It is also mentioned that replenishment or augmentation of the BESS system shall be strictly carried out only at the start of the respective CAMC year.	Kindly confirm the estimated or required length of XLPE cable from the BESS system to the Point of Interconnection (POI) for each site. Additionally, please clarify whether NTPC will provide the final cable routing and termination details during detailed	Location of BESS block and Switchyard are indicated in tender GLP for each project. Bidders is requested to assess the requirement related to distance/EHV cables etc. accordingly afterb taking into account all existing thermal plant facilities. bidder is expected to assess and provision cable lengths based on site conditions.
110				1.01.10	A dedicated building shall be provided to house the 33 kV pooling switchgear.	Please share distance from BESS allocated area to Control Room to calculate all cable for EMS and auxilary supply cable for all the given sites	BESS control room housing EMS and Auxiliary supply system is proposed to be located in BESS block. Layout to be developed by bidder during detailed engineering
111				Form 18.7	Liquidated damage for shortfall in performance not described	Please provide detailed LD criteria's on Performance Parameters along with capping. Open LD clauses will make it difficult for bidders to participate.	LD criteria for Performance Parameters are included in Sub Section IV, Part A, Section VI of Technical Specifications
112				Part A Section-I Provenness 1.00.00	If the bidder itself has not manufactured or supplied Batteries for grid interactive battery energy storage system of cumulative installed capacity of minimum 20 MWh, out of which at least one grid interactive battery energy system should be of 5 MWh capacity or higher....ttery energy storage system of 5 MWh or higher capacity should have been successfully commissioned at least six (6) months prior to the date of techno-commercial bid opening	As very few local companies are manufacturing BESS which are required for the grid scale project, since this clause is asking for the already operational plant which has successfully commissioned 20MWh of BESS 6 months prior to the bid date, it will significantly lower the competition and give edge to few manufacturers, hence it is requested to provide relaxation to those entities which have already under-contruction BESS manufacturing units or have a work order book of 500 MWh of BESS supply and installation	Bidders proposal is not acceptable. Bidder to comply with technical specification requirements. Also, refer technical amendment no.1.
113				Section VI, Part B page 450		Kindly confirm the estimated or required length of XLPE cable from the BESS system to the Point of Interconnection (POI) for each site. Additionally, please clarify whether NTPC will provide the final cable routing and termination details during detailed engineering or if the bidder is expected to assess and provision cable lengths based on site conditions.	Location of BESS block and Switchyard are indicated in tender GLP for each project. Bidders is requested to assess the requirement related to distance/EHV cables etc. accordingly afterb taking into account all existing thermal plant facilities. bidder is expected to assess and provision cable lengths based on site conditions.
114				General		Do we need to consider a Diesel Genset for Aux power to BESS yard, in case of total blackout at site, backup power for the startup of the plant is required.	Black start capability has been specified as a functional requirement for BESS. As such No DG set has been considered.
115				General		Do we need to consider a separate feeder from POG for auxilary supply or it will be provided by NTPC, please clarify.	Auxilary supply for BESS shall be drawn from electrical system of BESS and NO separate supply shall be provided by NTPC
116				page no -209		Sample SLD is attached for IDT 22KV and again stepdown for auxiliary and same will step down and step up for 33KVa this multiple transformer use or follow as per standard SLD is attached. Kindly confirm on the same, whether this needs to be considered or not?	Bidder proposal SLD not available. Bidder to comply with technical specification requirements
117				1.01.02	the Contractor is required to ensure year-wise minimum dispatchable energy (MWh) at the Point of Interconnection, considering battery degradation. Table-2 outlines the minimum dispatchable energy percentages from Year-1 to Year-12. It is also mentioned that replenishment or augmentation of the BESS system shall be strictly carried out only at the start of the respective CAMC year.	Kindly confirm the estimated or required length of XLPE cable from the BESS system to the Point of Interconnection (POI) for each site. Additionally, please clarify whether NTPC will provide the final cable routing and termination details during detailed	Location of BESS block and Switchyard are indicated in tender GLP for each project. Bidders is requested to assess the requirement related to distance/EHV cables etc. accordingly afterb taking into account all existing thermal plant facilities. bidder is expected to assess and provision cable lengths based on site conditions.
118				1.01.10	A dedicated building shall be provided to house the 33 kV pooling switchgear.	Please share distance from BESS allocated area to Control Room to calculate all cable for EMS and auxilary supply cable for all the given sites	BESS control room hosing EMS and Auxiliary supply system is proposed to be located in BESS block. Layout to be developed by bidder during detailed engineering
119				Form 18.7	Liquidated damage for shortfall in performance not described	Please provide detailed LD criteria's on Performance Parameters along with capping. Open LD clauses will make it difficult for bidders to participate.	LD criteria for Performance Parameters are included in Sub Section IV, Part A, Section VI of Technical Specifications
120				Part A Section-I Provenness 1.00.00	If the bidder itself has not manufactured or supplied Batteries for grid interactive battery energy storage system of cumulative installed capacity of minimum 20 MWh, out of which at least one grid interactive battery energy system should be of 5 MWh capacity or higher....ttery energy storage system of 5 MWh or higher capacity should have been successfully commissioned at least six (6) months prior to the date of techno-commercial bid opening	As very few local companies are manufacturing BESS which are required for the grid scale project, since this clause is asking for the already operational plant which has successfully commissioned 20MWh of BESS 6 months prior to the bid date, it will significantly lower the competition and give edge to few manufacturers, hence it is requested to provide relaxation to those entities which have already under-contruction BESS manufacturing units or have a work order book of 500 MWh of BESS supply and installation	Bidders proposal is not acceptable. Bidder to comply with technical specification requirements.
121			General	GEO-TECHNICAL INVESTIGATION and Contour survey	GEO-TECHNICAL INVESTIGATION AND CONTOUR SURVEY.	The bidder requests a geotechnical survey and contour survey for all locations.	1)Geotechical and Foundation data is available in Part A of Technical Specification. Any additional data required other than data provided, is in Bidder scope. 2)Topography Survey is in Bidder's scope.
122			General	Site Preparation	FGL and HFL	Please provide the Finished Ground Level (FGL) and High Flood Level (HFL) for all proposed locations, as these details are essential for planning grading, drainage, and foundation levels.	Proposed location of BESS area are within existing Plant premises and are safe wrt HFL. Storm water drain of BESS area to be connected to nearest owner's drain. For FGL, bidder to refer Amendment
123			Genral	ROADS AND CULVERTS	Approch Road	Please confirm whether the approach road is under the bidder’s scope or NTPC’s scope. If it falls under the bidder’s scope, kindly provide the location of the nearest village road from all proposed locations, along with the length of the approach road to be considered under the present scope.	Bidder shall refer to Amendment No. 1.

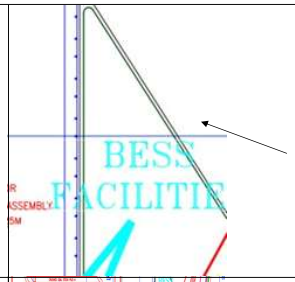
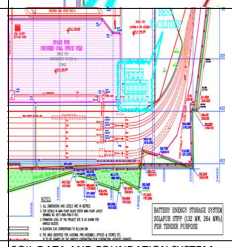
124			Technical	Cable trench	Type of cable trench and length	"As discussed in the meeting, the cable trench is to be considered as an RCC underground trench from the BESS to the switchyard. The bidder would like to highlight that, as observed during the site visit, certain locations pose challenges such as coal storage areas and railway crossings. Therefore, the bidder kindly requests clarification on these issues.	Location of BESS block and Switchyard are indicated in tender GLP for each project. Bidder is requested to assess the requirement related to distance/EHV cables etc. accordingly after taking into account all existing thermal plant facilities. bidder is expected to assess and provision cable lengths based on site conditions.
125			Technical	Crossing	Railway crossingg	During the bidder's site visit, it was observed that an overhead structure exists at the railway crossing in the Solapur Thermal Plant for cable routing. The bidder requests clarification on whether this existing structure can be used.	Existing facility of thermal power plant not proposed to be used for laying of EHV CABLES.
126			General	Space	.Space for constucting	Please confirm if space is available for the extension of bays and the BESS.	Bidders is requested to assess the space availability and requirement related to EHV switchyard extension after taking into account all existing Bays. bidder is expected to assess and provision based on site conditions.
127			114 OF 1175	Supply	Reactive power response from wind power plant & Dynamically varying reactive power: STATCOM & SVC emulate the dynamically varying reactance at the point of measurement.	For each Location STATCOM & SVC and harmonic Filter rating MVAR and Qty need to mentioned, Since it was high cost equipment	This is the extract of CERC approved procedure. Only the items applicable to BESS are to be furnished by the bidder based on system studies and statutory requirements.
128			120 OF 1175	Supply	Modelling of Solar Power Plant:	Need to elabrate the (To be used along with REGCA1 and REPCA1)	This is the extract of CERC approved procedure. Only the items applicable to BESS are to be furnished Based on system studies and statutory requirements
129			121 OF 1175 to 129 of 1175	Supply	Wind Power Plant (WPP): A typical Wind Power Plant has a Wind Turbine Generator (WTG) as a source of electrical power.	Need to elabrate the Types of WTGs based on construction:	This is the extract of CERC approved procedure. Only the items applicable to BESS are to be furnished Based on system studies and statutory requirements
130			General	Aux. Power Consmption	Please clarify the Aux. Power Consmption Charging through grid for NTPC scope and bidder will provide the infrastructures	Metering will measure at 33kV side or 415V Side	Auxilary supply for BESS shall be drawn from electrical system of BESS and NO separate supply shall be provided by NTPC. Metering shall be at 33kV side
131	Section VI Technical Specificatio n & Tender Drawings (TS)	SUB SECTIO N-IVFUNCTIONAL GUARA NTEES & LIQUID ATED DAMAG ES Cl. 2.02.01			General Notes:v) Contractor's aggregate liability to pay liquidated damages for failure to attain the functional guarantee shall not exceed twenty five percent (25%) of the Total Contract Price.	The Bidder understands that the aggregate liability towards Functional Guarantees shall encompass both Performance Guarantee Test (PGT) and Comprehensive Annual Maintenance Contract (CAMC) Liquidated Damages collectively.	Bidder's understanding is correct.
132	Section VI Technical Specificatio n & Tender Drawings (TS)	SUB SECTIO N IV FUNCTI ONAL GUARA NTEES & LIQUID ATED DAMAG ES General Notes			iv) The LD recovery in respective CAMC year shall be limited to the percentage of Comprehensive Annual Maintenance Contract value (Third Contact) as defined in the table below: Year after completion of PG Test — %age of CAMC Year-1 — 7% Year-2 — 7% Year-3 — 7% Year-4 — 7% Year-5 — 9% Year-6 — 9% Year-7 — 9% Year-8 — 9% Year-9 — 12% Year-10 — 12% Year-11 — 12% Total — 100%	Bidder requests that the LD recovery shall be made from the AMPBG (which shall be replenished subsequently to the BG amount)	Bidder's proposal is not acceptable. Bidder to comply with the technical specification requirements.
133	Section VI Technical Specificatio n & Tender Drawings (TS)	Appendi x 2 to Subsecti on I-B			4. Barh Super Thermal Power Station, Stage I & II Area Requirement ~ 9 Acres	As per the tender drawing, when plotted in a .kmz file, the area is observed to be approximately 5 acres. Kindly confirm the actual available area at the proposed location.	Approxiamate area available is 9 acres.
134	Section VI Technical Specificatio n & Tender Drawings (TS)	Appendi x 2 to Subsecti on I-B			6. Simhadri Super Thermal Power Station, Stage I & II Area Requirement ~ 7.50 Acres	As per the tender drawing, when plotted in a .kmz file, the area is observed to be approximately 6 acres. Kindly confirm the actual available area at the proposed location.	Approxiamate area available is 7.5 acres.
135	Section VI Technical Specification & Tender Drawings (TS)	SUB SECTION IV FUNCTIONAL GUARANTEES & LIQUIDATED DAMAGES Cl. 2.02.01, B, 3a			For each CAMC Year, the benchmark ("start-of-year") capacity shall be the measured capacity of the respective BESS plant at the end of the immediately preceding year	Bidder requests the following modification in the clause 'For each CAMC Year, the benchmark ("start-of-year") capacity shall be the as per the capacity of the respective BESS plant as specified in Table 2 of SUB SECTION II SCOPE OF SUPPLY AND SERVICES'	Bidder's proposal is not acceptable. Bidder to comply with the technical specification requirements.
136	Section VI Technical Specificatio n & Tender Drawings (TS)	SUB SECTIO N I-APROV ENNES SCl. 1.00.00			If the bidder itself has not manufactured or supplied Batteries for grid interactive battery energy storage system of cumulative installed capacity of minimum 20 MWh, out of which at least one grid interactive battery energy system should be of 5 MWh capacity or higher, in that case the bidder shall associate/collaborate for procurement/sourcing of batteries from Battery Manufacturer who has manufactured and supplied Batteries of cumulative capacity of minimum 20 MWh for grid interactive battery energy storage system(s), out of which at least one reference grid interactive battery energy storage system should be of minimum 5 MWh capacity supplied in a single order. The reference grid interactive battery energy storage system of 5 MWh or higher capacity should have been successfully commissioned at least six (6) months prior to the date of techno-commercial bid opening.	1. Bidder requests clarity on the term "Batteries."Kindly confirm whether the term refers to cells or battery packs. 2. In case it refers to battery packs, the bidder requests relaxation of this pre-qualification requirement, as the BESS sector in India is still in its early stages, with several projects under development and yet to be commissioned. Furthermore, domestic cell- to-pack integration has only recently commenced in India, and enforcing this criterion makes it difficult for Indian manufacturers to qualify.	1. For the purpose of the provenness requirement, the term "Batteries" refers to complete battery packs/modules, as supplied and installed in a grid-interactive battery energy storage system, and not individual cells. 2. Bidder to comply with the technical specification requirements. Also, refer technical amendment no. 1.

137	Section VI Technical Specification & Tender Drawings (TS)	SUB SECTION-IVFUNCTIONAL GUARANTEES& LIQUIDATED DAMAGES Cl. 2.02.01			General Notes:v) Contractor's aggregate liability to pay liquidated damages for failure to attain the functional guarantee shall not exceed twenty five percent (25%) of the Total Contract Price.	Bidder requests that the Performance Liquidated Damages (LD) be capped at 15% of the Contract Value, as at the time of Performance Guarantee (PG) test completion, the Employer will already be holding 10% Contract Performance Bank Guarantee (CPBG) and 5% stage payment retained against Operational Acceptance Test (OAT). Additionally, the 4% Annual Maintenance Performance Bank Guarantee (AMPBG) will be submitted only prior to the release of the CPBG. Hence, the total effective hold with the Employer amounts to 15% of the Contract Value.	Bidder's proposal is not acceptable. Bidder to comply with the technical specification requirements.
138	Section VI Technical Specificatio n & Tender Drawings (TS)	SUB SECTIO N IV FUNCTI ONAL GUARA NTEES & LIQUIDATED DAMAG ES Cl. 01.03.0 0			The PG Test shall conclude after completion of one (1) year from its commencement.	Bidder request that the PG test shall be conducted for 1month	Bidder's proposal is not acceptable. Bidder to comply with the technical specification requirements.
139	TECHNICA L SPECIFICA TION SECTION – VI, PART- B- Part 1 of 3	B-02(A) PCS/IN VERTE R TRANS FORME R 1.0 TECHNI CAL REQUI RMENT S (OIL FILLED TRANS FORME R),Page No 444 of 1175			All the foundation shall be designed as per highest rating Transformer in case different capacity transformer are offered.	Bidder propose foundation shall be based on actual transformer rating offered. Kindly accept.	Bidder to comply with specification requirements.
140	TECHNICAL SPECIFICA TIONSECT ION –VI, PART-B- Part 1 of 3	B-10 AUXILIA RY POWER SUPPL Y SYSTE M, 1.012 Page NO 439 of 1175			The battery shall be sized considering a minimum electrolyte temperature of 15 deg along with temperature correction factors as per relevant standard.	Bidder understand the minimum ambient temperature of the particular location shall be considered for sizing. Please clarify	Bidder to comply with specification requirements.
141	TECHNICA L SPECIFICA TION SECTION – VI, PART- B- Part 1 of 3	B-10B BATTE RY Page No. 643 of 1175			General	Bidder understand that battery bank for battery charger and UPS can be placed on outdoor RCC platform with suitable container and air flow arrangement under shed Kindly confirm your acceptance for the same.	Bidders proposal is not acceptable
142	TECHNICA L SPECIFICA TION SECTION – VI, PART- B- Part 1 of 3	.-			General	Bidder request to allow for outdoor type Inverter control room RCC based platform under the shed. All equipment such as Inverter, HT panel, UPS with Battery bank and auxiliary supply equipment shall be kept on the same under shade.	PCS may be placed outdoor with shed as per OEM standard practice and as per Technical specification. refer technical Amendment1
143	TECHNICA L SPECIFICA TION SECTION – VI, PART- B- Part 1 of 3	2.0 CABLE SELEC TION & SIZING Page No. 552 of 1175			The Maximum Overall Voltage Drop: As per relevant clause in chapter 2-A,Part- A,Subsection 2.	Kindly confirm the power losses to be maintain between the central inverter to 33kV evacuation point.	Losses breakdown shall be as per bidders design but shall be suitable to demonstrate the performance guarantee of RTE at PoI
144	TECHNICA L SPECIFICA TIONSECT ION –VI, PART-B- Part 1 of 3	5 EARTHI NG SYSTE M Page 568 of 1175			Electrical Resistivity Test (ERT) of the soil is included in the scope of bidder	Kindly confirm the ERT value to be considered at the preliminary stage.	Project Specific ERT report is attached in PART A of Technical Specification
145	TECHNICA L SPECIFICA TION SECTION – VI, PART- B- Part 1 of 3	GENER AL			Inverter Duty Transformer	Bidder is allowed to use mineral oil for the IDTs at the Ground mount solar	Query NOT clear regarding ground mounted solar, however Inverter Duty Transformer shall be mineral oil filled
146	TECHNICAL SPECIFICATION SECTION –VI, PART-B- Part 1 of 3	MV SWITCHGEAR PG no: 487 of 1175			Communication Standard for Numerical relays-IEC 61850	Bidder propose relay with RS-485 protocol for 33kV HT switchgear feeders. Kindly confirm the same	Bidder to comply with specification requirements.
147	TECHNICA L SPECIFICA TION SECTION – VI, PART- B- Part 1 of 3	B-2(B) AUXILIA RY TRANS FORME R 1.0 TECHNI CAL REQUI RMENT S (OIL FILLED TRANS FORME R) PG no: 460 of 1175			In case Ester Oil filled Transformers are offered, then 50% quantity shall be Natural ester filled and balance 50% quantity shall be of Synthetic Ester oil filled.	Bidder understand the subject clause is applicable only for Auxiliary transformer. Also, as per the market availability mixed oil option (synthetic + Natural ester oil) is not available. Both are separate item, can be available individual only, please clarify the requirements accordingly.	Refer Technical Amendment-01
148	TECHNICA L SPECIFICA TIONSECT ION –VI, PART-B- Part 1 of 3	GENER AL			-	Kindly confirm the scope & location of metering pointKindly provide the scope and location of ABT Meters	Metering point for BESS is at PoI. Scope related to supply of meters and metering systems shall be as indicated in Tender specifications
149	TECHNICA L SPECIFICA TION SECTION – VI, PART- B- Part 1 of 3	SUB SECTION-II SCOPE OF SUPPLY AND SERVICES 1.01.00 SCOPE 302 of 1175			A dedicated building shall be provided to house the 33 kV pooling switchgear. In addition, a common control room building shall be provided for the BESS installation,	Bidder needs to construct only 1. A common control room for Bess installation 2. Separate 33kV switchgear room Kindly confirm no other buildings are in scope of bidder	Refer Technical Amendment-01

<table>
<tr><td>150</td><td>TECHNICA L SPECIFICA TION SECTION – VI, PART-
B- Part 1 of 3</td><td>SUB SECTION-II SCOPE OF SUPPLY AND SERVICES 1.01.00 SCOPE 302 of 1175</td><td></td><td></td><td>All control panels associated with BESS and associated system shall be installed in the new BESS control room building. Operator Workstations (OWS) and Engineering Workstations (EWS) shall be provided in the BESS control room building. Additionally,OWS shall also be provided in Central Control Room (CCR),</td><td>Kindly confirm Central control room and common control room both are same for better understanding</td><td>Bidders understanding is not correct. Additional,OWS Is to be provided in Central Control Room (CCR) of thermal plant</td></tr>
<tr><td>151</td><td>TECHNICAL SPECIFICATIONSECTION –VI, PART-B- Part 1 of 3</td><td>PCS/INVERTER TRANSFORMER1.0 0.00 TECHNICAL REQUIRMENTS (OIL FILLED TRANSFORMER)pg no: 444 of 1175</td><td></td><td></td><td>Inverter Transformer shall have copper/Aluminum Shield winding betweenLV & HV windings</td><td>Bidder wishes to propose aluminium Shield winding betweenLV & HV windings</td><td>Bidder to comply with specification requirements.</td></tr>
<tr><td>152</td><td>TECHNICAL SPECIFICATIONSECTION –VI, PART-B- Part 1 of 3</td><td>2.00.00 SCOPE OF SUPPLY AND SERVICES (BESS, ELECTRICAL & ASSOCIATEDSYSTE MS)24. UPS and / or DC systempg no:313 of 1175</td><td></td><td></td><td>For BESS project located with Bongaigaon TPP, where new 400kV GIS switchyard is envisaged, 220V DC system with backup of 3 hours is to be provided in line with the requirements of CEA technical standards for construction</td><td>Bidder understands that GIS Switchgear is not in bidders scope Kindly confirm the same</td><td>Confirmed</td></tr>
<tr><td>153</td><td>TECHNICAL SPECIFICATION SECTION –VI, PART-B- Part 1 of 3</td><td>SUB SECTION-III TERMINAL POINTS & EXCLUSIONS 3.00.00 Terminal Points
pg no: 329 of 1175</td><td></td><td></td><td><table>
<tr><th>Sl. No.</th><th>Plant</th><th>BESS (MW) rating</th><th>BESS (MWh) rating</th><th>Proposed Point of interconnection</th><th>Remarks</th></tr>
<tr><td>1</td><td>Kudgi STPP</td><td>240</td><td>480</td><td>220kV</td><td>New Bays</td></tr>
<tr><td>2</td><td>Mouda STPP Stage-I</td><td rowspan="2">200</td><td rowspan="2">400</td><td rowspan="2">132kV</td><td rowspan="2">New Bays</td></tr>
<tr><td>3</td><td>Mouda STPP Stage-II</td></tr>
<tr><td>4</td><td>Solapur STPP</td><td>132</td><td>264</td><td>132kV</td><td>New Bays</td></tr>
<tr><td>5</td><td>Barh STPP Stage-I</td><td rowspan="2">200</td><td rowspan="2">400</td><td rowspan="2">132kV</td><td rowspan="2">New Bays</td></tr>
<tr><td>6</td><td>Barh STPP Stage-II</td></tr>
<tr><td>7</td><td>Nabinagar STPP Stage-I</td><td>200</td><td>400</td><td>132kV</td><td>New Bays</td></tr>
<tr><td>8</td><td>Simhadri STPP Stage-II</td><td>70</td><td>140</td><td>400kV</td><td>New Bays</td></tr>
<tr><td>9</td><td>Simadhri STPP Stage-I</td><td>75</td><td>150</td><td>400kV</td><td>New Bays</td></tr>
<tr><td>10</td><td>Ramagundam STPP Stage-III</td><td>50</td><td>100</td><td>33kV</td><td>33kV Tie switchgear</td></tr>
</table></td><td>Bidders understands that the scope is limited from Bess- 33kv switchgear to respective existing TPP POI
kindly confirm</td><td>Bidders understanding is not correct. Entire scope upto EHV switchyard including BESS Tie transformer and Switchyard Bays [as applicable] are in scope of BESS project</td></tr>
<tr><td>154</td><td>TECHNICA L SPECIFICA TIONSECT ION –VI, PART-B-
Part 1 of 3</td><td>GENER AL</td><td></td><td></td><td>-</td><td>Bidder Request to provide the KMZ file With Route details. Kindly mention the path of cable corridors if any</td><td>Location of BESS block and Switchyard are indicated in tender GLP for each project. Bidders is requested to assess the requirement related to distance/EHV cables etc. accordingly after taking into account all existing thermal plant facilities. bidder is expected to assess and provision cable lengths based on site conditions.</td></tr>
<tr><td>155</td><td>TECHNICA L SPECIFICA TION SECTION – VI, PART-
B- Part 1 of 3</td><td>9. MV Switchg ear (33 kV Pooling Switchg ear)
pg no: 308 of 1175</td><td></td><td></td><td>The switchgear(s) shall be suitably rated to handle the total BESS capacity and configured with the required number of feeders based on the system requirements and as indicated in tender SLD’s.</td><td>Bidder wishes to consider HT Switchgear with maximum power limit of 30MW or more according to BESS Capacity</td><td>Bidder to comply with specification requirements nand select HT switchgear rating as indicated in tender SLD/Functional requirement.</td></tr>
<tr><td>156</td><td>TECHNICA L SPECIFICA TION SECTION – VI, PART-
B- Part 1 of 3</td><td>ELECT RICAL SINGLE LINE DIAGRA M
pg no: 1132 of 1175</td><td></td><td></td><td>SLD</td><td>Kindly provide the SLD for Mouda, Barh, Nabinagar locations</td><td>Included in specifications</td></tr>
<tr><td>157</td><td>TECHNICA L SPECIFICA TION SECTION – VI, PART-
B- Part 1 of 3</td><td>GENER AL</td><td></td><td></td><td>-</td><td>Kindly confirm the System fault current</td><td>Fault level for EHV system is Indicated in Tender SLD. Fault level for MV and LT BESS systems shall be as per subsection B0 part B section VI of technical specifications</td></tr>
<tr><td>158</td><td>TECHNICA L SPECIFICA TIONSECT ION –VI, PART-B- Part 1 of 3</td><td>GENER AL</td><td></td><td></td><td>-</td><td>1.Bidder request to allow for outdoor type Inverter control room RCC based platform under the shed. All equipment such as Inverter, HT panel, UPS with Battery bank and auxiliary supply equipment shall be kept on the same under shade.2.Kindly mention the list of rooms to be provided on MCR3..Ground temperature to be considered4.Short circuit withstand capability for cable. 5.Kindly confirm the Corrosion Category To be considered for the all the equipments.</td><td>1.Refer Technical Amendment-1
UPS battary bank etc. are not allowed outdoor under shed.
2. refer Technical Amendment-1
3. Ground temperature to be considered as 40 Deg C
4.SC witshand time of cables shal be as per system fault level.
5. Site specific Corrosion Category is Mentioned in Appendix 4 to Subsection IB of Part A of Technical Specification.</td></tr>
<tr><td>159</td><td>TECHNICA L SPECIFICA TION PART-B</td><td>APPENDIX 7 Procedure for First Time Charging of BESS Documents and data to be submitte d for integrati on of BESS:</td><td></td><td></td><td>Battery cycle life - > 4,000 at 20-80% SOC</td><td>The two clauses seem to contradict each other. A cycle life of 4,000 over a 12-year period implies roughly one cycle per day of operation. Employer to provide clarification on this matter.</td><td>Appendix-7 is the First Time Charging procedure specified by NLDC. Actual equipment shall meet functional requirement of Part A and Part B of Technical Specification.</td></tr>
</table>

160	TECHNICA L SPECIFICA TION PART-B	Sub Section -IIScope of Supply and Services 1.01.00 SCOPE			1.01.07 BESS shall be designed for minimum 12-year life, considering two cycle operation per day for BESS.		Bidder's query not available. Bidder to comply with Technical Specification.
161	TECHNICA L SPECIFICA TION PART-B	1.00.00 SUBSE CTION- A 03 POWER CONDIT IONING UNIT GENER AL			1.05.00 Same size and same make of PCS is recommended for the whole plant.	The bidder proposes the quantity of Power Conversion Systems (PCS) based on the number of battery containers necessary to achieve the required energy discharge capacity, ensuring that the specified C-rate is maintained throughout operation.	Bidders proposal is accepted
162	TECHNICA L SPECIFICA TION PART-B	4.10.00 OUTDOOR SUBSE CTION- A 03 POWER CONDIT IONING UNIT PCS			b. The PCS enclosure protection class shall IP 54 or better protection. For outdoor solution (Other than containerized), the electronic card compartment shall have IP 65 or better protection.	employer to provide clarification on the specific requirements for the canopy and platform associated with the PCS, including any design specifications, dimensions, and installation guidelines.	Design requirement for Civil structure and foundation is mentioned in part B , Subsection C of Technical Specification. Development of General Arrangement(GA) in Bidder's scope of work and same shall be finilized during detail engineering
163	TECHNICA L SPECIFICA TION PART-B	SUB SECTIO N-IISCOP E OF SUPPL Y AND SERVIC ES 13. Cabling			All cables upto 33kV Pooling switchgear shall be laid in cable trenches. Cables beyond 33kV pooling switchgear uptoidentified PoI including all EHV cables may be laid in buried arrangement.	The bidder proposes that the MV cable (from PCS to IDT) be laid on a cable tray. Kindly consider and approve this proposal.	Confirmed
164	TECHNICA L SPECIFICA TION PART-B	4. Auxiliary SUB SECTIO N-II SCOPE OF SUPPL Y AND SERVIC ES transfor mer			Auxiliary transformers may be fed from 33kV pooling switchgear or LV side of the Inverter Duty Transformer as per standard practice of the system Integrator.	The bidder proposes LV side tapping for the auxiliary transformer without LV switchgear protection. Kindly review and approve this proposal.	Bidder's proposal is not acceptable. Refer Technical Amendment-01
165					General	Please share the kmz file of the location.	The idenfied locations of BESS are within the existing Plants of NTPC. The Girds with local coordinates are marked in GLP document in Tender drawings
166					General	Employer to provide clarification on the specified operating temperature range for the PCS. This information is essential for accurately determining the appropriate nameplate capacity of the BESS plant.	For operating temperature range of PCS, please refer Clause no. 3.01.00 (12) of Sub Section A-03, Part B of Section VI of technical specifications
167					General	Employer to clarify the exact power rating necessary to fully charge the BESS within a 2-hour timeframe. This information is critical for accurately sizing the charging infrastructure and ensuring the system meets operational requirements.	BESS rating specified in the Technical Specification consider 2 hr discharge duration and ratings has been indicated in Tender SLD. Charging duration may be slightly higher based on system RtE and equipment ratings.
168	TECHNICA L SPECIFICA TION PART-B	2.02.01 BESS SUB SECTIO N-IISCOP E OF SUPPL Y AND SERVIC ES tie transfro mer			General	for Mouda, BARH, and Simhardi locations, capacity is splitted in Stage-1 and stage 2.Employer to clarify that whether separate bays are required for each of the stages.	YES. Separate bays and BESS Tie transformers as indicated in tender SLD are to be provided
169	TECHNICA L SPECIFICA TION PART-B				General	for BARH location area provided is not sufficient, Employer to provide more spare for occupation of capacity.	Approxiamate area available is 9 acres.
170	TECHNICA L SPECIFICA TION PART-B	SUB SECTIO N-II SCOPE OF SUPPL Y AND SERVIC ES				Employer to clarify that power trafo location is at switchyard end, as laying of HV cables of 132kV and 220 is difficult.	Bidder to comply with specification requirements
171	TECHNICA L SPECIFICA TION PART-B	APPEN DIX - 4 to SUB SECTIO N I-B			GENERAL DESIGN DATA FOR BESS SITE A. PROJECT LOCATION CLASSIFICATION (CORROSION PROTECTION) Corrosive Category: C3-All Projects (Except Simhadri & Dadri); C5-for Simhadri and Dadri Project	Bidder requests clarity on the scope of works on Dadri project. Whether it is included in this project.	Dadri is Not included under LOT-1
172	TECHNICA L SPECIFICA TION PART-B	SUBSE CTION- A 02BATT ERY AND BATTE RYMAN AGEME NT SYSTE M Cl. 3.00.00			ENCLOSURE/CONTAINER OF BESS The battery enclosure details as below. Fire Rating: 2 Hrs Corrosion Level: C5M Enclosure IP rating: IP54 HVAC: as per rated battery capacity HVAC Mounting Arrangement: Wall/Roof Mount FFS/FSS Suppressant used: Aerosol (UL Listed) E-Stop Functionality: Yes Design Standard: As per NFPA 855	Bider requests clarity on the corrosion category to be considered for all the plots.	Corrosion Category of Structure and Civil is Mention in Appendix 4 to Subsection IB of Part A of Technical Specification.
173	TECHNICA L SPECIFICA TION PART-B	SUB SECTION-II SCOPE OF SUPPLY AND SERVICES 2.00.00			Bidder shall also provide NIFPS (complete in all respect) for Tie Transformer and PCS/Inverter Duty Transformer (as applicable as per statuary requirement), details of the same as specified elsewhere.	Bidder understand that Nitrogen Injection Fire Prevention & Extinguishing System (NIFPES) shall be provided only for all oil filled transformers/reactors of rating 10MVA/10MVR & above. For all other transformer bidder consider only portable fire extinguisher. Kindly confirm.	Bidder's understanding is correct.

174	TECHNICA L SPECIFICA TION PART-B	SUB SECTIO N-II SCOPE OF SUPPL Y AND SERVIC ES 1.01.03			Complete Electrical system, mechanical systems/auxiliaries including Fire detection & protection system, HVAC system and C&I system as required for the successful completion of the proposed BESS system and its integration with the existing system shall be in the scope of the contractor.	Bidder request to provide the full name of C & I System.	Full name of C & I System is "Control & Instrumentation System".
175	TECHNICA L SPECIFICA TION PART-B	SUB SECTIO N-II SCOPE OF SUPPL Y AND SERVIC ES18 HVAC System			The BESS shall include HVAC system designed to maintain battery temperatures at levels acceptable to the Battery Manufacturer's normal Battery warranty conditions, conducive to acceptable battery life, and as required to maintain battery capacity for all seasons/climatic conditions at the site.	Bidder proposes containerized liquid cooling system to maintain the acceptable battery temperature. Kindly accept.	Containerized liquid cooling system to maintain the acceptable battery temperature, is acceptable as per standard & proven practice of industry/OEM complying to statutory/regulatory norms & guidelines(as applicable). Further, refer Refer Technical Amendment-01 in this regard.
176	TECHNICA L SPECIFICA TION PART-B	SUB SECTIO N-D FDPS & HVAC 1.02.00			The complete fire detection and protection systems shall be as per the guidelines/codes/standards / rules of TAC/ NFPA / IS: 3034 /OISD, etc.	Bidder proposes to consider High Velocity Water Spray system only for the power transformer of capacity 220kV and above. Kindly confirm.	High Velocity Water (HVW) Spray system is not envisaged for any transformer in the scope of the Bidder. However, Nitrogen Injection Fire Prevention & Extinguishing System (NIFPES) shall be provided for all oil filled transformers/reactors of rating 10MVA/10MVR & above as per specification.
177	TECHNICA L SPECIFICA TION PART-B	SUB SECTIO N-D FDPS & HVAC 3.00.00 Portable Fire Extingui shers			Fire extinguishers shall be installed in all thebuildings/equipment in the scope of the Bidder as per TAC requirement. However, the Contractor shall supply the following quantities (minimum) of fire extinguishers (for each station) and install the same at various locations: Pressurized water type (9 lit. cap.) (IS:15683 operated by CO2 cartridge type) — 10 Nos. Foam type (9 lit. cap. IS: 15683) — 10 Nos. CO2 type (4.5 kg. Cap. IS: 15683) — 10 Nos. Dry Chemical powder (6 kg. Cap. IS: 15683) — 10 Nos.	Please confirm, whether the specified quantity (10 Nos) of fire extinguisher is applicable only for the main control building or the same quantity has to consider for all other buildings in BESS area.	Quantity of portable fire extinguishers as specified [at clause no. 3.00.00, Sub-Section-D (FDPS & HVAC), Part-B of Technical Specification] is the **minimum** quantity for each station. However, Bidder to note that required quantities (as per TAC) of fire extinguishers shall be supplied & installed in all the buildings/equipment in the scope of the Bidder.
178	TECHNICAL SPECIFICA TION PART-B	SUB SECTION-D FDPS & HVAC 2.01.00 Air Conditioning System			For areas, where A/C load is of the order of 5-25TR, ductable split/packaged A/C shall be provided. Smaller areas which may require air conditioning up to 5 TR rating shall be served with Hi-wall Split/Cassette air conditioner units as per requirement.	Bidder proposes to provide combination of two or more Hi-wall Split/Cassette air conditioner units where A/C load is upto 10 TR and ductable split/packaged A/C unit for load more than 10 TR. Kindly confirm if this alternative arrangement is acceptable.	Bidder to comply with specification requirements.
179					General	Bidder request to provide information on the existing capacity of the fire water tank (if any) at the station and the parameters of the fire pump. Please share the existing fire pump room detail.	Bidder to note that no water based fire protection system (Hydrant/Spray) is envisaged and hence integration with existing fire water network & pumping system is not required.
180	TECHNICA L SPECIFICA TION PART-B				General	Kindly share the kmz file of the mentioned project sites with the following: 1. Clear demarcation of proposed BESS area & Bay extension area 2. Proposed location for Control room and switch gear buildings 3. Approach road to the BESS location 4. Existing drains 5. Existing Buildings structures that needs to demolished and 6. Other important landmarks of concern.	1. The idenfied locations of BESS and switchyard are within the existing Plants of NTPC. The Girds with local corodinates are marked in GLP document in Tender drawings. 2. The Control room and Switchgear - to be accomodated within identifed area. Detail layout is to be prepared by the bidder during detail engg. 3&4. Approach road and Existing Drain : Paving area of BESS plant to be connected with nearby available Road with suitable provision of culvert on existing drain is in Bidder's scope of work. Further bidder to refer Amendment no. - 01 for approach. 5. As such any structure demolision is not envisaged, however, any foundation or underground obstructions shall be demolished as per clause v, Part II A of Technical Specification
181	TECHNICA L SPECIFICA TION PART-B				General	Kindly share the following files of the mentioned project sites: 1. Topography survey report(AutoCAD file) 2. Detail geotechnical report 3. Detail Hydrology survey report.	1) Topography survey is scope of bidder 2) Available Geotechnical data is provided in Technical Specification. Any other data required, other than provided in document, is in scope of Bidder. 3)Detail Hydrology survey report is not available. However,Storm water drains of BESS area to be connected to nearest owner's drainage system.

182	TECHNICA L SPECIFICA TION PART-E					Kindly clarify the meaning and relevance of this line as depicted in all General Arrangement (GA) drawings for the project site locations.	Bidder's query not clear.
183	TECHNICA L SPECIFICA TION PART-E					Bidder proposes to relocate the Proposed BESS location as the location seems not feasible due to the pollution and vibrations due to adjacent Coal stack pile and railway track respectively.	Bidder to refer Technical Amendment-01 in this regard
184	TECHNICA L SPECIFICA TION PART-B	SUB SECTIO N I-B PROJE CT INFOR MATIO NAnnex ure C			SOIL DATA AND FOUNDATION SYSTEM - Employer has carried out geotechnical investigation in the proposed area. Logs of boreholes of proposed area are enclosed with this Annexure.	Kindly provide the detail borelog for the Simhadri project location.	The available geotechnical data is provided in Technical specifications. Any other data required, other than provided in document, is in scope of Bidder.
185	TECHNICA L SPECIFICA TION PART-B	SUB SECTIO N II-A SCOPE OF SUPPL Y AND SERVICES - CIVIL 1			Storm water drain in BESS area and connecting the same with existing Nearby drain. Design and construction of Drainage system as per General Layout & Topography	As per Bidder's understanding, the BESS location and Extension bay comes inside the developed or under developing Thermal Power plant Township. So no separate drains for the BESS location and bay extension location is envisaged. Kindly confirm.	BESS location and Extension bays are located in a working thermal power plant. For drains bidder to refer S. No. VIII of Cl 1.00.00 of Sub-Section IIA, Part-A of technical Specs.
186	TECHNICA L SPECIFICA TION PART-B	SUB SECTIO N II-A SCOPE OF SUPPL Y AND SERVIC ES - CIVIL 1			Civil, structural and architectural works associated with RCC framed Service Building and Switchgear Building with brick wall cladding including substructure, superstructure and all other related works like cable trench etc., complete as per system requirement.	Bidder understands that the Service Building and Control room building are same. Also, one control room building for both bay extension and BESS is required for all project locations. Kindly confirm.	Bidder's understanding is correct regarding service building. No separate control room building for switchyard extension is proposed. CRP panels are proposed to be kept in AC kiosk.
187	TECHNICA L SPECIFICA TION PART-B	SUB SECTIO N II SCOPE OF SUPPL Y AND SERVIC ES1.01. 10			A dedicated building shall be provided to house the 33 kV pooling switchgear. In addition, a common control room building shall be provided for the BESS installation, which shall accommodate all LT panels, Battery Management Systems (BMS), Energy Management System (EMS), SCADA, communication equipment, UPS and other common auxiliary systems required for operation and monitoring	Bidder proposes to provide the Switchgear inside the Control room building and no separate building for Switch gear and Control room building is required. Kindly confirm.	Refer Technical Amendment-01
188	TECHNICA L SPECIFICA TION PART-B	SUB SECTIO N II SCOPE OF SUPPL Y AND SERVIC ES 2.02.02 (i)			The scope includes the extension / addition of bays in existing service switchyards envisaged for power evacuation and charging of BESS system except for Bongaigaon BESS. For Bongaigaon BESS system a new 400kV GIS switchyard with associated Nos of bays shall be considered as indicated in single line diagram. The switchyard bay(s) arrangement and switching scheme of respective project shall be as indicated in single line diagram.	Kindly clarify whether 400Kv GIS switchyard for Bongaigaon BESS system and FGUTP-IV BESS System are scope of this EPC package or not.	FGUTPP and Bongaigaon TPP are not covered in This package
189	TECHNICA L SPECIFICA TION PART-B	SUB SECTIO N II-A SCOPE OF SUPPL Y AND SERVIC ES - CIVIL1			Construction of approach pathway (heavy duty paving) connecting to the existing Road (if required)	Bidder understands that all the BESS locations are connected by already existing approach roads of Thermal powerplant township and there is no requirement of approach pathway. Kindly confirm.	Refer Technical Amendment-01
190	TECHNICA L SPECIFICA TION PART-B	SUB SECTIO N II-A SCOPE OF SUPPL Y AND SERVIC ES - CIVIL 1			Chain Link Fencing with Gate along with Guard room for BESS Area wherever required. Precast Boundary with Gate along with Guard room for BESS Area where ever required.	Kindly confirm whether bidder have to provide Chain link fencing or Precast Boundary fencing for the BESS location along with Guard room and main gate.	If the BESS is located outside the plant boundary, a precast boundary wall shall be constructed around it as per the applicable technical specifications. However, if the BESS is situated within the plant boundary, it shall be enclosed with chain link fencing.

191	TECHNICA L SPECIFICA TION PART-B	SUB SECTIO N II-A SCOPE OF SUPPL Y AND SERVIC ES - CIVIL1			Removal, and disposal of identified facilities/ structures/ substructures/ foundations of dismantled quarters/buildings/structures, reinforcement, pavement/paving, pipes and any underground structure/materials, debris etc. all complete. All existing foundations/below ground facilities interfering with new facilities are to be dismantled up to minimum 10m or technical/system requirement, whichever is greater, from the extreme outline of the new underground foundation/ structure. No drawing for substructures are available. Bidder may assess the same as per actual site conditions without any additional time and cost implication to owner.	Kindly provide the details, layout and type of building, structures, foundation and other facilities to be dismantled or demolished for all the project locations as the scope is not clear in the Technical specification and GA layouts shared with the tender documents.	As such any structure demolision is not envisaged, however, any foundation or underground obstructions shall be demolished as per clause v, Part II A of Technical Specification
192	TECHNICA L SPECIFICA TION PART-B	SUB SECTIO N II-A SCOPE OF SUPPL Y AND SERVIC ES - CIVIL 2			Construction stores (covered) & open stores as per his requirement.	Kindly confirm whether there is requirement of permanent storage shed for the O&M phase. If yes, provide the type of structure, area and detail technical specification required for the Permanent storage shed.	Construction stores (covered) & open stores are temporary facilities . Bidder to refer clause 2.00.00 of Part A,Sub-Section IIA, , Section VI of Techncial Specification
193	TECHNICA L SPECIFICA TION PART-B	SUB SECTIO N III TERMIN AL POINTS & EXCLU SION2			Construction of any shed/closed area required for storage of material/equipment in NTPC premises shall be in Bidders scope		Bidder's Query is blank
194	TECHNICAL SPECIFICA TION PART-B	SUB SECTION II-A SCOPE OF SUPPLY AND SERVICES - CIVIL 1			Area Paving in and around BESS facilities/ structure to be provided as per Technical Specifications and Layout.	Bidder understands that the area paving mentioned is the internal road inside the BESS area. If yes, kindly provide the width of carriage way and shoulder for the internal road.	Bidder to refer Typical Layout of BESS plant of PART E- Tender drawing,for Internal road/ heavy duty paving width.
195		SUB SECTION-C CIVIL 10.00.00			RCC paving of minimum 150 mm thick with M25/M35 grade concrete, over an under bed as specified herein shall be provided for areas mentioned below. RCC paving shall be designed as rigid reinforced concrete pavement for the crane/ vehicular/ equipment movement loads which the paving has to bear		Bidder's Query is blank
196	TECHNICA L SPECIFICA TION PART-B	SUB SECTIO N-C CIVIL12 .03.00			All foundations and surfaces of substructures coming in contact with earth shall be applied with Minimum two coats of hot bitumen of Industrial grade V30, conforming to IS: 702 (latest), mixed with 1% anti-stripping compound at the rate 1.7 Kg/Sq.m (for sum of all coats). In addition Water/ cement ratio shall generally be restricted to 0.45.	Bidder understands that out 7 Thermal Power plant project locations, Simhadri Thermal power plant falls under C5 Corrosion category and remaining six locations falls under C3 corrosion category. Kindly confirm.As per corrosion protection measure given in the technical specification for Simhadri region(C5 category), higher grade concrete(M35) and corrosion resistant reinforcement are suggested which eliminates the need for additional bitumen layer as specified. Kindly confirm.	1) Simhadri Thermal power plant is in C5 Corrosion Catergory and rest in C3 corrosion category. 2) Bidder to comply Technical Specification
197	TECHNICA L SPECIFICA TION PART-B	12.02.0 0			Dense and durable concrete is to be used. Minimum grade of concrete shall be M25 except in Dadri and Simhadri projects where minimum grade of concrete is M35.		Bidder's Query is blank
198	TECHNICAL SPECIFICATION PART-B	15.02.00			Reinforcement steel shall be of corrosion resistant grade high strength deformed TMT steel bars (for Simhadri and Dadri Project Corrosion Resistance thermo mechanically treated (CRS-TMT) bars) of grade Fe-415/ Fe-500/ Fe500D/ Fe550D and shall conform to IS 1786 and IS 13920		Bidder's Query is blank
199	TECHNICA L SPECIFICA TION PART-B	SUB SECTIO N-II SCOPE OF SUPPL Y AND SERVIC ES 2.01.00			EMS, PPC shall also enable standalone AGC and interface with RLDC for independent BESS operation.	Bidder proposes that a. BESS EMS shall have in-built functionalities of the AGC. Hence, standalone BESS AGC is not required. b. BESS Plant data shall be communicated to RLDC via SAS through IEC 104 protocol. Kindly confirm the same.	a) The BESS EMS may incorporate AGC functionality, provided it meets all AGC-related performance, response time, and interfacing requirements specified in the tender and is compliant with CEA (Technical Standards for Connectivity to the Grid) Regulations and other applicable statutory requirements. A separate standalone AGC is not required in such case. b) Confirmed
200	TECHNICA L SPECIFICA TION PART-B	SUB SECTION-I-BPROJECT INFORMATION1.05 .00			i. The Contractor shall supply a separate hot standby redundant Power Plant Controller (PPC) or part of the EMS to act as redundant PPC, along with associated equipment.	Bidder understands and proposes that a. PPC shall be a part of BESS EMS system. b. BESS EMS should be a computerized system.Kindly confirm bidder's understanding	a) The EMS (Energy Management System) can be considered as the Plant Power Controller (PPC) provided it meets all the functional and performance requirements specified for the PPC in the technical specifications. A separate PPC is not required if the EMS fulfills these requirements. However, if a separate PPC is required as per statutory, grid connectivity, or other regulatory requirements, the same shall be provided by the bidder accordingly. b) Bidder's proposal is not acceptable. EMS shall be controller based system. Refer Technical Amendment-01 in this regard.
201	TECHNICA L SPECIFICA TION PART-B	SUB SECTIO N-II SCOPE OF SUPPL Y AND SERVIC ES 2.01.00			22. The CCTV system shall be integrated with EMS system.	The CCTV system is a separate system for surveillance of the BESS plant area. Hence, integration of CCTV and EMS system is not applicable. Kindly confirm that bidder's understanding is correct.	Bidder's understanding is correct. However, Bidder to refer Technical Ammendment-01 in this regard.

202	TECHNICAL SPECIFICATION PART-B	SUB SECTION-II SCOPE OF SUPPLY AND SERVICES 2.01.00			f. suitable arrangement for integration to BESS DCS/EMS.	Bidder proposes to considered OPC UA and MODBUS TCP/IP protocol for integration of BESS SCADA and Thermal power plant's DCS. Kindly confirm the same.	Bidder's proposal is noted. However, the same shall be discussed & finalized during detail engineering.
203	TECHNICA L SPECIFICA TION PART-B	SUBSECTION-A 04ENERGY MANAGEMENT SYSTEM3.00. 00			The DCS shall have the following minimum features:i. Redundant communication controllers shall be provided to handle thecommunication between I/O Modules (including remote I/O) and PLCs andbetween PLCs and operator workstation.	Bidder understand and proposes to consider the followinga. Redundant PLC at BESS Control room Building.b. Non- Redundant PLC RIO/RTU at each Power distribution Room. c. Hot swappable IO modules for BESS Control room Building d. Hot swappable IO modules at each Power distribution Room. Kindly provide your acceptance for the same.	Bidder's proposal is not acceptable. Bidder to comply with the technical specification requirements.
204	TECHNICA L SPECIFICA TION PART-B	SUBSE CTION- A 04 ENERG Y MANAG EMENT SYSTE M 11.00.00			i. The HSRS shall collect, store and process system data from MMIPIS data base. The data shall be saved online on hard disk and automatically transferred to non-erasable long term storage media once in every 30 Days periodically for long term storage.	Bidder understands that the historian system to be considered for this requirement is the same system in which the historical data has to be stored. Kindly confirm that bidders understanding is correct.	Bidder's understanding is correct.
205	TECHNICA L SPECIFICA TION PART-B	1.00.00 CLOSE D CIRCUI T TELEVI SION (CCTV) SYSTE M 2.02.00			For cameras to be located in remote areas where the UPS power supply cannot be extended due to voltage drop etc., then such cameras can be grouped and fed from mini- UPS. Individual mini-UPS shall be provided for the cameras which cannot be grouped. The contractor shall also provide local power distribution boxes as required for sub- distribution of supply from these mini-UPS to cameras.	Cameras in remote location will be getting power through POE cable. Hence separate mini UPS not required for cameras. Kindly confirm the same.	Specification requirement is clear. Bidder to comply the technical specification.
206	TECHNICA L SPECIFICA TIONSECT ION –VI, PART-B- Part 1 of 3	APPEN DIX-2 TO SUBSE CTION I-B (Locatio n and Approac h):			1. Kudgi Super Thermal Power Station:Location of BESS Plant The location for the BESS is proposed at two alternate locations for FR purpose: Location-I in between: 900N-1200N & 2200E-2600E Location-II in between: 600N-800N & 1100E- 1400E	Bidder request owner to provide the existing substation drawings for the proposed BESS bay extension in the existing switchyard. .Layout plan with section drawings of the substation .Erection key drawing layout, exiting bus bar configuration with existing conductor details.Civil/structural plan including foundations, equipment plinths and section details .Cable tray, trench and conduit routing layout .Earthing grid and lightning protection layout .Control room equipment layout plan	Available drawings shall be shared with successful bidder during detail engineering
207	TECHNICA L SPECIFICA TION SECTION – VI, PART- B- Part 1 of 3	APPEN DIX-2 TO SUBSE CTION I-B (Locatio n and Approac h):			2. Mouda Super Thermal Power Station, Stage I & II: Location of BESS Plant The proposed BESS plant is near the existing switchyard on West side in between the following co-ordinates: (a) 6000N-6200N (b) 4700E-5000E	Bidder request owner to provide the existing substation drawings for the proposed BESS bay extension in the existing switchyard. .Layout plan with section drawings of the substation .Erection key drawing layout, exiting bus bar configuration with existing conductor details .Civil/structural plan including foundations, equipment plinths and section details .Cable tray, trench and conduit routing layout .Earthing grid and lightning protection layout .Control room equipment layout plan .Please confirm Stage I & II are having common substation or different substations	Available drawings shall be shared with successful bidder during detail engineering
208	TECHNICA L SPECIFICA TIONSECT ION –VI, PART-B- Part 1 of 3	APPEN DIX-2 TO SUBSE CTION I-B (Locatio n and Approac h):			3. Solapur Super Thermal Power Station Location of BESS Plant In between 200S- 400S and 1600E-1900E co-ordinates, on South-East side of the existing Coal stockpiles.	Bidder request owner to provide the existing substation drawings for the proposed BESS bay extension in the existing switchyard. .Layout plan with section drawings of the substation .Erection key drawing layout, exiting bus bar configuration with existing conductor details.Civil/structural plan including foundations, equipment plinths and section details .Cable tray, trench and conduit routing layout .Earthing grid and lightning protection layout .Control room equipment layout plan	Available drawings shall be shared with successful bidder during detail engineering
209	TECHNICA L SPECIFICA TION SECTION – VI, PART- B- Part 1 of 3	APPEN DIX-2 TO SUBSE CTION I-B (Locatio n and Approac h):			4. Barh Super Thermal Power Station, Stage I & II Location of BESS Plant The proposed BESS plant is located adjoining the existing switchyard on East side in between the following co-ordinates: (c) 1000E-1200E (d) 100N-400S	Bidder request owner to provide the existing substation drawings for the proposed BESS bay extension in the existing switchyard. .Layout plan with section drawings of the substation .Erection key drawing layout, exiting bus bar configuration with existing conductor details .Civil/structural plan including foundations, equipment plinths and section details .Cable tray, trench and conduit routing layout .Earthing grid and lightning protection layout .Control room equipment layout plan .Please confirm Stage I & II are having common substation or different substations	Available drawings shall be shared with successful bidder during detail engineering
210	TECHNICA L SPECIFICA TIONSECT ION –VI, PART-B- Part 1 of 3	APPEN DIX-2 TO SUBSE CTION I-B (Locatio n and Approac h):			5. Nabinagar Super Thermal Power Station, NPGCLLocation of BESS Plant The location of BESS is within the Stage-II SWYD area on Southern side in between the following co- ordinates: (e) 1400E-1600E (f) 400N-600N	Bidder request owner to provide the existing substation drawings for the proposed BESS bay extension in the existing switchyard. .Layout plan with section drawings of the substation .Erection key drawing layout, exiting bus bar configuration with existing conductor details.Civil/structural plan including foundations, equipment plinths and section details .Cable tray, trench and conduit routing layout .Earthing grid and lightning protection layout .Control room equipment layout plan	Available drawings shall be shared with successful bidder during detail engineering

211	TECHNICAL SPECIFICATION SECTION –VI, PART-B- Part 1 of 3	APPENDIX-2 TO SUBSECTION I-B (Location and Approach):			6. Simhadri Super Thermal Power Station, Stage I & II Location of BESS Plant The proposed BESS plant is adjoining the existing switchyard on East side in between the following co-ordinates: (g) 2000W-2200W (h) 1400N-1600N	Bidder request owner to provide the existing substation drawings for the proposed BESS bay extension in the existing switchyard. .Layout plan with section drawings of the substation .Erection key drawing layout, exiting bus bar configuration with existing conductor details .Civil/structural plan including foundations, equipment plinths and section details .Cable tray, trench and conduit routing layout .Earthing grid and lightning protection layout .Control room equipment layout plan .Please confirm Stage I & II are having common substation or different substations	Available drawings shall be shared with successful bidder during detail engineering
212	TECHNICA L SPECIFICA TIONSECT ION –VI, PART-B- Part 1 of 3	APPEN DIX-2 TO SUBSE CTION I-B (Locatio n and Approac h):			7. Ramagundam-III Super Thermal Power Station, Stage-III Location of BESS Plant The proposed BESS plant located adjoining the existing switchyard of St-I on East side in between the following co-ordinates: (a) 1400E-1600E (b) 400N-600N	Bidder request owner to provide the existing substation drawings for the proposed BESS bay extension in the existing switchyard. .Layout plan with section drawings of the substation .Erection key drawing layout, exiting bus bar configuration with existing conductor details.Civil/structural plan including foundations, equipment plinths and section details .Cable tray, trench and conduit routing layout .Earthing grid and lightning protection layout .Control room equipment layout plan	Available drawings shall be shared with successful bidder during detail engineering
213	TECHNICA L SPECIFICA TION SECTION – VI, PART- B- Part 1 of 3	1.00.00 BRIEF DESCRI PTION OF THE PROPO SED SYSTE M:			Plant : Kudgi STPP BESS (MW) rating: 240 BESS (MWh) rating: 480 Proposed Point of interconnection :220kV Remarks: New Bay	Bidder request owner to provide the existing substation drawings for the proposed BESS bay extension in the existing switchyard. .Layout plan with section drawings of the substation .Erection key drawing layout, exiting bus bar configuration with existing conductor details .Civil/structural plan including foundations, equipment plinths and section details .Cable tray, trench and conduit routing layout .Earthing grid and lightning protection layout .Control room equipment layout plan	Available drawings shall be shared with successful bidder during detail engineering
214	TECHNICA L SPECIFICA TIONSECT ION –VI, PART-B- Part 1 of 3	1.00.00 BRIEF DESCRI PTION OF THE PROPO SED SYSTE M:			Plant : Mouda STPP Stage-IBESS (MW) rating: 200 BESS (MWh) rating: 400Proposed Point of interconnection :132kVRemarks: New Bay Plant : Mouda STPP Stage-IIBESS (MW) rating: 200 BESS (MWh) rating: 400Proposed Point of interconnection :132kVRemarks: New Bay	Bidder request owner to provide the existing substation drawings for the proposed BESS bay extension in the existing switchyard. .Layout plan with section drawings of the substation .Erection key drawing layout, exiting bus bar configuration with existing conductor details.Civil/structural plan including foundations, equipment plinths and section details .Cable tray, trench and conduit routing layout .Earthing grid and lightning protection layout .Control room equipment layout plan.Please confirm Stage I & II are having common substation or different substations	Available drawings shall be shared with successful bidder during detail engineering
215	TECHNICA L SPECIFICA TION SECTION – VI, PART- B- Part 1 of 3	1.00.00 BRIEF DESCRI PTION OF THE PROPO SED SYSTE M:			Plant : Solapur STPP BESS (MW) rating: 132 BESS (MWh) rating: 264 Proposed Point of interconnection :132kV Remarks: New Bay	Bidder request owner to provide the existing substation drawings for the proposed BESS bay extension in the existing switchyard. .Layout plan with section drawings of the substation .Erection key drawing layout, exiting bus bar configuration with existing conductor details .Civil/structural plan including foundations, equipment plinths and section details .Cable tray, trench and conduit routing layout .Earthing grid and lightning protection layout .Control room equipment layout plan	Available drawings shall be shared with successful bidder during detail engineering
216	TECHNICAL SPECIFICATIONSECTION –VI, PART-B- Part 1 of 3	1.00.00 BRIEF DESCRIPTION OF THE PROPOSED SYSTEM:			Plant : Barh STPP Stage-IBESS (MW) rating: 200BESS (MWh) rating: 400Proposed Point of interconnection :132kVRemarks: New BayPlant : Barh STPP Stage-IIBESS (MW) rating: 200BESS (MWh) rating: 400Proposed Point of interconnection :132kVRemarks: New Bay	Bidder request owner to provide the existing substation drawings for the proposed BESS bay extension in the existing switchyard. .Layout plan with section drawings of the substation .Erection key drawing layout, exiting bus bar configuration with existing conductor details.Civil/structural plan including foundations, equipment plinths and section details .Cable tray, trench and conduit routing layout .Earthing grid and lightning protection layout .Control room equipment layout plan.Please confirm Stage I & II are having common substation or different substations	Available drawings shall be shared with successful bidder during detail engineering
217	TECHNICA L SPECIFICA TION SECTION – VI, PART- B- Part 1 of 3	1.00.00 BRIEF DESCRI PTION OF THE PROPO SED SYSTE M:			Plant : Nabinagar STPP Stage-I BESS (MW) rating: 200 BESS (MWh) rating: 400 Proposed Point of interconnection :132kV Remarks: New Bay	Bidder request owner to provide the existing substation drawings for the proposed BESS bay extension in the existing switchyard. .Layout plan with section drawings of the substation .Erection key drawing layout, exiting bus bar configuration with existing conductor details .Civil/structural plan including foundations, equipment plinths and section details .Cable tray, trench and conduit routing layout .Earthing grid and lightning protection layout .Control room equipment layout plan .Please confirm Stage I & II are having common substation or different substations	Available drawings shall be shared with successful bidder during detail engineering

218	TECHNICAL SPECIFICATIONSECTION –VI, PART-B- Part 1 of 3	1.00.00 BRIEF DESCRIPTION OF THE PROPOSED SYSTEM:			Plant : Simhadri STPP Stage-II BESS (MW) rating: 70BESS (MWh) rating: 140Proposed Point of interconnection :400kVRemarks: New Bay	Bidder request owner to provide the existing substation drawings for the proposed BESS bay extension in the existing switchyard. .Layout plan with section drawings of the substation .Erection key drawing layout, exiting bus bar configuration with existing conductor details.Civil/structural plan including foundations, equipment plinths and section details .Cable tray, trench and conduit routing layout .Earthing grid and lightning protection layout .Control room equipment layout plan.Please confirm Stage I & II are having common substation or different substations	Available drawings shall be shared with successful bidder during detail engineering
219	TECHNICA L SPECIFICA TION SECTION – VI, PART- B- Part 1 of 3	1.00.00 BRIEF DESCRI PTION OF THE PROPO SED SYSTE M:			Plant : Simhadri STPP Stage-I BESS (MW) rating: 75 BESS (MWh) rating: 150 Proposed Point of interconnection :400kV Remarks: New Bay	Bidder request owner to provide the existing substation drawings for the proposed BESS bay extension in the existing switchyard. .Layout plan with section drawings of the substation .Erection key drawing layout, exiting bus bar configuration with existing conductor details .Civil/structural plan including foundations, equipment plinths and section details .Cable tray, trench and conduit routing layout .Earthing grid and lightning protection layout .Control room equipment layout plan .Please confirm Stage I & II are having common substation or different substations	Available drawings shall be shared with successful bidder during detail engineering
220	TECHNICA L SPECIFICA TIONSECT ION –VI, PART-B- Part 1 of 3	1.00.00 BRIEF DESCRI PTION OF THE PROPO SED SYSTE M:			Plant : Rama Gundam STPP Stage-IIIBESS (MW) rating: 50BESS (MWh) rating: 100Proposed Point of interconnection :33kVRemarks: 33kV Tie switchgear	Bidder request owner to provide the existing substation drawings for the proposed BESS bay extension in the existing switchyard. .Layout plan with section drawings of the substation .Erection key drawing layout, exiting bus bar configuration with existing conductor details.Civil/structural plan including foundations, equipment plinths and section details .Cable tray, trench and conduit routing layout .Earthing grid and lightning protection layout .Control room equipment layout plan	Available drawings shall be shared with successful bidder during detail engineering
221	TECHNICA L SPECIFICA TION SECTION – VI, PART- B- Part 1 of 3	2.00.00 2.01.00 SCOPE OF SUPPL Y AND SERVIC ES (BESS, ELECT RICAL & ASSOCI ATED SYSTE MS)			2.02.02 (i) The scope of work comprises of design, supply, erection, testing and commissioning of 400kV/220kV/132kV AIS/GIS, Switchyard/bays as shown in single line diagram associated with each project [except for BESS located at Ramagundam-III and FGUTP-IV]. The scope includes the extension / addition of bays in existing service switchyards envisaged for power evacuation and charging of BESS system except for Bongaigaon BESS. For Bongaigaon BESS system a new 400kV GIS switchyard with associated Nos of bays shall be considered as indicated in single line diagram. The switchyard bay(s) arrangement and switching scheme of respective project shall be as indicated in single line diagram.	Bidder request owner to provide the tender SLD & layout plan with sections for the proposed Bongaigaon BESS system a new 400kV GISsubstation	Available drawings shall be shared with successful bidder during detail engineering
222	TECHNICA L SPECIFICA TIONSECT ION –VI, PART-B- Part 1 of 3	2.00.00 2.01.00 SCOPE OF SUPPLY AND SERVICES (BESS, ELECTRICAL & ASSOCIATED SYSTEMS)			2.02.02 (iii) Details of switchyard bays at each project are indicated in table below: Sl.No. : 1Plant : Kudgi STPPBESS (MW) rating: 240 BESS (MWh) rating : 480Proposed Point of interconnection : 220kVRating of bays : 245kV, 1600Amp, 40kA Number of bays : 2Remarks	.As per the tender specifications and the provided single-line diagram (SLD), the bidder understands that the proposed scope includes two (2) bays equipped with two (2) 220/33 kV, 125 MVA power transformers..However, as per the latest CEA publication titled "Standard Specifications and Technical Parameters for Transformers and Reactors (66 kV & Above Voltage Class)", the standard rating for a power transformer at the 220/33 kV voltage level is 100 MVA..In light of this discrepancy, the bidder respectfully requests the following clarifications:.Please confirm whether the transformer rating of 125 MVA is to be retained as per the tender, or revised to 100 MVA in alignment with the CEA guidelines..Please confirm the total number of bays and associated power transformers to be considered for the proposed BESS bay extension, in accordance with applicable standards.	BESS transformer size and quantity has been specified considering the BESS project requirements. Bidder to comply with specification requirements
223	TECHNICA L SPECIFICA TIONSECT ION –VI, PART-B- Part 1 of 3	2.00.00 2.01.00 SCOPE OF SUPPLY AND SERVICES (BESS, ELECTRICAL & ASSOCIATED SYSTEMS)			2.02.02 (iii) Details of switchyard bays at each project are indicated in table below: Sl.No. : 2Plant : Mouda STPP Stage-I and II BESS (MW) rating: 200 BESS (MWh) rating : 400Proposed Point of interconnection : 132kVRating of bays : 145kV, 2000Amp, 40kA Number of bays : 2Remarks	.As per the tender specifications and the provided single-line diagram (SLD), the bidder understands that the proposed scope includes two (2) bays equipped with two (2) 132/33 kV, 100 MVA power transformers..However, as per the latest CEA publication titled "Standard Specifications and Technical Parameters for Transformers and Reactors (66 kV & Above Voltage Class)", the standard rating for a power transformer at the 132/33 kV voltage level is 31.5MVA, 50MVA & 80 MVA only..In light of this discrepancy, the bidder respectfully requests the following clarifications:.Please confirm whether the transformer rating of 100 MVA is to be retained as per the tender, or revised to 80 MVA in alignment with the CEA guidelines..Please confirm the total number of bays and associated power transformers to be considered for the proposed BESS bay extension, in accordance with applicable standards.	BESS transformer size and quantity has been specified considering the BESS project requirements. Bidder to comply with specification requirements

224	TECHNICAL SPECIFICATIONSECTION –VI, PART-B- Part 1 of 3	2.00.00 2.01.00 SCOPE OF SUPPLY AND SERVICES (BESS, ELECT RICAL & ASSOCI ATED SYSTE MS)			2.02.02 (iii) Details of switchyard bays at each project are indicated in table below: Sl.No. : 3Plant : Solapur STPP BESS (MW) rating: 132 BESS (MWh) rating : 264Proposed Point of interconnection : 132kVRating of bays : 145kV, 2000Amp, 40kA Number of bays : 2Remarks	As per the tender specifications and the provided single-line diagram (SLD), the bidder understands that the proposed scope includes two (2) bays equipped with two (2) 132/33 kV, 80 MVA power transformers..However, as per the latest CEA publication titled "Standard Specifications and Technical Parameters for Transformers and Reactors (66 kV & Above Voltage Class)", the standard rating for a power transformer at the 132/33 kV voltage level is 31.5MVA, 50MVA & 80 MVA only..Please confirm whether the transformer rating of 80 MVA is to be retained as per the tender in alignment with the CEA guidelines..Please confirm the total number of bays and associated power transformers to be considered for the proposed BESS bay extension, in accordance with applicable standards.	BESS transformer size and quantity has been specified considering the BESS project requirements. Bidder to comply with specification requirements
225	TECHNICA L SPECIFICA TIONSECT ION –VI, PART-B- Part 1 of 3	2.00.00 2.01.00 SCOPE OF SUPPLY AND SERVICES (BESS, ELECTRICAL & ASSOCIATED SYSTEMS)			2.02.02 (iii) Details of switchyard bays at each project are indicated in table below: Sl.No. : 4Plant : Barh STPP Stage-I and II BESS (MW) rating: 200 BESS (MWh) rating : 400Proposed Point of interconnection : 132kVRating of bays : 145kV, 2000Amp, 40kA Number of bays : 2Remarks	As per the tender specifications and the provided single-line diagram (SLD), the bidder understands that the proposed scope includes two (2) bays equipped with two (2) 132/33 kV, 100 MVA power transformers..However, as per the latest CEA publication titled "Standard Specifications and Technical Parameters for Transformers and Reactors (66 kV & Above Voltage Class)", the standard rating for a power transformer at the 132/33 kV voltage level is 31.5MVA, 50MVA & 80 MVA only..In light of this discrepancy, the bidder respectfully requests the following clarifications:.Please confirm whether the transformer rating of 100 MVA is to be retained as per the tender, or revised to 80 MVA in alignment with the CEA guidelines..Please confirm the total number of bays and associated power transformers to be considered for the proposed BESS bay extension, in accordance with applicable standards.	BESS transformer size and quantity has been specified considering the BESS project requirements. Bidder to comply
226	TECHNICA L SPECIFICA TIONSECT ION –VI, PART-B- Part 1 of 3	2.00.00 2.01.00 SCOPE OF SUPPLY AND SERVICES (BESS, ELECTRICAL & ASSOCIATED SYSTEMS)			2.02.02 (iii) Details of switchyard bays at each project are indicated in table below: Sl.No. : 5Plant : Nabinagar STPP Stage-I BESS (MW) rating: 200 BESS (MWh) rating : 400Proposed Point of interconnection : 132kVRating of bays : 145kV, 2000Amp, 40kA Number of bays : 2Remarks	As per the tender specifications and the provided single-line diagram (SLD), the bidder understands that the proposed scope includes two (2) bays equipped with two (2) 132/33 kV, 100 MVA power transformers..However, as per the latest CEA publication titled "Standard Specifications and Technical Parameters for Transformers and Reactors (66 kV & Above Voltage Class)", the standard rating for a power transformer at the 132/33 kV voltage level is 31.5MVA, 50MVA & 80 MVA only..In light of this discrepancy, the bidder respectfully requests the following clarifications:.Please confirm whether the transformer rating of 100 MVA is to be retained as per the tender, or revised to 80 MVA in alignment with the CEA guidelines..Please confirm the total number of bays and associated power transformers to be considered for the proposed BESS bay extension, in accordance with applicable standards	BESS transformer size and quantity has been specified considering the BESS project requirements. Bidder to comply with specification requirements
227	TECHNICAL SPECIFICATIONSECTION –VI, PART-B- Part 1 of 3	2.00.00 2.01.00 SCOPE OF SUPPLY AND SERVIC ES (BESS, ELECT RICAL & ASSOCI ATED SYSTE MS)			2.02.02 (iii) Details of switchyard bays at each project are indicated in table below: Sl.No. : 6Plant : Simhadri STPP Stage-IIBESS (MW) rating: 70 BESS (MWh) rating : 140Proposed Point of interconnection : 400kVRating of bays : 420kV, 3150Amp, 50kA Number of bays : 2Remarks : Note#1 (Simhadri STPP- II): No switchyard is envisaged with Simhadri Stage-II	As per the tender specifications and the provided single-line diagram (SLD), the bidder understands that the proposed scope includes one (1) bay equipped with one (1) 400/33 kV, 80 MVA power transformers..However, as per the latest CEA publication titled "Standard Specifications and Technical Parameters for Transformers and Reactors (66 kV & Above Voltage Class)", there is no standard rating for a power transformer at the 400/33 kV voltage level..In light of this discrepancy, the bidder respectfully requests the following clarifications:.Please confirm whether the transformer rating of 80 MVA is to be retained as per the tender, or revised to 80 MVA in alignment with the CEA guidelines..Please confirm the total number of bays and associated power transformers to be considered for the proposed BESS bay extension, in accordance with applicable standards.	BESS transformer size and quantity has been specified considering the BESS project requirements. Bidder to comply with specification requirements
228	TECHNICA L SPECIFICA TIONSECT ION –VI, PART-B- Part 1 of 3	2.00.00 2.01.00 SCOPE OF SUPPL Y AND SERVIC ES (BESS, ELECT RICAL & ASSOCI ATED SYSTE MS)			2.02.02 (iii) Details of switchyard bays at each project are indicated in table below: Sl.No. : 7Plant : Simhadri STPP Stage-IBESS (MW) rating: 75 BESS (MWh) rating : 150Proposed Point of interconnection : 400kVRating of bays : 420kV, 3150Amp, 50kA Number of bays : 2Remarks : Note#2 (Simhadri STPP- 1): Complete DIA is to be provided under Simhadri Stage-I BESS package.	.As per the tender specifications and the provided single-line diagram (SLD), the bidder understands that the proposed scope includes one (1) bay equipped with one (1) 400/33 kV, 80 MVA power transformers..However, as per the latest CEA publication titled "Standard Specifications and Technical Parameters for Transformers and Reactors (66 kV & Above Voltage Class)", there is no standard rating for a power transformer at the 400/33 kV voltage level..In light of this discrepancy, the bidder respectfully requests the following .As per the tender specifications and the provided single-line diagram (SLD), the bidder understands that the proposed scope includes one (1) bay equipped with one (1) 400/33 kV, 80 MVA power transformers..However, as per the latest CEA publication titled "Standard Specifications and Technical Parameters for Transformers and Reactors (66 kV & Above Voltage Class)", there is no standard rating for a power transformer at the 400/33 kV voltage level..In light of this discrepancy, the bidder respectfully requests the following	BESS transformer size and quantity has been specified considering the BESS project requirements. Bidder to comply with specification requirements

229	TECHNICA L SPECIFICA TION SECTION – VI, PART- B- Part 1 of 3	2.00.00 2.01.00 SCOPE OF SUPPL Y AND SERVIC ES (BESS, ELECT RICAL & ASSOCI ATED SYSTE MS)			2.02.02 (iv) II. Switchyard materials: • 400kV GIS for Bongaigaon along with associated Pothead yard	Bidder request owner to provide the tender SLD & layout plan with sections for the proposed Bongaigaon BESS system a new 400kV GISsubstation	Bongaigaon TPP is not covered under Lot-1
230	TECHNICA L SPECIFICA TIONSECT ION –VI, PART-B- Part 1 of 3	2.02.02 (iv) II. Switchy ard material s:			• Contractor shall make earth resistivity measurements at site (based on four electrode method) and design the earthing grid as per IEEE: 80 (Latest edition). Complete earthing grid of present scope of bays (inclusive of supply of 40mm dia MS rod and GI flat) for earthing of all switchyard equipment, antiweed, and PCC, Gravel filling as required and its connection to earthing grid. The Earth pit as per IS 3043 as required. For extension / addition of bays in existing switchyard only antiweed and gravel filling to be provided.• Bidder's scope shall also include the complete interconnection of Earth grid with existing Earth grid of existing switchyard/thermal plant.	Bidder requests owner to provide the following information for the proposed BESS bay extension at all proposed locations:. Existing substation earth resistivity value, including any soil test reports..Existing earth grid design layout, including conductor sizing, grid spacing, depth, and connection details to major equipment and structures	Available drawings shall be shared with successful bidder during detail engineering
231	TECHNICA L SPECIFICA TION SECTION – VI, PART- B- Part 1 of 3	2.02.02 (iv) II. Switchy ard material s:			• Complete Direct Stroke Lightning Protection using Lightning Mast and/or shield wire and its connection to earth mat as required.	Bidder requests owner to provide the following information for the proposed Battery Energy Storage System (BESS) bay extension at all designated locations within the existing substation: .Existing DSLP layout with design details etc.	Available drawings shall be shared with successful bidder during detail engineering
232	TECHNICA L SPECIFICA TIONSECT ION –VI, PART-B- Part 1 of 3	2.02.02 (iv) II. Switchy ard material s:			•Supply and laying Armoured Power and control cables, Armoured FO Cables, screen cables, cabling (including inter and intra panel), cabling between Contractor supplied equipment and existing owner equipment Etc. and from present scope of panels to existing panels to complete the system is in the scope of Bidder. Cable trenches, cable support angles, cable trays and accessories as necessary for cable erection such as glands, lugs, clamps for cables, ferrules, cable ties, Hume pipe etc. cable route markers for buried cable trench are also included in the scope.	Bidder requests owner to provide the following information for the proposed Battery Energy Storage System (BESS) bay extension at all designated locations within the existing substation:.Detailed route length of the cable.	Location of BESS block and Switchyard are indicated in tender GLP for each project. Bidders is requested to assess the requirement related to distance/EHV cables etc. accordingly after taking into account all existing thermal plant facilities. bidder is expected to assess and provision cable lengths based on site conditions.
233	TECHNICA L SPECIFICA TION SECTION – VI, PART- B- Part 1 of 3	2.02.02 (iv) II. Switchy ard material s:			• The scope of work shall also include construction of the new cable trenches required for cable laying of present scope of bays and its interconnection with existing cable trenches etc.	Bidder requests owner to provide the following information for the proposed Battery Energy Storage System (BESS) bay extension at all designated locations within the existing substation: .Existing cable routing layout details along with existing cable trench layout and section details etc.	Available drawings shall be shared with successful bidder during detail engineering
234	TECHNICA L SPECIFICA TION SECTION – VI, PART- B- Part 1 of 3	2.02.02 (iv) II. Switchy ard material s:			• Intermediate gantries	Bidder requests owner to provide the following information for the proposed Battery Energy Storage System (BESS) bay extension: .Existing substation gantry details, including structural drawings, material specifications, height, span, and load-bearing capacity .Confirmation on the suitability of existing gantries for accommodating the bay extension at all proposed BESS locations	Available drawings shall be shared with successful bidder during detail engineering
235	TECHNICA L SPECIFICA TIONSECT ION –VI, PART-B- Part 1 of 3	2.02.02 (iv) II. Switchy ard material s:			• Indoor, outdoor Lighting and its accessories. Lightning Mast / Lighting mast shall be used for mounting lighting fixtures for outdoor switchyard lighting. Mounting of Lighting fixtures on towers/ gantries is not permitted. For extension of bays / addition of bays in existing switchyard bay lighting shall be provided as suited as per the site condition.	Bidder requests owner to provide the following information for the proposed Battery Energy Storage System (BESS) bay extension at all designated locations within the existing substation:.Existing Indoor & outdoor lighting layout with design details etc.	Available drawings shall be shared with successful bidder during detail engineering
236	TECHNICA L SPECIFICA TION SECTION – VI, PART- B- Part 1 of 3	2.02.02 (iv) II. Switchy ard material s:			• Extension of AC and DC supply from existing ACDB and DCDB of the thermal generation switchyard for feeding Auxiliary supply of the extension bays. • A Separate 220V DC system is to be provided in case of Bongaigaon TPP. This DC system may be utilized for DC control supply to switchyard as well as to BESS.	Bidder requests owner to provide the following information for the proposed Battery Energy Storage System (BESS) bay extension at all designated locations within the existing substation: .Details of the existing Auxiliary AC and DC systems, including specifications of distribution boards, voltage levels, battery banks, chargers, and load capacities .Confirmation on the availability of expansion provisions, specifically regarding spare terminals, capacity margins, and space within existing panels to accommodate additional Bay loads	Available drawings shall be shared with successful bidder during detail engineering
237	TECHNICA L SPECIFICA TION SECTION – VI, PART- B- Part 1 of 3	2.02.02 (iv) II. Switchy ard material s:			2.02.02(v) : 400kV Transmission Line: Material including Towers, conductors, OPGW, Hardware, Earthing Material etc. complete in all respect [only for BESS at Bongaigaon STPP]. OPGW shall have minimum 24 cores.	As per tender SLD Bidder understood that there is no transmission line in present scope	Confirmed
238	TECHNICA L SPECIFICA TIONSECT ION –VI, PART-B- Part 1 of 3	2.02.02 (iv) II. Switchy ard material s:			2.02.03 Control and Protection of EHV SystemThe scope of supply includes comprehensive provisions for the control and protection of the EHV system as outlined below..All components necessary for integrating control and protection relays, IEDs, and associated equipment—including their interface with the existing switchyard SAS system—shall be within the bidder's scope. .Numerical relays shall be deployed for all protection schemes.	Bidder requests owner to provide the following information for the proposed Battery Energy Storage System (BESS) bay extension at all designated locations within the existing substation for communication integration with existing system:.Existing numerical relays details like makes and models along with protection schemes..Existing SAS details like makes and models along with SAS Architecture & communication protocols.	Available drawings shall be shared with successful bidder during detail engineering

239	TECHNICA L SPECIFICA TION SECTION – VI, PART- B- Part 1 of 3	2.02.02 (iv) II. Switchy ard material s:			AC and DC power supply systems shall be extended for all EHV bay equipment from existing ACDB/DCDB. Wherever sufficient feeders are not available separate AC and DC distribution boards to be supplied and shall be connected from existing ACDB /DCDB	Bidder requests owner to provide the following information for the proposed Battery Energy Storage System (BESS) bay extension at all designated locations within the existing substation: .Details of the existing Auxiliary AC and DC systems, including specifications of distribution boards, voltage levels, battery banks, chargers, and load capacities .Confirmation on the availability of expansion provisions, specifically regarding spare terminals, capacity margins, and space within existing panels to accommodate additional Bay loads	Available drawings shall be shared with successful bidder during detail engineering
240	TECHNICA L SPECIFICA TION SECTION – VI, PART- B- Part 1 of 3	2.02.02 (iv) II. Switchy ard material s:			Panel-mounted Bay Protection Units (BPUs) and Bay Control Units (BCUs) shall be installed for all extended bays and shall be integrated with the existing protection and control systems/networks.	Bidder requests owner to provide the following information for the proposed Battery Energy Storage System (BESS) bay extension at all designated locations within the existing substation for communication integration with existing system: .Existing numerical relays details like makes and models along with protection schemes. .Existing SAS details like makes and models along with SAS Architecture & communication protocols.	Available drawings shall be shared with successful bidder during detail engineering
241	TECHNICA L SPECIFICA TIONSECT ION –VI, PART-B- Part 1 of 3	2.02.02 (iv) II. Switchy ard material s:			PMUs shall be installed in all 132KV and above transmission lines (extended bays) and shall be integrated with the existing systems/networks.		Available drawings shall be shared with successful bidder during detail engineering
242	TECHNICA L SPECIFICA TION SECTION – VI, PART- B- Part 1 of 3	2.02.02 (iv) II. Switchy ard material s:			Control and relay panels for bays under the current scope shall be installed in AC kiosks or within the existing control room, as per the existing practice followed for panel placement at respective site.	Bidder requests owner to provide the following information for the proposed Battery Energy Storage System (BESS) bay extension: .Existing substation Control room/Kiosk room details, including structural drawings, material specifications, height, span, and load-bearing capacity .Confirmation on the suitability of existing Control room/Kiosk room for accommodating the bay extension control, relay & communication panels at all proposed BESS locations	Available drawings shall be shared with successful bidder during detail engineering
243	TECHNICA L SPECIFICA TION SECTION – VI, PART- B- Part 1 of 3	2.02.02 (iv) II. Switchy ard material s:			.Busbar protection for extended bays shall be integrated into the existing busbar system. This includes all required hardware, software, Peripheral Units (PUs), accessories, and any necessary upgrades. .All protection schemes shall conform to the relevant single-line diagrams (SLDs) provided in the tender.	Bidder requests owner to provide the following information for the proposed Battery Energy Storage System (BESS) bay extension at all designated locations within the existing substation for communication integration with existing system: .Existing bus bar configuration and protection numerical relays details like makes and models along with protection schemes. .Relay Settings & Configuration Files Recommended relay settings, including calculation files. .Confirmation on the suitability of bus bar protection system for accommodating the bay extension bus bar protection also please confirm the requirement of augmentation and integration for all proposed BESS locations	Available drawings shall be shared with successful bidder during detail engineering
244	TECHNICA L SPECIFICA TIONSECT ION –VI, PART-B- Part 1 of 3	2.02.02 (iv) II. Switchy ard material s:			Islanding scheme for extended bays shall be integrated into the existing islanding system. This includes all required hardware, software, relays, accessories etc.	Bidder requests owner to provide the following information for the proposed Battery Energy Storage System (BESS) bay extension at all designated locations within the existing substation for communication integration with existing system:.Existing numerical relays details like makes and models along with protection schemes..Existing SAS details like makes and models along with SAS Architecture & communication protocols.	Available drawings shall be shared with successful bidder during detail engineering
245	TECHNICA L SPECIFICATION SECTION – VI, PART- B- Part 1 of 3	2.02.02 (iv) II. Switchy ard material s:			PLCC/FOTE panels at both ends transmission lines along with necessary panels, accessories, cables, JBs etc. is in the scope of work.	Bidder requests owner to provide the following information for the proposed Battery Energy Storage System (BESS) bay extension at all designated locations within the existing substation for communication integration with existing system: .Existing PLCC/FOTE details like makes and models along with communication protocols. .Confirmation on the suitability of existing PLCC/FOTE communication system for accommodating the bay extension also please confirm the requirement of augmentation and integration for all proposed BESS locations	Available drawings shall be shared with successful bidder during detail engineering
246	TECHNICA L SPECIFICA TIONSECT ION –VI, PART-B- Part 1 of 3	2.02.02 (iv) II. Switchy ard material s:			Additional Provisions 1. Interface with DCS/LDCs All additional Digital / Analogue signals related to extended bays shall be integrated to DCS, LDCs as per existing scheme of respective sites. 2. Cabling All control and fiber optic cabling within the switchyard and main plant—including interfaces between the switchgears, transformers, and switchyard for extended bays—shall be provided to realize the control and protection scheme. 3. Relay Settings & Configuration Files Recommended relay settings, including calculation files, software (if any), and SCD/ICD/SCL files, shall be submitted for the owner's review and approval for the switchyard bays under the present scope. 4. Space Provision Provision for all BCU/BPU, PMU and networking panels shall be kept in AC kiosk or Control room as per requirement.	Bidder requests owner to provide the following information for the proposed Battery Energy Storage System (BESS) bay extension at all designated locations within the existing substation for communication integration with existing system:.Existing numerical relays details like makes and models along with protection schemes..Relay Settings & Configuration Files Recommended relay settings, including calculation files, software (if any), and SCD/ICD/SCL files.Existing SAS details like makes and models along with SAS Architecture & communication protocols..Existing DCS/LDCS makes and models along with architecture & communication protocols..Cable route length between DCS/LDCS panels to	Available drawings shall be shared with successful bidder during detail engineering

247	TECHNICA L SPECIFICA TION SECTION – VI, PART- B- Part 1 of 3	1.01.00 SCOPE			Provision shall also be made for signal exchange between the BESS EMS/SCADA and the DCS of the main plant (each Unit of respective Thermal Power plant) to enable seamless integration and centralized supervision. The list of signals for such interfacing shall be finalized during detailed engineering.	proposed bay communication panels	Available drawings shall be shared with successful bidder during detail engineering
248	TECHNICA L SPECIFICA TIONSECT ION –VI, PART-B- Part 1 of 3	2.02.04 EHV CABLE S [as applicab le] and accesso ries			132kV and 220kV EHV cables for interconnection from BESS Tie transformer to identified PoI as per relevant tender SLD for each project. Bidders scope shall also include all necessary accessories, sealing ends, Jointing kits and end termination for the laying of EHV cables	Bidder requests owner to provide the following details of the proposed Battery Energy Storage System (BESS) bay extension:.Detailed route survey report, including topographical data, right-of- way conditions, and any constraints along the proposed UG cable route.KMZ file of the surveyed route, compatible with Google Earth, showing coordinates, alignment, and key landmarks	Location of BESS block and Switchyard are indicated in tender GLP for each project. Bidders is requested to assess the requirement related to distance/EHV cables etc. accordingly after taking into account all existing thermal plant facilities. bidder is expected to assess and provision cable lengths based on site conditions.
249	TECHNICA L SPECIFICA TION SECTION – VI, PART- B- Part 1 of 3	B-05A EHV CABLE - 220 KV			3.00.00 220 KV CABLE 6.00.00 CABLE /ACCESSORIES PARAMETERS 4 Conductor material Copper	Bidder request owner to allow EPC to consider conductor material with aluminium	Bidders proposal is NOT accepted
250	TECHNICA L SPECIFICA TION SECTION – VI, PART- B- Part 1 of 3	B-05B EHV CABLE - 132 KV			3.00.00 220 KV CABLE 6.00.00 CABLE /ACCESSORIES PARAMETERS 4 Conductor material Copper	Bidder request owner to allow EPC to consider conductor material with aluminium	Bidders proposal is NOT accepted
251	TECHNICA L SPECIFICA TIONSECT ION –VI, PART-B- Part 1 of 3	SUB SECTIO N-B-09 SWITC HYARD PROTE CTION & METERI NG			EHV Line Protection Each EHV Line shall be provided with the following protection: Main-I: Numerical Line Distance protection scheme suitable for carrier aided protection Main-II: Numerical Line Distance protection scheme suitable for carrier aided protection and with a hardware platform different from that of the Main-I protection. The Main-I and Main-II distance protection shall be of equal performance capability. The Main-I and Main- II distance protection relays shall be connected to two different protection groups to meet the requirements of relevant clause above.	Bidder requests owner to provide the following information for the proposed Battery Energy Storage System (BESS) bay extension at all designated locations following clarifications:.Please confirm whether line protection relays are required for the proposed Battery Energy Storage System (BESS) bay extension.. If line protection is required, please confirm the make and model of the relays installed at the remote end, along with any specific interfacing or communication protocols to be considered..Please clarify the supply scope at both ends, including whether the EPC contractor is expected to provide matching relays or interface with existing systems.	Transmission line distance protection is NOT applicable for projects under BESS lot-1. Cable differential protection, as applicable shal be provided for interconnection of BESS Tie transformer with switchyard
252	TECHNICA L SPECIFICA TION SECTION – VI, PART- B- Part 1 of 3	SUB SECTIO N-B-09 SWITC HYARD PROTE CTION & METERI NG			1.03.00 Bus bar Protection Each bus bar shall be covered with a centralized high-speed busbar protection scheme. Bus bar protection of each bus shall operate in a two-out-of-two mode so as to achieve better security.	Bidder requests owner to provide the following information for the proposed Battery Energy Storage System (BESS) bay extension at all designated locations within the existing substation for communication integration with existing system: .Existing bus bar configuration and protection numerical relays details like makes and models along with protection schemes. .Relay Settings & Configuration Files Recommended relay settings, including calculation files. .Confirmation on the suitability of bus bar protection system for accommodating the bay extension bus bar protection also please confirm the requirement of augmentation and integration for all proposed BESS locations	Available drawings shall be shared with successful bidder during detail engineering
253	TECHNICA L SPECIFICA TIONSECT ION –VI, PART-B- Part 1 of 3	Specific ation for PLCC Equipm ent (Annexu re-B)			Power Line Carrier Communication (Applicable for 400kV transmission line in Bongaigaon)	Bidder requests owner to provide the following information for the proposed Battery Energy Storage System (BESS) bay extension at all designated locations within the existing substation for communication integration with existing system:.Existing PLCC details like makes and models along with communication protocols..Confirmation on the suitability of existing PLCC communication system for accommodating the bay extension also please confirm the requirement of augmentation and integration for all proposed BESS locations	Bongaigaon TPP is not covered under Lot-1

254	TECHNICA L SPECIFICA TION SECTION – VI, PART- B- Part 1 of 3	CHAPT ER: 11A - SWITC HYARD ELECT RICAL- AIS			1.01.02 The basic design shall include, but not limited to, the following: a) Development of general arrangement. b) Development of detailed layout (plan & section/elevation) drawings. c) Development of single line diagram with parameters of equipment and details of protection. d) Protection and control philosophy and selection of protection, control and annunciation schemes. e) Development of interlocking schemes. f) Development of switchyard structure loading details. g) Development of earthing system. h) Development of direct stroke lightning protection system. i) Insulation coordination of the EHV equipment. j) Calculation of static and dynamic force load, and selection of spacer spans and equipment terminal loading. k) Development of clearance diagrams. l) Lighting design, Lux level calculation and conduit wiring diagram. m) Development of power & control cable laying and termination schedules. n) Relay setting calculations. o) Development of erection key diagram with bill of material. p) Foundation design and construction drawings. q) Development of cable trench layout and sections and construction	Bidder requests owner to provide the following information for the proposed Battery Energy Storage System (BESS) bay extension at all designated locations following clarifications: a) Existing substation layout plan & section drawing details. b) Existing substation SLD, protection system & busbar configuration drawing details. c) Existing substation Protection and control philosophy details. d) Existing substation interlocking schemes details. e) Existing switchyard structure loading details. Also please confirm whether existing substation gantries are suitable for bay extension and no. of gantries required for proposed bay extension. f) Existing substation earthing system details like earthing design calculations and earthing layout details etc. g) Existing substation DSLP details like design calculations and DSLP layout details etc. h) Existing substation Insulation coordination system details of the EHV equipment. i) Existing substation Calculation of static and dynamic force load, and selection of spacer spans and equipment terminal loading. j) Existing substation section clearance diagrams. k) Existing substation Lighting design, Lux level calculation and conduit wiring diagram. l) Existing substation power & control cable laying and termination schedules. m) Existing substation Relay setting calculations. n) Existing substation erection key diagram with bill of material. o) Existing substation foundation design and construction drawings. p Existing substation cable trench layout and sections and construction drawings.	Available drawings shall be shared with successful bidder during detail engineering. Bidder to make site visit to assess and make adequate provisions and consider scope accordingly
255	TECHNICA L SPECIFICA TIONSECT ION –VI, PART-B- Part 1 of 3	SUB- SECTIO N B- 11A SWITC HYARD ELECT RICAL - AIS			All equipment shall be supplied with suitable terminal connectors. The terminal connectors shall be well coordinated with type/size of conductor and equipment to be connected. The conductor terminations for equipment shall be either rigid or expansion type suitable for horizontal or vertical take-off suitable for tube / quadruple / twin/single Moose / Zebra / AAC Bull conductor. For Jack Bus Line Side Quad/ Twin moose/ Zebra / AAC BULL Conductor shall be used. The sub conductor spacing for quadruple and twin moose ACSR conductor / AAC Bull conductor shall be 450 mm for 765kV/400kV/ 220kV and 250mm for 132kV. The terminal pads shall preferably be capable of taking the required conductor span under normal, short circuit and meteorological conditions, without effecting the performance of the equipment..The rigid busbars for equipment inter connections shall have rigid connections at one end and expansion /flexible at other end. The tubular Al. connections shall have not more than one joint per span. Corona Bell shall be provided at the end of the rigid busbars.	Bidder request owner to provide the following information for the proposed Battery Energy Storage System (BESS) bay extension:a) Existing substation erection key diagram, including the associated bill of material listing all major equipment and components. **b) Busbar system details, including:**.Busbar ratings (current-carrying capacity).Configuration and layout of both main busbar and jack bus conductor material specifications.Equipment jumpering conductor type and sizing**c) In addition, the bidder requests the following clarifications:**.Please confirm whether the existing busbar has already been extended to the proposed BESS bays, or if the busbar extension is to be included within the bidder's scope..Please confirm whether the existing busbar rating is adequate to support the additional load introduced by the BESS installation, in compliance with applicable standards and thermal limits.	Available drawings shall be shared with successful bidder during detail engineering. Bidder to make site visit to assess and make adequate provisions and consider scope accordingly
256	TECHNICA L SPECIFICA TION SECTION – VI, PART- B- Part 1 of 3	CHAPT ER: 11A - SWITC HYARD ELECT RICAL- AIS			The switchyard / extension of bays in existing switchyard shall be provided with peripheral roads and roads for maintenance / approach for major AIS equipment for maintenance purpose and it is also inter connected with existing roads.	Bidder requests owner to provide the following information for the proposed Battery Energy Storage System (BESS) bay extension: .Existing substation peripheral road layout with section details.	Available drawings shall be shared with successful bidder during detail engineering
257	TECHNICA L SPECIFICA TIONSECT ION –VI, PART-B- Part 1 of 3	CHAPT ER: 11A - SWITC HYARD ELECT RICAL- AIS			The present scope of cable trenches shall be interconnected to existing cable trenches (as applicable) and connected to sump pit to drain the water.	Bidder requests owner to provide the following information for the proposed Battery Energy Storage System (BESS) bay extension:.Existing substation cable routing layout, cable trench & section details, including structural drawings, material specifications, height, span, and load- bearing capacity.Confirmation on the suitability of existing cable trench for accommodating the bay extension control, relay & communication panels at all proposed BESS locations	Available drawings shall be shared with successful bidder during detail engineering
258	TECHNICA L SPECIFICA TION SECTION – VI, PART- B- Part 1 of 3	CHAPT ER: 11A - SWITC HYARD ELECT RICAL- AIS			The control & protection panels belongs to present scope of Bays shall be placed in control room building if space is available / AC kiosk. AC kiosk shall be provided with adequate air conditioning, fire alarm system with at least two detectors and it shall be wired to SAS system. Two nos. of suitable separate power supply shall be provided to each AC kiosk to cater power supply to panels and AC separately.	Bidder requests owner to provide the following information for the proposed Battery Energy Storage System (BESS) bay extension: .Existing substation Control room/Kiosk room details, including structural drawings, material specifications, height, span, and load-bearing capacity .Confirmation on the suitability of existing Control room/Kiosk room for accommodating the bay extension control, relay & communication panels at all proposed BESS locations	Available drawings shall be shared with successful bidder during detail engineering
259	TECHNICA L SPECIFICA TION SECTION – VI, PART- B- Part 1 of 3	CHAPT ER: 11A - SWITC HYARD ELECT RICAL- AIS			Contractor shall make earth resistivity measurements at site (based on four electrode method) and design the earthing grid as per IEEE: 80 (Latest edition) and Gravel filling of switchyard. Earthing of all switchyard equipment's and its connection to existing earthing grid. Also, interconnection of switchyard earthing grid, BESS earthing with existing available earthing grid (02 no's minimum). Earth pit as per IS 3043 as required.	Bidder requests owner to provide the following information for the proposed BESS bay extension at all proposed locations: .Existing substation earth resistivity value, including any soil test reports. .Existing earth grid design layout, including conductor sizing, grid spacing, depth, and connection details to major equipment and structures	Available drawings shall be shared with successful bidder during detail engineering

260	TECHNICA L SPECIFICA TIONSECT ION –VI, PART-B- Part 1 of 3	CHAPT ER: 11A - SWITC HYARD ELECT RICAL- AIS			Complete Direct Stroke Lightning Protection using Lightning Mast and/or shield wire and its connection to earth mat as required for switchyard area extension / addition of present scope of Bays & Transformer yard.	Bidder requests owner to provide the following information for the proposed Battery Energy Storage System (BESS) bay extension at all designated locations within the existing substation:	Available drawings shall be shared with successful bidder during detail engineering
261	TECHNICA L SPECIFICA TION SECTION – VI, PART- B- Part 1 of 3	CHAPT ER: 11A - SWITC HYARD ELECT RICAL- AIS			Lighting, earthing, lightning protection of switchyard area , extension / addition of present scope of Bays & Transformer yard.	Bidder requests owner to provide the following information for the proposed BESS bay extension at all proposed locations: .Existing DSLP layout with design details etc.	Available drawings shall be shared with successful bidder during detail engineering
262	TECHNICA L SPECIFICA TION SECTION – VI, PART- B- Part 1 of 3	09.00.0 0 INSTAL LATION			09.11.05 EARTHING NOTES FOR SWITCHYARD	Bidder requests owner to provide the following information for the proposed BESS bay extension at all proposed locations: .Existing substation earth resistivity value, including any soil test reports. .Existing earth grid design layout, including conductor sizing, grid spacing, depth, and connection details to major equipment and structures	Available drawings shall be shared with successful bidder during detail engineering
263	TECHNICAL SPECIFICATION SECTION –VI, PART-B- Part 1 of 3	09.00.00 INSTALLATION			LIGHTNING PROTECTION: Direct stroke lightning protection (DSLP) shall be provided in the switchyard by lightning masts (at least 50 m high) and shield wires.	Bidder requests owner to provide the following information for the proposed Battery Energy Storage System (BESS) bay extension at all designated locations within the existing substation:Existing DSLP layout with design details etc.	Available drawings shall be shared with successful bidder during detail engineering
264	TECHNICA L SPECIFICA TIONSECT ION –VI, PART-B- Part 1 of 3	CHAPT ER: SWITC HYARD ELECT RICAL- GIS			i) The towers and gantries shall be suitable for a normal conductor tension of minimum 2T/conductor in case of twin/ single conductors and 1.5T/conductor in case of quad conductor, 0.8T/conductor in case of ground wire. The foundations and structures etc shall be designed accordingly.	Bidder requests owner to provide the following information for the proposed Battery Energy Storage System (BESS) bay extension:.Existing substation tower gantry details, including structural drawings, material specifications, height, span, and load-bearing capacity.Confirmation on the suitability of existing tower gantries for accommodating the bay extension at all proposed BESS locations	Available drawings shall be shared with successful bidder during detail engineering
265	240MW/48 0MWH BATTERY ENERGY STORAGE SYSTEM (BESS) AT KUDGI STPP	SINGLE LINE DIAGRA M			BESS TIE TRANSFORMER 220 kV/33KV 125 MVA	.As per the tender specifications and the provided single-line diagram (SLD), the bidder understands that the proposed scope includes two (2) bays equipped with two (2) 132/33 kV, 100 MVA power transformers. .However, as per the latest CEA publication titled "Standard Specifications and Technical Parameters for Transformers and Reactors (66 kV & Above Voltage Class)", the standard rating for a power transformer at the 132/33 kV voltage level is 31.5MVA, 50MVA & 80 MVA only. .In light of this discrepancy, the bidder respectfully requests the following clarifications: .Please confirm whether the transformer rating of 100 MVA is to be retained as per the tender, or revised to 80 MVA in alignment with the CEA guidelines. .Please confirm the total number of bays and associated power transformers to be considered for the proposed BESS bay extension, in accordance with applicable standards. .Please confirm location of the power transformer whether bidder need to consider power transformer inside the BESS plant or with in the switchyard. .Bidder request owner to confirm which type of fire protection to be considered NIFPS or HVWS	BESS transformer size and quantity has been specified considering the BESS project requirements. Bidder to comply with specification requirements
266	240MW/48 0MWH BATTERY ENERGY STORAGE SYSTEM (BESS) AT KUDGI STPP	SINGLE LINE DIAGRA M			220KV CABLE	Bidder requests owner to provide the following details of the proposed Battery Energy Storage System (BESS) bay extension:.Detailed route survey report, including topographical data, right-of- way conditions, and any constraints along the proposed UG cable route.KMZ file of the surveyed route, compatible with Google Earth, showing coordinates, alignment, and key landmarks.Please confirm location of the power transformer whether bidder need to consider power transformer inside the BESS plant or with in the switchyard.	Location of BESS block and Switchyard are indicated in tender GLP for each project. Bidders is requested to assess the requirement related to distance/EHV cables etc. accordingly after taking into account all existing thermal plant facilities. bidder is expected to assess and provision cable lengths based on site conditions. Tie transformer for all projects (wherever applicable) are proposed to be located in the BESS area except for simadhri where Tie transformers are to be considered near new 400kV bays

267	BATTERY ENERGY STORAGE SYSTEM (BESS) AT MOUDA, BARH, NPGC, SOLAPUR	SINGLE LINE DIAGRA M			BESS TIE TRANSFORMER 132 kV/33KV 100 MVA FOR ALL PROJECTS EXCEPT SOLAPUR 80 MVA FOR SOLAPUR	.As per the tender specifications and the provided single-line diagram (SLD), the bidder understands that the proposed scope includes two (2) bays equipped with two (2) 132/33 kV, 100 MVA power transformers. .However, as per the latest CEA publication titled "Standard Specifications and Technical Parameters for Transformers and Reactors (66 kV & Above Voltage Class)", the standard rating for a power transformer at the 132/33 kV voltage level is 31.5MVA, 50MVA & 80 MVA only. .In light of this discrepancy, the bidder respectfully requests the following clarifications: .Please confirm whether the transformer rating of 100 MVA is to be retained as per the tender, or revised to 80 MVA in alignment with the CEA guidelines. .Please confirm the total number of bays and associated power transformers to be considered for the proposed BESS bay extension, in accordance with applicable standards. .Please confirm location of the power transformer whether bidder need to consider power transformer inside the BESS plant or with in the switchyard. .Bidder request owner to confirm which type of fire protection to be considered NIFPS or HVWS	BESS transformer size and quantity has been specified considering the BESS project requirements. Bidder to comply with specification requirements
268	BATTERY ENERGY STORAGE SYSTEM (BESS) AT MOUDA, BARH, NPGC, SOLAPUR	SINGLE LINE DIAGRA M			132KV CABLE	Bidder requests owner to provide the following details of the proposed Battery Energy Storage System (BESS) bay extension:.Detailed route survey report, including topographical data, right-of- way conditions, and any constraints along the proposed UG cable route.KMZ file of the surveyed route, compatible with Google Earth, showing coordinates, alignment, and key landmarks.Please confirm location of the power transformer whether bidder need to consider power transformer inside the BESS plant or with in the switchyard.	Available drawings shall be shared with successful bidder during detail engineering
269	75MW/150 MWH BATTERY ENERGY STORAGE SYSTEM (BESS) AT SIMHADRI STPP-1	SINGLE LINE DIAGRA M			BESS TIE TRANSFORMER 400 kV/33KV 80 MVA	.As per the tender specifications and the provided single-line diagram (SLD), the bidder understands that the proposed scope includes one (1) bay equipped with one (1) 400/33 kV, 80 MVA power transformers. .However, as per the latest CEA publication titled "Standard Specifications and Technical Parameters for Transformers and Reactors (66 kV & Above Voltage Class)", there is no standard rating for a power transformer at the 400/33 kV voltage level. .In light of this discrepancy, the bidder respectfully requests the following clarifications: .Please confirm whether the transformer rating of 80 MVA is to be retained as per the tender, or revised to 80 MVA in alignment with the CEA guidelines. .Please confirm the total number of bays and associated power transformers to be considered for the proposed BESS bay extension, in accordance with applicable standards. .Please confirm location of the power transformer whether bidder need to consider power transformer inside the BESS plant or with in the switchyard. .Bidder request owner to confirm which type of fire protection to be considered NIFPS or HVWS	BESS transformer size and quantity has been specified considering the BESS project requirements. Bidder to comply with specification requirements
270	70MW/140 MWH BATTERY ENERGY STORAGE SYSTEM (BESS) AT SIMHADRI STPP- 2	SINGLE LINE DIAGRA M			BESS TIE TRANSFORMER 400 kV/33KV80 MVA	.As per the tender specifications and the provided single-line diagram (SLD), the bidder understands that the proposed scope includes one (1) bay equipped with one (1) 400/33 kV, 80 MVA power transformers..However, as per the latest CEA publication titled "Standard Specifications and Technical Parameters for Transformers and Reactors (66 kV & Above Voltage Class)", there is no standard rating for a power transformer at the 400/33 kV voltage level..In light of this discrepancy, the bidder respectfully requests the following clarifications:.Please confirm whether the transformer rating of 80 MVA is to be retained as per the tender, or revised to 80 MVA in alignment with the CEA guidelines..Please confirm the total number of bays and associated power transformers to be considered for the proposed BESS bay extension, in accordance with applicable standards..Please confirm location of the power transformer whether bidder need to consider power transformer inside the BESS plant or with in the switchyard..Bidder request owner to confirm which type of fire protection to be considered NIFPS or HVWS	BESS transformer size and quantity has been specified considering the BESS project requirements. Bidder to comply with specification requirements

271	TECHNICA L SPECIFICA TION FOR EPC PACKAGE FOR DEVELOP MENT OF BESS AT NTPC THERMAL POWER STATIONS (Part 1 of 3) SECTION - VI BIDDING DOCUMEN T NO.: CS- 0011-171A-9	1.07.00 OTHER DETAIL S			APPENDIX-I TO SUBSECTION-IB	Bidder request for confirm any spere bay construction to be considered under the present scope	scope of switchyard bays are to be considered as per tender SLD of relevant project. regarding bay details, please refer technical amendment-1
272	TECHNICAL SPECIFICATION FOR EPC PACKAGE FOR DEVELOPMENT OF BESS AT NTPC THERMAL POWER STATIONS (Part 1 of 3) SECTION - VI BIDDING DOCUMENT NO.: CS-0011-171A-9	1.00.00 BRIEF DESCRI PTION OF THE PROPO SED SYSTE M:			The proposed Battery Energy Storage System (BESS) is to be installed within the premises of existing NTPC thermal power stations, utilizing available land and interconnection infrastructure. The BESS installation shall comprise, but not be limited to, containerized battery modules, Power Conversion Systems (PCS), Inverter Duty Transformer (IDT), Battery Management System (BMS), Energy Management System (EMS), Power Plant Controller (PPC), Supervisory Control and Data Acquisition (SCADA), fire detection and suppression system, HVAC, auxiliary power supply scheme and all other auxiliary systems / facilities required for completion of the BESS system and integration with the existing thermal power plant facilities. Each Battery Energy Storage System (BESS) block shall be connected to a common 33 kV pooling switchgear. From this pooling switchgear, suitable facilities shall be provided for interconnection with the existing thermal power plant infrastructure at PoI identified in Table-1 below.		scope of switchyard bays are to be considered as per tender SLD of relevant project. regarding bay details, please refer technical amendment-1
273	TECHNICA L SPECIFICA TION FOR EPC PACKAGE FOR DEVELOP MENT OF BESS AT NTPC THERMAL POWER STATIONS (Part 1 of 3) SECTION - VI BIDDING DOCUMEN T NO.: CS- 0011-171A-9	2.02.01 BESS TIE TRANS FORME R			Rating and Quantity of BESS Tie Transformers applicable for each project are indicated in the table below:	.Bidder understood that spare transformer to be provided at Kudgi STPP & Mouda STPP Stage-I and II .Please confirm that only supply of spare transformer is in bidder scope or spare bay construction also to be consider in present scope	Only supply of spare transformer is envisaged. No spare bay is proposed.
274	TECHNICAL SPECIFICATION FOR EPC PACKAGE FOR DEVELOPMENT OF BESS AT NTPC THERMAL POWER STATIONS (Part 1 of 3) SECTION - VI BIDDING DOCUMENT NO.: CS-0011-171A-9	2.02.01 BESS TIE TRANS FORME R			Note: For Simhadri projects following shall be additionally applicable, 1) All in all EHV Bushing RTV coating with Silicone HV Insulation Coating shall be carried out at the commissioning stage, also spare EHV bushing coating shall be done at site before completion of facilities. 2) All auxiliary oil filled Transformers Transformer bushings and support insulators shall be provided with creepage of minimum 31 mm/KV.	Bidder request to confirm that EHV Bushing RTV coating with Silicone HV Insulation Coating shall be carried is applicable only of power transformer bushings or for all outdoor switchyard equipment bushings.	Applicable for power transformers ONLY
275	TECHNICAL SPECIFICATION FOR EPC PACKAGE FOR DEVELOPMENT OF BESS AT NTPC THERMAL POWER STATIONS (Part 1 of 3) SECTION - VI BIDDING DOCUMENT NO.: CS-0011-171A-9	2.02.02 SWITC HYARD			2.02.02 (iii) The scope of work shall comprise, but not limited to the design, engineering, manufacture, testing and inspection at manufacturer's works, packing, supply, transportation, transit insurance, delivery to site, unloading, storage and equipment erection including associated civil & structural works. Further the scope shall also include the cabling, lighting, lightning protection, earthing, association of sub vendors in the erection, supervision, site testing, inspection and commissioning. .Details of switchyard bays at each project are indicated in table below:Note#1 (Simhadri STPP-II): No switchyard is envisaged with Simhadri Stage-II Note#2 (Simhadri STPP-1): Complete DIA is to be provided under Simhadri Stage-I BESS package.	Bidder request to provide detailed scope of work for Note#1 (Simhadri STPP-II): No switchyard is envisaged with Simhadri Stage-II & Note#2 (Simhadri STPP-1): Complete DIA is to be provided under Simhadri Stage-I BESS package.	Refer Technical Amendment No.1

276	TECHNICA L SPECIFICA TION FOR EPC PACKAGE FOR DEVELOPMENT OF BESS AT NTPC THERMAL POWER STATIONS (Part 1 of 3) SECTION - VI BIDDING DOCUMEN T NO.: CS- 0011-171A-9	2.02.02 (iv) II. Switchy ard material s:			Circuit Breaker, Isolators with/without earth switches, current transformer, Surge arrestors, Bus post insulators, Capacitor Voltage Transformers, Wave Trap etc. (as applicable for each project) • 400kV GIS for Bongaigaon along with associated Pothead yard	Bidder request to provide detailed scope of work along with existing switchyard details for the proposed 400kV GIS for Bongaigaon along with associated Pothead yard.	Bongaigaon TPP is not covered under Lot-1
277	TECHNICA L SPECIFICA TION FOR EPC PACKAGE FOR DEVELOP MENT OF BESS AT NTPC THERMAL POWER STATIONS (Part 1 of 3) SECTION - VI BIDDING DOCUMEN T NO.: CS- 0011-171A-9	EHV CABLE S [as applicab le] and accesso ries			132kV and 220kV EHV cables for interconnection from BESS Tie transformer to identified PoI as per relevant tender SLD for each project.	Bidder request to provide EHV cable route length with location wise for the proposed bay extensions..Bidder request to confirm the location of the Tie-Transformers	Tie transformer for all projects (wherever applicable) are proposed to be located in the BESS area except for simadhri where Tie transformers are to be considered near new 400kV bays
278	TECHNICA L SPECIFICA TIONSECT ION –VI, PART-B- Part 1 of 3	PART - B, SUBSE CTION A-04 ENERG Y MANAG EMENT SYSTE M1.07.0 0			EMS System shall have the provision to perform the following functions:i. Provision to operate the BESS as per following minimum application requirement including Ancillary services but not limited to:a. Integrated control with thermal power plantb. Standalone operation (independent of thermal plant) based on the grid schedule/requirements.c. VAR support to Grid / voltage Regulationd. Black Start applicatione. Frequency Regulation /Grid supportf. Ancillary Services (PRAS, SRAS, TRAS)g. Energy Arbitrage/energy shifting operationh. Ramp rate supporti. Power Quality Application to Gridj. Interaction on real-time with IEX for schedule of charging and discharging.k. Inertia Support to Grid as virtual Synchronous	we understand that integration/interface with IEX platform will be arranged by NTPC. Kindly provide the interface details for EMS communication with IEX.	Communication infrastructure from SAS/DCS to EMS is in bidders scope. Necessary provisions and compatibility for EMS communication for IEX interface, including required protocols and data exchange capability, shall be provided by the bidder and shall be finalized during detailed engineering.
279	TECHNICAL SPECIFICA TIONSECT ION –VI, PART-B- Part 1 of 3	PART - **B, SUBSE CTION A-04 ENERG Y MANAG EMENT SYSTE M1.07.0 0**			EMS System shall have the provision to perform the following functions:i. Provision to operate the BESS as per following minimum application requirement including Ancillary services but not limited to:a. Integrated control with thermal power plantb. Standalone operation (independent of thermal plant) based on the grid schedule/requirements.c. VAR support to Grid / voltage Regulationd. Black Start applicatione. Frequency Regulation /Grid supportf. Ancillary Services (PRAS, SRAS, TRAS)g. Energy Arbitrage/energy shifting operationh. Ramp rate supporti. Power Quality Application to Gridj. Interaction on real-time with IEX for schedule of charging and discharging.k. Inertia Support to Grid as virtual Synchronous	Please confirm the detailed functional and performance requirements for EMS to support Ancillary Services (PRAS, SRAS, TRAS). Specifically	Anciliary services shall be provided as per CERC anciliary service regualtions and approved provisions of NLDC.Broad functional requirements are indicated in the Technical Specifications and Refer Technical Amendment No.1 regarding requirement of PRAS.
280	TECHNICA L SPECIFICA TIONSECT ION –VI, PART-B- Part 1 of 3	PART - B, SUBSE CTION A-04 ENERG Y MANAG EMENT SYSTE M1.07.0 1			EMS System shall have the provision to perform the following functions:i. Provision to operate the BESS as per following minimum application requirement including Ancillary services but not limited to:a. Integrated control with thermal power plantb. Standalone operation (independent of thermal plant) based on the grid schedule/requirements.c. VAR support to Grid / voltage Regulationd. Black Start applicatione. Frequency Regulation /Grid supportf. Ancillary Services (PRAS, SRAS, TRAS)g. Energy Arbitrage/energy shifting operationh. Ramp rate supporti. Power Quality Application to Gridj. Interaction on real-time with IEX for schedule of charging and discharging.k. Inertia Support to Grid as virtual Synchronous	We understand that virtual Synchronous operation is functionality of Power Conversion System (PCS), but it is mentioned under Energy management System section. Kindly confirm	Bidder's understanding is correct. However, since the operation mode selection, coordination, and setpoint management are governed through the EMS, the requirement is mentioned under the EMS section to ensure integrated control and supervisory functionality. Bidder to comply accordingly.

281	TECHNICA L SPECIFICA TIONSECT ION –VI, PART-B- Part 1 of 3	PART - A, SUBSE CTION II, SCOPE OF SUPPL Y & SERVIC E1.01.0 5			The EMS shall be integrated with Automatic Generation Control (AGC), existing thermal plant DCS of each unit/main control room for coordinated operation and visibility. A separate AGC shall also be provided and configured for standalone BESS operation. The Contractor's scope shall include all necessary telemetry, data acquisition, and communication interfaces required to provide real-time data, status, and control signals to the Employer's DCS, Regional Load Dispatch Centre (RLDC), State Load Dispatch Centre (SLDC), and other statutory bodies, as per applicable grid code, LDC requirements. All necessary hardware, software, protocols, and cybersecure communication links required t ensure above interface, performance monitoring, and dispatch control are included in the Contractor's scope	Bidder proposes thata. BESS EMS shall have in- built functionalities of the AGC. Hence, standalone BESS AGC is not required.Kindly confirm the same.	The BESS EMS may incorporate AGC functionality, provided it meets all AGC-related performance, response time, and interfacing requirements specified in the tender and is compliant with CEA (Technical Standards for Connectivity to the Grid) Regulations and other applicable statutory requirements. A separate standalone AGC is not required in such case.
282	General	-			-	Upon site visit at Solapur, it was observed that space is available only for one bay extension, whereas the tender documents specify two bay extensions. Bidder kindly requests clarification regarding the availability of space for the second bay extension.	Adequate space is available.
283	General	-			-	Upon site visit, the bidder observed that an additional area of approximately 4.5 acres is available within the premises. The bidder kindly requests clarification on whether this additional land can be utilized for the installation of the BESS system.	Bidder's Query not clear.Project to be Specified
284	General.				Auxiliary Power	1. Will AUX power be chargeable or provided as Free Issue? Should it be included under O&M costs, and if so, at what tariff?. 2.At night, for plant/control room and peripheral lighting, will NTPC provide AUX power from the metered connection? 3.Regarding RTE, does it include AUX consumption for BESS standby, or only for charging/discharging? 4.Will NTPC provide AUX power during BESS discharge and standby hours, or should we use stored BESS energy for these periods? 5.Will power consumption for BESS yard, control room, and switchyard lighting be considered under AUX power, or excluded?	1. Aux. power arrangement is NOT being provided by NTPC. It has to be drawn from Bidders own electrical network. Aux. Power shall be made without any charges. 2) Refer reply at Sl. No. 1 above. 3) Yes, BESS auxiliary consumption (for standby, charging & discharging) is included in RTE calculation 4) NTPC shall NOT provide any power 5) All drawl bt BESS system for ANY purpose shall be covered under AUX power
285	General.				Degradation	Will lower degradation be favorably considered in the tender evaluation? If yes, how will it be accounted for?	Lower degradation will not be given any preferential consideration in the tender. Bidders must meet the guaranteed degradation limits as specified in the technical specifications
286	General				The cable trench From PCS to BESS cooling station at Solapur	While laying the cable trench from PCS to the BESS cooling station at Solapur, it passes through the coal area. Kindly clarify how this should be executed.	Refer Technical Amendment-01
287		Battery System:- As per warranty of BESS is 12 years		8.00.00	Warranty Clause	Please confirm the warranty of battery i,e 05 years Warranty + 7 Years CAMC or 12 Years warranty?	Bidder's scope include 1 year of Performance Guarantee and 11 years of CAMC (after completion of PG Test) as per Clause 5.00.00 of Sub-Section-II, Part-A of Technical Specification.
288	SUBSECTION-A 01 GENERAL REQUIREMENTS OF BESS			CL 7.06.00/Pg 5	Factory testing shall, if required, demonstrate operation at expected temperature extremes at the independent laboratory. Certification of operation of critical components and subsystems in the battery, PCS, and control systems shall be submitted at the time of the FAT. The Contractor shall submit to the Employer for approval, 90 days before the FAT	Bidder request if NTPC can share any document mentioning tests which need to be covered under extreme temperature clause mentioned under tender specification. Further bidder request Battery is liquid cooled so we request NTPC that this test will be performed in ambient temperature as Container size thermal chamber are not available in india to perform the same	Testing shall be as per relevant IS/IEC/equivalent standard, as applicable.
289	General			General	Auxilary Power Consumption	Bidder request NTPC to confirm the tarrif for each thermal station to be considered for Auxilary power consumption.	Auxiliary power supply shall be made available to the bidder by NTPC without any charges.
290	General			General	Project Timelines	Bidder request that considering 2334 MWH total capcity (cells mostly imported out side India) of the projects having Switch Yard requirment of 220 kV & 400 KV (including power transformer), pls. increase the commissioning time lines to 18 months from LOA instead of 14 months from LOA and completion time lines within 19 months from LOA instead of 15 months.	Bidder to comply with the requirements in Technical Specification
291	SUB SECTION II SCOPE OF SUPPLY & SERVICE			CL 2.01.00.18/Pg 15	HVAC System: The BESS shall include HVAC system designed to maintain battery temperatures at levels acceptable to the Battery Manufacturer's normal Battery warranty conditions, conducive to acceptable battery life, and as required to maintain battery capacity for all seasons/climatic conditions at the site. The air handling/distribution system shall be designed to ensure temperature uniformity within the battery. The HVAC/ventilation system shall be designed as per applicable codes/standards for such applications and in line with relevant CEA regulations (as applicable).	Request to clarify on the requirement for separate HVAC system as TPREL batteries operates on liquid cooled technology	Containerized liquid cooling system to maintain the acceptable battery temperature, is acceptable as per standard & proven practice of industry/OEM complying to statutory/regulatory norms & guidelines (as applicable). Further, refer Technical Amendment-01 in this regard.

292	SUBSECTION-A 02 BATTERY AND BATTERY MANAGEMENT SYSTEM			CL 1.00.0/Pg 2&3	UL9540A IEC 61427-2/IS 16270 IEC 62933-2-1	Please clarify whether the system-level certification can be waived off if the rack-level has passed this certification.	Bidder's proposal is not acceptable. Bidder to comply with requirement of Technical Specifications.
293	SUB SECTION IV FUNCTIONAL GUARANTEES & LIQUIDATED DAMAGES			CL 1.04.01.B/Pg 4	Round trip AC/AC Efficiency (%) of BESS system at Metering Point shall be considering the energy loss including auxiliary power requirement of BESS.	Please clarify whether the auxiliary power consumption should include the standby power of the system, or if it should cover only the operating (charge and discharge) auxiliary power consumption	auxiliary power consumption includes the power consumption during standby periods also.
294	SUBSECTION-A 03 POWER CONDITIONING UNIT			CL 2/Pg 3	IEC 62477-2	The Certificate is not applicable for PCS of BESS. Request to elimiate this certification from the list.	Bidder's proposal is not acceptable. Bidder to comply with requirement of Technical Specifications. The Certifications shall be applicable based on the PCS Voltage level provided by the bidder.
295	SUBSECTION-A 03 POWER CONDITIONING UNIT			CL 2/Pg 2	IEEE 519-2022	Project is done as per CEA guidelines ,hence mentioned certification not required	Compliance to IEEE 519 shall be ensured as per the applicable requirements of CEA regulations.
296	SUBSECTION-A 04 ENERGY MANAGEMENT SYSTEM			Cl 11/Pg 14	HISTORICAL STORAGE AND RETRIEVAL SYSTEM (HSRS)	Bidder request NTPC to provide the cloud server, bidder shall push the EMS data till end of Plant life.	Bidder's proposal is not acceptable. Bidder to comply with the requirements in Technical Specification
297	SUBSECTION-A 04 ENERGY MANAGEMENT SYSTEM			Cl 11/Pg 14	For long term plant performance analysis, the following plant data as a minimum with time stamping and interval as indicated in below table but not limited to shall be stored daily on historian.	We request acceptance of the provision that EMS data will be stored locally for a period of one (1) year, after which the data will be automatically overwritten on a rolling basis.E14:F14	Bidder's proposal is not acceptable. Bidder to comply with the requirements in Technical Specification
298	Site Visit Solarpur				Railway crossing with 33KV Cables are possible with prior approval from NTPC as existing cables are crossing with structure.	Please clarify	Bidder to refer Technical Amendment-01 in this regard.
299	Site Visit Nabinanager				A 33kv dead TL passes over the plot which is not in use for NTPC. As site team has confirmed that its removal from site is not in vendor's scope. NTPC will remove the TL from site before handover of site	Please clarify	confirmed
300	Site Visit Nabinanager				400 KV TL is passing over the new suggestion and there will be no space left for BESS after leaving 46mtrs space for ROW	Please clarify on the space for BESS installation	No 400kV transmission line is planned in area provided for BESS facilities
301	Site Visit Nabinanager				Proposed land for BESS is already assigned for CLIMS. As site team has confirmed that 25 areas area is already proposed for Contractor labors entry process/contract cell	Please clarify the same	Bidder to refer Amendment-01
302	Site Visit Nabinanager				We shall keep only one person 24*7 at one plant for EMS monitoring to ensure charge, discharge from remote (SCADA) & availabilty & communcation with all BESS. If required other teams for mainetance shall be deployed based on requirments at any site or we may keep only ine team for Bihar or near by two or three stations to ensure the availability of BESS as per norms.	Please clarify the same	Bidder to maintain adequate manpower as required to discharge its obligation under PG test and CAMC periods. Bidder to refer 5.00.00, Subsection-II, Part-A of Technical Specification
303	Site Visit Nabinanager				We shall consider pre -fab rooms, Suitable containers solutions etc. based on site for indoor BESS wlak in type and indoor PCS or we may choose to have containerised BESS and outdoor PCS solution for best fitting the sapce.	Please allow us to have design as per our engineering solution.	Bidder's proposal is acceptable subject to meeting the Statutory requirement and OEM standard practice/design.
304	Site Visit Nabinanager				There are big nala and road on the way of cables parth from BESS to Siwtchyard hence please allow us to use HDD(Horizontal direct drilling to cross tehse to save execution time and cost.	Please clarify the same	The bidder is requested to provide detail methodology of HDD for review and consideration before bidding.
305	Site Visit Nabinanager &Barh				Fromm tie transfomer HV side the cables are running form transformer to sicthyard which is around 2 KM away without any breaker at transformer end, may arrnage to review this in SLD for Barh and other plants as well. This may need to review as during discharge and black start mode any high impedance cable fault may casue enery loss and safety hazard.	Please clarify the same	No separate bay/breaker at BESS Tie transformer end is envisaged. Suitable protection scheme alsong with control cables/Fibres are to be provided for operation of switchyard breaker in case of fault. Details of protection scheme shall be finalized during detailed engineering stage.
306	Site Visit Nabinanager &Barh				SLD shows the removable type ACB after PCS. Every PCS has fixed type ACB hence no sperate ACB required. Pelase review the removable type ACB after PCS in SLD.	Please clarify the same	Biders proposal for provision of ACB as integral part of PCS is technicaly accepted. In case ACB is part of PCS, fixed type ACB shall be accepted.
307	Site Visit Nabinanager &Barh				The 132kV additional bay controling shall be done form NTPC existing control room	Please clarify on additional space for CRP and other panels in control room.	Panles related to CRP requirements of BESS bays shall be suitably placed in AC kisosk as per subsection B-11A, part B section VI of the technical specifications
308	Site Visit Nabinanager &Barh				If we keep two interfact point one at EMV and one at 33kV level then we need to review the station loss consideration during RTE whicle we supply to thermal plant auxillaries through 33kV bus	Please clarify the same	Bidders query NOT clear. For BESS at Nabinagar and Barh, PoI is 132kV switchyard and metering for BESS shall be done at this point. No thermal Power Plant Auxiliaries are proposed to be fed from 33kV BESS Pooling switchgear

309	Site Visit Solarpur				Can we use existing Structure for HV cable crossing the railway line ? NTPC shall provide the railways crossing permission for HT cable railway crossing.	Please clarify the same	As per the layout,railway track(permanent way) crossing is not envisaged for BESS at Solapur. refer Amendment no 01.
310	Site Visit Solarpur				Only one spare bay is available for 132KV 132MW Power evacauation at 132KV S/s. NTPC shall permit for bay extension at extreme ledt end in 132KV Substation.	Please clarify the same	Bay extension can be done by bidders on either side based on technical feasibility and existing thermal plant facilities
311	Site Visit Ramagundam				Provided area in tender for NTPC Ramagundam is ~3acres, however during site visit as per the marking mentioned by site personnell it is around 7 acres	Please clarify the same	Bidder's to refer the tender drawings
312	Site Visit Ramagundam				33kV switchgear room is almost 1.2km away from the BESS area following the cable route along the boundary of 400kV switchyard. Considering that there are exsisting cable trays should EPC prefer cable trays only for NTPC Ramagundam or trench?	Please clarify the same	Biders proposal for use of existing cable trays is NOT agreed. Actual laying arrangement for 33kV cables shall be decided during detailed engineering stage.
313	Site Visit Ramagundam				NTPC Ramagundam site full of dense trees which requires local approvals hence requesting NTPC to not consider the scope of clearing for NTPC Rmaagundam BESS area under EPC.	Please clarify the same	Bidder to refer Technical Amendment-01
314	Site Visit Ramagundam				As per visit, 33kV switchgear FDG building doesn't have any SCADA equipments hence confirm the location of control panel/FO cable connection for BESS plant.	Please clarify the same	The control of 33 KV switchgear panels at PoI for Ramagundam shall be in Employer scope.
315	Site Visit Ramagundam				Do we required build any service building or special purpose room in BESS area?	Please clarify the same	No
316	Site Visit Ramagundam				As per site visit, no additional approach road and peripheral drain is not required, kindly confirm?	Please clarify the same	Bidder to refer Technical Amendment-01
317	Site Visit Ramagundam				Where does metering panel situated as there are no enough additional spare feeders in FDG swithcgear room.	Please clarify the same	Metering for BESS is to be done at PoI. In case of non-availability of space in room, same may be provided separately or outside building.
318	Site Visit Ramagundam				As we are connecting in 33kV side directly, do we need to consider any additional SVG & Harmonic filter ?	Please clarify the same	Bidders system should comply with harmonic injection limits as per CEA standards for connectivity to grid and other statutory regulations applicable for Inverter based generation resources. Any additional equipment for complying the Statutory requirements shall be in Bidder's scope.
319	Site Visit Ramagundam				Kindly confirm that the scope of NTPC Ramagundam is up to cable connection in exsisiting 50MVA feeders only. No SVG or harmonics are required.	Please clarify the same	Bidders system should comply with harmonic injection limits as per CEA standards for connectivity to grid and other statutory regulations applicable for Inverter based generation resources. Any additional equipment for complying the Statutory requirements shall be in Bidder's scope.
320	Site Visit Solarpur				33KV HT cable from BESS to PSS is around 2.5kms so NTPC shall permit for buried cable instead of RCC Cable trench.	Please clarify the same	Bidder to refer tender GLP.Distance between BESS to Pooling Switchgear is significantly less than 2.5 km. Bidder's proposal is not acceptable.
321	Site Visit Simadhri				Kindly provide the SLD of 400kV switchyard and details of bay, LA, make etc for reference.	Please clarify the same	Engineering documents as available with the owner shall be shared with the successful bidder during detailed engineering stage.
322	Site Visit Simadhri				Where does metering panel situated ?	Please clarify the same	Metering for BESS is proposed at PoI. metering panel shall be placed in AC Kiosk or switchyard control room as decided during detailed engineering.
323	Site Visit Simadhri				As per site visit, no additional approach road and peripheral drain is not required, kindly confirm?	Please clarify the same	Bidder to refer Technical Amendment-01
324	Site Visit Simadhri				Kindly provide us the actual KMZ of BESS area as per visit BESS area is about 6acres.	Please clarify the same	Approxiamate area available is 7.5 acres.
325	Site Visit Simadhri				Kindly confirm of construction power and water supply ?	Please clarify the same	Arrangement of Construction power and its further distribution in various area of BESS package is in bidders scope. For Construction water refer Cl 2.01.00 of Sub Section-III, Part-A
326	Site Visit					Bidder request NTPC to clarify site development scope of work, Such as tree cutting (including its approval) and any other structure at site shall be removed by NTPC only	Bidder to refer Technical Amendment-01
327	SEC VI/TECH SPEC		Pg 1004		Battery cell, Battery Management System, PCS (Power Conversion System), Energy Management System (EMS) Proposed supplier shall be NTPC ACCEPTED SOURCES BASED ON SUB-QR CLEARANCE AND QUALITY TIE-UP.	Please share details of approved supplier if available	The sub-vendor for the items may be proposed by the successful bidder during detailed engineering, subject to meeting the technical specification requirement, sub-QR clearance. Quality tie-up shall be done subsequently with the sub-QR qualified sub-vendor by NTPC CQA.
328	SEC VI/TECH SPEC		Pg 1004		PCS (Power Conversion System) Proposed supplier shall be NTPC ACCEPTED SOURCES BASED ON SUB-QR CLEARANCE AND QUALITY TIE-UP.	Based on past inverter supply can we consider sungrow, FIMER etc	The sub-vendor for PCS may be proposed by the successful bidder during detailed engineering, subject to meeting the technical specification requirement, sub-QR clearance. Quality tie-up shall be done subsequently with the sub-QR qualified sub-vendor by NTPC CQA.

329	Site Visit				KMZ/Autocad	Kindly share us the clear marking of BESS boundaries and cable route for all the substations. As per site visit boundary and acres are different from what tender specifies.	AutoCAD file would be provided to the successful bidder. Cable routing shall be finalised during detailed engineering. Approximate areas identified for BESS for different sites are marked in tender drawing and values are provided in project information chapter.
330	Site Visit					Solapur - BESS area to 132kV SYD is around of 2.3km hence can we propose 33kV cable and install power transformer in the bay area as 132kV cable for such a length is quite challenging.	Bidder to refer Technical Amendment-01
331	Site Visit					Solapur - considering the cable laying challenging requesting NTPC to consider power transfromer installation in bay area so that 33kV cable can be laid from BESS area to Bay area.	Bidder's proposal is not accepted. Bidder to refer Technical Amendment-01
332	Tender SLD					Transformer vector group shall be star-delta (YNd11d11d11d11)?	Vector group of IDT shall be as per standrd practice of the bidder/technical recommendations of PCS manufacturer and shall be finalised during detailed engineering stage.
333	Site Visit					Does reallignment of road in Barh substation is in the scope of EPC or NTPC?	Bidder to refer Technical Amendment-01
334	Site Visit					Kindly confirm that approach road for all sites will be normal plant entry point only.	Bidder to refer Technical Amendment-01
335	Tender SLD					Kindly provide confirmation on space for CRP panel installation and Aux AC & DC supply.	CRP panels shall be instaled in AC kiosks as per subsection B-11A, Part B section VI of technical specifications. Aux AC and DC supply for switchard bay equipments and associated CRP panels shall be provided by the owner.
336	Tender Spare					Kindly confirm the location of storing the spare tie transformers.	Spare Tie transformer, wherever applicable, shall be supplied by the bidder and stored in the plant as per directions of EIC. Location of storage shall be finalized during detailed engineering.
337		Provenness		1.00.00	The Sub-Section I-A (Provenness – Battery System) requires bidders to have supplied/manufactured 20 MWh cumulative capacity of grid-interactive BESS, including at least one system of 5 MWh or higher, or collaborate with a manufacturer meeting this requirement.	We request relaxation of this clause based on the following: Manufacturing Capacity: JSW Energy PSP Eleven Limited has a 5 GWh battery manufacturing capacity, located at Ground & Mezzanine floor, Gat no 446, 447, 453/1, 454, 455, 456, 462, 463, 525, Vivan Kohli Industrial Park, Industrial Shed No. 2, Old Pune Mumbai Highway, Taluka Maval, Nayagaon, Kamshet, Pune, Maharashtra, 412106. Confirmed Orders: We have firm order bookings totaling 500 MWh, demonstrating our capability to execute large-scale projects. Technology Adoption: BESS technology is new in India, with limited players having installed grid-interactive systems of 5 MWh or higher, making the 20 MWh provenness requirement restrictive. Compliance Assurance: All systems supplied will fully comply with NTPC's technical, safety, and operational standards. In view of the above, we request NTPC to allow participation based on the 500 MWh confirmed orders.	Bidder's proposal is not accepted. Bidder to comply with the requirement in Technical specifications. Refer Technical Amendment No.1.
338	Technical Specifications Part 1 of 3- SUB SECTION-II-SCOPE OF SUPPLY AND SERVICES		304/1175	1.01.00. SCOPE	1.01.10: A dedicated building shall be provided to house the 33 kV pooling switchgear. In addition, a common control room building shall be provided for the BESS installation, which shall accommodate all LT panels, Battery Management Systems (BMS),Energy Management System (EMS), SCADA, communication equipment, UPS andother common auxiliary systems required for operation and monitoring. The control room shall also include Operator Workstations (OWS) and Engineering Workstations(EWS) for local monitoring, control, diagnostics, and facilities/gateways required forintegration with the plant's existing control architecture.	Kindly confirm whether the bidder may propose an integrated building housing both the 33 kV pooling switchgear and the BESS control room.	Bidders proposal is acceptable. Refer Technical Amendment-01.
339	Technical Specifications Part 1 of 3-SUB-SECTION B-01 GENERAL ELECTRICAL SPECIFCIATION		438/1175	3.08.00:Cables and Bus Ducts	All cables from PCS upto BESS Pooling switchgear shall be laid in built up cable trenches. Cabled beyond BESS Pooling switchgear shall be laid in buried arrangement.	Kindly confirm whether the cable from the BESS container to the BESS pooling switchgear can be laid underground in a buried arrangement instead of in a built-up cable trench.	Bidders proposal is NOT accepted. Bidder to comply the technical specification requirements
340	Technical Specifications Part 1 of 3-SUB SECTION B-04 LT SWITCHGEARS & LT BUSDUCTS		517/1175	2.08.00: BUSDUCT	BUSDUCT (NON-SEGREGATED, AIR INSULATED TYPE)	Kindly confirm whether the use of cables instead of bus ducts for the LT switchgear is acceptable.	LT Busducts shall be provided in case of current rating above 1600Amp.
341	Technical Specifications Part 1 of 3			ELECTRICAL SINGLE LINE DIAGRAM	50MW/100MWH BATTERY ENERGY STORAGE SYSTEM (BESS) AT RAMAGUNDAM STPP-III	Kindly confirm if the inverter's inbuilt ACB can be considered as a substitute for the external ACB shown after the PCS in the SLD.	Bidders proposal is acceptable

342	Technical Specifications Part 1 of 3-SUB SECTION B-03(B) 33KV MV-LV PROTECTION, CONTROL & MONITORING		499/1175	6.02.01 :Transformer Feeder Protections (Module Type DB/DBF)	6.02.01:d):Transformer Differential protection (87T): Differential protection for transformers (87T) of rating 5MVA and above shall be provided with stabilized biased differential relay	As per CEA guidelines, differential protection is required for transformers rated above 10 MVA. Kindly confirm.	Bidders proposal is NOT accepted.Bidder to comply with the technical specification requirements
343	Technical Specifications Part 1 of 3-SUB SECTION I-B PROJECT INFORMATION		94/1175	1.07.00 OTHER DETAILS	APPENDIX-I TO SUBSECTION-IB : Solapur STPP ,132MW 264MWh,132kV 80MVA, 33kV/132kV -2 Number bay	As per the tender specifications, two bay spaces are mentioned as available. However, during the site survey, it was observed that only one spare bay is available at the Solapur site. Kindly confirm the actual bay availability.	2 nos. 132kV New bays have to be installed along with bus extension [as required].
344	Technical Specifications Part 1 of 3 -SUB SECTION II SCOPE OF SUPPLY AND SERVICES		301/1175	1.01.00 : SCOPE	1.01.05 :A separate AGC shall also be provided and configured for standalone BESS operation.	Kindly provide the specification of AGC. If it is in scope of NTPC then requst you to provide the clarify on our scope of work.	AGC is included in the scope of the bidder. Requirements for AGC are included in Sub Section A-01, Part B, Section VI of Technical Specifications.
345	Technical Specifications Part 1 of 3-SUB SECTION II SCOPE OF SUPPLY AND SERVICES		305/1175	2.01.00:BESS, ASSOCIATED SYSTEMS AND INTERCONNECTIO N UP TO 33 kV POOILING SWITCHGEAR	3. Inverter Duty Transformers: One number IDT with same rating shall be provided as spare for EACH location	Kindly confirm whether the bidder can provide only one IDT of the maximum rating at a location, even if there are two variants/ratings of IDT at the same location.	Bidders proposal is NOT accepted
346	Technical Specifications Part 1 of 3-SUB SECTION II SCOPE OF SUPPLY AND SERVICES		305/1175	2.01.00: BESS, ASSOCIATED SYSTEMS AND INTERCONNECTIO N UP TO 33 kV POOILING SWITCHGEAR	4. Auxiliary transformer :Necessary redundancy shall be maintained such that there is no loss of auxiliary power supply in case of outage of Single Auxiliary Transformer.	Kindly confirm whether the bidder may consider using a UPS system for redundancy to meet this requirement.	Bidders proposal is NOT accepted
347	Technical Specifications Part 1 of 3-SUB SECTION II SCOPE OF SUPPLY AND SERVICES		306/1175	2.01.00: BESS, ASSOCIATED SYSTEMS AND INTERCONNECTIO N UP TO 33 kV POOILING SWITCHGEAR	6.**Energy Management System:**The EMS along with the Power Plant Controller (PPC) shall provide real time monitoring and control of BESS, with provision for standalone operation (independent of thermal generation) as well as coordinated operation with the host thermal plant.	Kindly confirm whether the EMS can be considered as the PPC, or if a separate PPC is required.	The EMS (Energy Management System) can be considered as the Plant Power Controller (PPC) provided it meets all the functional and performance requirements specified for the PPC in the technical specifications. A separate PPC is not required if the EMS fulfills these requirements. However, if a separate PPC is required as per statutory, grid connectivity, or other regulatory requirements, the same shall be provided by the bidder accordingly.
348	Technical Specifications Part 1 of 3-SUB SECTION II SCOPE OF SUPPLY AND SERVICES		309/1175	2.01.00: BESS, ASSOCIATED SYSTEMS AND INTERCONNECTIO N UP TO 33 kV POOILING SWITCHGEAR	10. Switchgear /Numerical Relay Networking :a) Communicable Numerical Relays (with IEC 61850) in all MV Switchgears & LV Switchgears.	Kindly confirm whether the bidder may provide IEC 61850 relays only in the MV switchgear panels.	Bidder to comply with requirements of technical specifications
349	Technical Specifications Part 1 of 3-SUB SECTION II SCOPE OF SUPPLY AND SERVICES			2.02.02 : SWITCHYARD	2.02.02 (iv) II. Switchyard materials: ACSR Conductor of suitable rating as required	Kindly confirm whether the bidder may consider AL59 or an equivalent conductor to meet losses and RTE requirements.	Confirmed. However, selected conductor shall have minimum ratings as provided in specifications and suitable to be used alsong with existing conductor material
350	Technical Specifications Part 1 of 3			ELECTRICAL SINGLE LINE DIAGRAM	BATTERY ENERGY STORAGE SYSTEM (BESS) AT MOUDA, ,BARH, NPGC, SOLAPUR	At the Solapur substation, one line bay will be constructed at the NTPC substation, from which a cable/transmission line (~2 km) will be laid up to the BESS pooling switchgear. Additionally, one line bay and two transformer bays with a double busbar arrangement will be erected. Kindly confirm.	Bidders understanding is NOT correct. 2 number 132kV bays are to be provided [with required bus extension] in existing 132kV switchyard of solapur STPP.
351	Technical Specifications Part 1 of 3-SUB SECTION I-B PROJECT INFORMATION		100/1175	APPENDIX-2 TO SUBSECTION I-B (Location and Approach):	6. Simhadri Super Thermal Power Station, Stage I & II : Proposed BESS Capacity 75MW / 150MWh (for Simhadri-I) 70MW / 140MWh (for Simhadri-II)	Since the locations for both BESS systems are near the 400 kV switchyard (common area), kindly confirm whether we may plan a common 400 kV system with a single bay and transformer, with internal segregation of the MV and DC blocks as Stage I and Stage II.	Bidder to follow tender specifications and provide separate BESS tie transformers
352	Tech specifications Section VI Part B			Clause 10, Page 8 of 10 - BESS Functional requirements	Reactive power, Black Start, Ancillary services (PRAS, STAS, TRAS), AGC signal based control features	Kindly confirm whether the BESS is intended for frequency response, peak shaving, or spinning reserve applications, and what performance KPIs will be validated during PG test. This is needed to size the control logic, inverter response time and EMS configuration correctly	BESS use case requirements are mentioned in Clause 2.01.00, Sub Section A-02, Part B, Section VI of Technical Specifications. Performance KPIs shall be as per Sub-section-IV, Part-A of Technical Specification. For PRAS, Refer Technical Amendment-01.

353	Tech specifications Section VI Part B Subsection A02 Battery and BMS -SUBSECTION-A 02-BATTERY AND BATTERY MANAGEMENT SYSTEM		383/1175	10.00.00: BATTERY MANAGEMENT SYSTEM	B) Further, an additional feature shall be provided to change/edit the discharge duration and rate of discharge whenever required.	Kindly note that it may not be advisable to edit the rate of discharge, as it is governed by the C-rate and could impact the battery warranty. Please confirm if this requirement can be modified accordingly.	The requirement to allow editing of the discharge rate is retained to provide operational flexibility. However, it shall be within the battery manufacturer's recommended C-rate/Depth of Discharge limits to ensure safety and maintain warranty. The bidder shall configure the system accordingly.
354	Tech specifications Section VI Part B Subsection A02 Battery and BMS -SUBSECTION-A 02-BATTERY AND BATTERY MANAGEMENT SYSTEM		383/1175	10.00.00: BATTERY MANAGEMENT SYSTEM	C) BMS shall monitor battery system parameters such as string voltage & current, cumulative number of cycles and throughput along with DoD. It shall automatically determine the State of Charge (SOC) and State of Health (SOH) of the battery individual cell/module	Kindly confirm whether cell-level monitoring of voltage and temperature is mandatory for each individual cell, or if monitoring at the module level is sufficient. This is to optimize the BMS architecture and reduce associated cabling complexity.	Monitoring at the module/pack level is sufficient. Cell-level monitoring of voltage and temperature is not mandatory, however the same shall be as per Battery OEM standard practice, provided that the BMS can accurately determine the State of Charge (SOC) and State of Health (SOH) of each battery module and the overall system.
355	Technical specifications Part A - SUB SECTION IV-FUNCTIONAL GUARANTEES & LIQUIDATED DAMAGES		333/1175	1.04.01 :PERFORMANCE GUARANTEE TEST (YEAR-1)	b. Round Trip Efficiency (RtE): Measurement of incoming and outgoing energy shall be carried out at the metering/delivery point/PoI of respective plant (33 kV/132 kV / 220 kV / 400 kV,as applicable) using ABT class meters. Auxiliary consumption of the completeBESS plant shall be separately measured (as applicable) with ABT class meters installed at the tapping point of auxiliary load feeders.	1.Kindly confirm whether a separate 33 kV or 11 kV metered connection will be available for auxiliary power. 2.May the bidder include a small rooftop solar PV system to reduce the auxiliary consumption of the BESS plant, and if so, will its contribution be considered in the RTE calculations?	1) NO 2) In case of Roof Top considered by Bidder on its own accord, same may be used to reduce its Aux. power drawl for the BESS system. Only roof top solar on buildings under this package shall be considered and all other provisions of technical specification shall prevail.
356	Technical specifications Part A - SUB SECTION IV-FUNCTIONAL GUARANTEES & LIQUIDATED DAMAGES		342-346 /1175	2.02.01 .B) AMOUNT OF LIQUIDATED DAMGES DURING CAMC Period	Shortfall in LD for Availability, RTE, Degradation etc	Kindly confirm whether there will be any incentive if the availability, RTE, or annual degradation values are better than the limits specified in the tender, and whether such improvements will be considered/incentivized in the evaluation criteria.	No incentives will be provided for exceeding the specified limits of availability, RTE, or annual degradation. Bidders are required to meet the guaranteed values as per the tender.
357	Technical specifications Part A - SUB SECTION IV-FUNCTIONAL GUARANTEES & LIQUIDATED DAMAGES		334 /1175	1.04.01 PERFORMANCE GUARANTEE TEST (YEAR-1)	c. Cumulative BESS Annual Availability: **Annual Availability Calculation:** Annual Availability of each plant shall be calculated as the mean of the daily availabilities. Daily availability shall be calculated as per the following formula: Daily Availability for the ith day (%) $= \frac{(DCi - ((SGi - ADi) \times 1.5))}{BESS\ Capacity\ after\ degradation\ for\ the\ ith\ day} \times 100$ Where • DCi: Declared capacity for the particular day in MWh corresponding to two cycles of operation • SGi: Scheduled injection and drawl for the ith day in MWh corresponding to two cycles of operation • ADi: Actual Injection and drawl for the particular day in MWh corresponding to two cycles of operation • The total BESS capacity in denominator corresponds to two cycles of operation per day	Kindly confirm whether linear degradation of the BESS capacity between BOY (Beginning of Year) and EOY (End of Year) for any given year can be used for availability calculations, particularly for the declared capacity (Dci) value on the i-th day, as per the formula provided.	Bidder's proposal is not acceptable. For availability calculation, the actual daily BESS capacity as reported by the EMS (after accounting for real degradation) shall be used as mentioned in Sub Section IV, Part A, Section VI of Technical Specifications
358	Technical specifications Part A - SUB		1136-1137/1175	ELECTRICAL SINGLE LINE DIAGRAM	Simhadri -Single Line Diagram : 75MW/150MWH BATTERY ENERGY STORAGE SYSTEM (BESS) AT SIMHADRI STPP- 1 70MW/140MWH BATTERY ENERGY STORAGE SYSTEM (BESS) AT SIMHADRI STPP- 2	Can we use a single transformer with 2 or 3 windings of 160 MVA instead of two separate transformers?	Bidders proposal is NOT accepted. Transformer sizes and ratings shall be as indicated in SLD/ Tender specifications
359	TECHNICAL SPECIFICATION SECTION –VI, PART-B-SUB SECTION B-05A 220 KV POWER CABLES		533/1175	3.00.00 220 KV CABLE	3.01.01 :The cable shall consists of single core stranded copper compacted circular conductor..... 6.00.00 : CABLE /ACCESSORIES PARAMETERS-Conductor material Copper	Kindly confirm if we can use aluminum conductors for the EHV cables.	Bidders proposal is NOT accepted. Bidder to comply the technical specification requirements
360	General.					For cable laying, may the bidder utilize NTPC's existing structures at the location, or is a separate cable crossing arrangement required? Kindly confirm.	Use of existing Thermal power plant structures is NOT envisaged
361	General.				Permission & approvals	Kindly confirm the scope of permissions required for the railway crossing.	Rail Track(Permanent Way) crossing is not envisage for Projects identified under LOT -1. However, for Rail cum road crossing bidder to refer sl xv, cl. 1.00.00 of subsection IIA, Part A of technical Specification.
362	General				The Cable crossing below Railway track.	Kindly confirm if horizontal directional drilling (HDD) work can be allowed for passing cables below the track/road while raliway crossing.	1.Rail Track(Permanent Way) crossing is not envisage for Projects identified under LOT -1. 2. The bidder is requested to provide detail methodology of HDD for review and consideration before bidding.

363	General.					Kindly confirm the make of the FOTE, the availability of spare ports, and the type of FOTE—whether it is STM-4 or STM-16. If it is within the scope of NTPC, we request you to share the specifications of the FOTE.	FOTE is NOT included in scope of supply for Lot 1 projects

SL. NO	SPECIFICATION REFERENCE				EXISTING SPECIFICATION	TO BE READ AS
	SEC/ PART	SUB SEC.	PAGE NO.	CLAUSE NO.		
1.	VI/A	I-A	2 of 9		**PROVENNESS CRITERIA** The bidder/its sub-vendor(s) is required to meet the provenness criteria and/or qualification requirement for the items/services listed below as per the stipulated criteria indicated in the respective clauses. For the purpose of qualification of Bidders / Sub-vendor(s), experience shall be reckoned as on the date of NOA unless otherwise specified in the respective clauses.	**PROVENNESS CRITERIA** The bidder/its sub-vendor(s) is required to meet the provenness criteria and/or qualification requirement for the items/services listed below as per the stipulated criteria indicated in the respective clauses. For the purpose of qualification of Bidders / Sub-vendor(s), experience shall be reckoned as on the date of consideration for approval but not later than six months after NOA unless otherwise specified in the respective clauses.
2.	VI/A	I-A	2 of 9	3.00.00	ENGINEERING CONSULTANT/ SYSTEM INTEGRATOR: If the bidder itself has not done integration of grid interactive battery energy storage system of cumulative installed capacity of 20 MWh or higher, out of which at least one project should be of 5 MWh capacity or higher, in that case the bidder shall employ Engineering Consultant/ system integrator who should have done integration of grid interactive battery energy storage system of cumulative installed capacity of 20 MWh or higher, out of which at least one project should be of 5 MWh capacity or higher.	DELETED
3.	VI/A	I-A	2 of 9	1.00.00	BATTERY SYSTEM: If the bidder itself has not manufactured or supplied Batteries for grid interactive battery energy storage system of cumulative installed capacity of minimum 20 MWh, out of which at least one grid interactive battery energy system should be of 5 MWh capacity or higher, in that case the bidder shall associate/collaborate for procurement/ sourcing	BATTERY SYSTEM: If the bidder itself has not manufactured or supplied Batteries for grid interactive battery energy storage system of cumulative installed capacity of minimum 20 MWh, out of which at least one grid interactive battery energy system should be of 5 MWh capacity or higher, in that case the bidder shall associate/collaborate for procurement/ sourcing of batteries from Battery Manufacturer who has manufactured and supplied Batteries of cumulative capacity of minimum 20 MWh for grid interactive

SL. NO	SPECIFICATION REFERENCE				EXISTING SPECIFICATION	TO BE READ AS
	SEC/ PART	SUB SEC.	PAGE NO.	CLAUSE NO.		
					of batteries from Battery Manufacturer who has manufactured and supplied Batteries of cumulative capacity of minimum 20 MWh for grid interactive battery energy storage system(s), out of which at least one reference grid interactive battery energy storage system should be of minimum 5 MWh capacity supplied in a single order. The reference grid interactive battery energy storage system of 5 MWh or higher capacity should have been successfully commissioned at least six (6) months prior to the date of techno-commercial bid opening.	battery energy storage system(s), out of which at least one reference grid interactive battery energy storage system should be of minimum 5 MWh capacity supplied in a single order. The reference grid interactive battery energy storage system of 5 MWh or higher capacity should have been successfully commissioned for at least six (6) months. **Note: Design validation of Battery sizing, associated cable sizing, etc. shall be done by the Battery Manufacturer. Certification for the same from Battery Manufacturer shall be submitted by the Successful Bidder during detailed engineering.**
4.	VI/A	I-A	2 of 9	2.00.00 a)	The bidder/sub vendor should have manufactured grid-interactive bidirectional PCS of cumulative installed capacity of 10 MW or higher, out of which PCS installation at one location should be of 2.5 MW capacity or higher. The reference PCS installation of 2.5 MW or higher capacity should have been successfully commissioned at least six (6) months prior to the date of techno-commercial bid opening.	The bidder/sub vendor should have manufactured grid-interactive bidirectional PCS of cumulative installed capacity of 10 MW or higher, out of which PCS installation at one location should be of 2.5 MW capacity or higher. The reference PCS installation of 2.5 MW or higher capacity should have been successfully commissioned for at least six (6) months. **Note: Design validation of PCS sizing, IDT sizing, associated cable sizing, etc shall be done by the PCS Manufacturer. Certification for the same from PCS manufacturer shall be submitted by the Contractor during detailed engineering.**
5.	VI/A	I-B	6 of 21	1.07.00	**OTHER DETAILS** The following clearances shall be arranged by bidder. However, necessary documentations/ applications shall be in the name of NTPC	**OTHER DETAILS** The following clearances shall be arranged by bidder. However, necessary documentations/ applications shall be in the name of NTPC

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<tr><td>2</td><td>PCB Clearance (SPCB/CPCB)</td><td>Application by NTPC.
Inputs for application & processing to be facilitated by bidder</td></tr>
<tr><td>3</td><td>MNRE Clearance</td><td>To be facilitated by bidder</td></tr>
<tr><td>4</td><td>Chief Electrical Inspector Clearance</td><td>To be facilitated by bidder</td></tr>
<tr><td>5</td><td>Tree Cutting Permission</td><td>To be facilitated by bidder</td></tr>
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The Bidder shall be responsible for obtaining and facilitating all other applicable clearances, approvals, and permits required for the BESS installation at thermal power plants, in addition to those specified herein, unless specifically excluded from the Scope of Work.
Facilitation includes Preparation of documents required for all Statutory clearances/ approvals/ permits/ certifications, statutory fees for the approval etc.
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					approvals, and permits required for the BESS installation at thermal power plants, in addition to those specified herein, unless specifically excluded from the Scope of Work. Bidder shall apply for necessary approvals, permits and clearances not more than 90 days from the issuance of LOA, which shall be complete in all respects, incorporating the clarifications/changes as required by the concerned authorities. **All the statutory fees for approvals till the completion of CAMC period shall be in the scope of bidder (unless otherwise specifically mentioned in document).**	Compliance of comments (if any) received from Statutory bodies/authorities shall also be in Bidder scope. Bidder shall apply for necessary approvals, permits and clearances not more than 90 days from the issuance of LOA, which shall be complete in all respects, incorporating the clarifications/changes as required by the concerned authorities. **All the statutory fees for approvals till the completion of CAMC period shall be in the scope of bidder (unless otherwise specifically mentioned in document).**
6.	VI/A	II	3 of 26	1.01.02	To maintain the required minimum dispatchable energy at the metering/delivery point for the respective plant, the Contractor shall undertake any required replenishment or augmentation of the BESS system. However, such replenishment or augmentation shall strictly be carried out at the start of the respective CAMC year only. No capacity addition, replenishment, or augmentation shall be permitted during the PG Test period or in-between any CAMC year, except in the event of an "Interruption of the PG Test Due to Fault/Failure" as defined in Clause 1.05.00 of Sub-Section IV of Part A of the technical specifications. Monthly/Yearly MW/MWh capacity of BESS should be automatically logged	To maintain the required minimum dispatchable energy at the metering/delivery point for the respective plant, the Contractor shall have the option to undertake replenishment or augmentation of the BESS system, at its own cost and responsibility, to ensure continued compliance with the guaranteed annual capacity degradation limits and thereby avoid Liquidated Damages (LDs). However, such replenishment or augmentation shall strictly be carried out at the start of the respective CAMC year only. No capacity addition, replenishment, or augmentation shall be permitted during the PG Test period or in-between any CAMC year, except in the event of an "Interruption of the PG Test Due to Fault/Failure" as defined in Clause 1.05.00 of Sub-Section IV of Part A of the technical specifications. Monthly/Yearly MW/MWh capacity of BESS should be automatically logged in the configured performance monitoring system/EMS of BESS Plant.

SL. NO	SPECIFICATION REFERENCE				EXISTING SPECIFICATION	TO BE READ AS
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					in the configured performance monitoring system/EMS of BESS Plant.	
7.	VI/B	A-04	2 OF 25	1.01.00	Energy Management System (EMS) system of individual plants shall be a computerized system for real time monitoring, operation, control, reliable & efficient operation and optimization of performance of the BESS Plant**.** SCADA system shall be part of EMS system. EMS shall be able to acquire real time data of various equipment of BESS system, have in built logic/programming to monitor, control, and optimize the performance of BESS as per specification.	Energy Management System (EMS) system of individual plants shall be a Controller based system for real time monitoring, operation, control, reliable & efficient operation and optimization of performance of the BESS Plant**.** SCADA system shall be part of EMS system. EMS shall be able to acquire real time data of various equipment of BESS system, have in built logic/programming to monitor, control, and optimize the performance of BESS as per specification.
8.	VI/B	A-01	7 OF 10	9.00.00 (7)	**7. Ancillary Services & Grid Support** • The BESS shall support provision of PRAS, SRAS, TRAS, as well as black start capability, reactive power control and synthetic inertia response, as per grid requirements and latest CEA guidelines/CERC regulation.	**7. Ancillary Services & Grid Support** • The BESS shall support provision of SRAS (Secondary Response Ancillary Service), TRAS (Tertiary Response Ancillary Service), as well as black start capability, reactive power control and synthetic inertia response, as per grid requirements and latest CEA guidelines/CERC regulation.

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	SEC/ PART	SUB SEC.	PAGE NO.	CLAUSE NO.		
9.	VI/B	A-03	2 OF 9	1.06.00	The PCS shall also be capable of supporting Black Start operation, Ancillary Services (PRAS, SRAS, TRAS, etc.), and delivering Synthetic Inertia response as per grid requirements.	The PCS shall also be capable of supporting Black Start operation, Ancillary Services (SRAS, TRAS, etc.), and delivering Synthetic Inertia response as per grid requirements.
10	VI/B	A-03	5 OF 9	3.01.00 (20) (xiv)	Ancillary Services (PRAS, SRAS, TRAS, etc.)	Ancillary Services (SRAS, TRAS, etc.)
11	VI/B	B-01	5 OF 11	3.06.00 (b)	All ACDBs, DCDBs, Solenoid Valve DBs and MCCs located on Stacker Reclaimer, Paddle feeders and Travelling trippers shall be of Fixed Module type. All 415V Circuit breaker modules and other MCC modules shall be fully draw out type.	All 415V Circuit breaker modules and other MCC modules shall be fully draw out type. For ACB provided as an integral part of the PCS, fixed type ACB shall also be acceptable.

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12.	VI/A C-01	SUB SECTION II SCOPE OF SUPPLY AND SERVICES	16 OF 26	02.01.00 (22)	CCTV: A CCTV surveillance system shall be installed to cover all critical areas of the BESS installation including container yards, switchgear rooms, and auxiliary buildings. The system shall support remote viewing, recording, and storage with redundancy. The minimum quantities of CCTV cameras shall be 15 of which 5 cameras shall be of PTZ type. The exact location shall be finalized at site during detail engineering/commissioning. **The CCTV system shall be integrated with EMS system.**	CCTV: A CCTV surveillance system shall be installed to cover all critical areas of the BESS installation including container yards, switchgear rooms, and auxiliary buildings. The system shall support remote viewing, recording, and storage with redundancy. The minimum quantities of CCTV cameras shall be 15 of which 5 cameras shall be of PTZ type. The exact location shall be finalized at site during detail engineering/commissioning. **Further, the feed of the CCTV system shall be displayed on a separate 55-inch LED Screen in the control room.**
13.	VI	Part 2 of 3	Part 1 of 2		Solapur - General Layout Plan (R0)	Solapur - General Layout Plan (R1)
14.	VI	Part 2 of 3	Part 1 of 2		NPGCL - General Layout Plan (R0)	NPGCL - General Layout Plan (R1)
15.	VI	Part 2 of 3	Part 1 of 2		Mouda - General Layout Plan (R0)	Mouda - General Layout Plan (R1)
16.	VI	Part 3 of 3	Part 2 of 2		Kudgi - General Layout Plan (R0)	Kudgi- General Layout Plan (R1)
17.	VI	Part 3 of 3	Part 2 of 2		Ramagundam - General Layout Plan (R0)	Ramagundam- General Layout Plan (R1)
18.	VI/A	I-B		Appendix-2		Refer revised Appendix-2 attached with Technical Amendment-01

SL. NO	SPECIFICATION REFERENCE				EXISTING SPECIFICATION	TO BE READ AS
	SEC/ PART	SUB SEC.	PAGE NO.	CLAUSE NO.		
19.	VI/B	C	7 of 40	3.03.02	**BESS- Service Building and Switchgear Room** i) The building shall ..... iv) Open space shall be ..... access for maintenance purposes.	BESS- Service Building, Switchgear Room **and Guard Room / Security Cabin / Watchman Cabin** i) The building shall ..... iv) Open space shall be ..... access for maintenance purposes. **V) As part of the site development works within the BESS area, one number Guard Room / Security Cabin / Watchman Cabin of minimum built-up area of 5 sqm shall be provided near the main gate of BESS or boundary wall/ fencing. It should be RCC framed super structure and RCC Slab with Bricks/concrete blocks masonry wall. Unless specified, the wall shall be with minimum one brick thick on exterior side in cement mortar (1:6).**
20.	VI/A	II-A	2 of 4	1.00.00 (iv)	Site Preparation: Site grading including slope protection, ground preparation/ filling/levelling (if required), Ground improvement (if required) of the identified area.	Site Preparation: Levelled area with finished ground as provided in project information shall be provided by the Owner, however, Area grading upto (+/-) 300mm as per proposed FGL including slope protection, Ground improvement (if required) of the identified area will be in the bidder scope.
21.	VI/A	II-A	2 of 4	1.00.00 (i)	Topography Survey	**Topography Survey** – To conduct topography survey of the identified area for BESS using total station. The benchmark with local co-ordinate system will be provided by EIC considering the same Contractor shall carry out spot level surveying at an interval of 5 meters for contouring the area. Contours are to be interpolated at 0.5 M intervals after the above points are plotted. The contours shall not be just interpolated but properly surveyed on the ground so that features falling between the two successive levels are also picked up. The scope of survey will also include survey for nearest existing road/drains for interconnection of approach/drain from BESS area.

SL. NO	SPECIFICATION REFERENCE				EXISTING SPECIFICATION	TO BE READ AS
	SEC/ PART	SUB SEC.	PAGE NO.	CLAUSE NO.		
22.	VI/B	C	17 of 40	10.00.00	**AREA PAVING** RCC paving of minimum 150 mm thick with M25/M35 grade concrete, ……..slope of 1:500 to dispose the surface water/wash water to the nearest storm water drain.	Area paving **and Approach Pathway and Connectivity** RCC paving of minimum 150 mm thick with M25/M35 grade concrete, ……..slope of 1:500 to dispose the surface water/wash water to the nearest storm water drain. **The paved area of the BESS plant shall be connected to the nearest available plant road through a heavy-duty approach pathway with a width of 7 meters, incorporating a suitable turning radius at junction points to ensure smooth vehicular movement. The scope also includes the construction of a culvert over any existing drain encountered along the pathway alignment.** **At road or drain crossings, provide NP3-class hume pipes at a minimum soil cushion of 1100mm below the finished ground level (FGL) for cable routing.**
23.	VI/A	II-A	2 of 4	1.00.00(v)	iii. Site clearance including cutting of trees of girth less than 30 centimeters. Cutting of trees of girth more than 30cm shall be done by the Owner after finalization of location. However, removal and disposal of roots of trees of all girths (including trees of girth less than 30cm or more) and other vegetation is in Bidder's scope**.**	iii. Site clearance including cutting of trees of girth less than 30 centimeters is **in bidder's scope of work.** Cutting of trees of girth more than 30cm shall be done by the Owner after finalization of location. However, removal and disposal of roots of trees of all girths (including trees of girth less than 30cm or more) and other vegetation, **and its disposal as per instructions of EIC**, is in Bidder's scope**.**
24.	VI/A	II-A	3 of 4	1.00.00(xxiii)	Chain Link Fencing with Gate along with Guard room for BESS Area wherever required.	Chain Link Fencing with minimum 02 numbers of 6m wide Gates shall be provided. Guard room for BESS Area shall also be provided at one gate as decided during detailed engineering.

SL. NO	SPECIFICATION REFERENCE				EXISTING SPECIFICATION	TO BE READ AS
	SEC/ PART	SUB SEC.	PAGE NO.	CLAUSE NO.		
25.	VI/B	C	16 of 40	9.00.00	GATE ALONG FENCING All gates shall be of structural steel of minimum 3.75 metre width for single lane access road. The height of gate shall be same as that of the fence unless noted otherwise. Each gate shall have provision for wicket gate of size 1.0 m x 2.1 m. The gate frame and post shall be fabricated from medium class MS pipe of nominal diameter not less than 75 mm. The panel plate shall be of minimum thickness 2.5 mm conforming to IS: 513. The gate shall be complete with fabricated hinges, MS aldrops with locking arrangement, tempered steel pivot, guide track of MS tee, bronze aluminium ball bearing arrangement, castor wheel, etc.	GATE ALONG FENCING All gates shall be of structural steel of **minimum 6 metre width**. The height of gate shall be same as that of the fence unless noted otherwise. The gate frame and post shall be fabricated from medium class MS pipe of nominal diameter not less than 75 mm. The panel plate shall be of minimum thickness 2.5 mm conforming to IS: 513. The gate shall be complete with fabricated hinges, MS aldrops with locking arrangement, tempered steel pivot, guide track of MS tee, bronze aluminium ball bearing arrangement, castor wheel, etc.
26.	VI/A	I-B Appendix-9	3 of 8	1.03.00	PILE FOUNDATIONS – In case piles are adopted, following shall be adhered to:	PILE FOUNDATIONS – In case piles are adopted for **Barh Project**, following shall be adhered to:
27.	VI/A	I-B Appendix-9	3 of 8	1.03.00	1.06.00 Ground Improvement …….…. Table-1	DELETED
28.	VI/A	I-B Appendix-9	11 of 12	Annexure-C (Barh)		**Add Clause (b):** In case pile foundation adopted, refer details provided at Clause 1.03.00 of Appendix-9, Sub-Section I-B of Part-A, SECTION-VI
29.	VI/A	I-B Appendix-9	11 of 12	Annexure-C (KUDGI)	Area Plan showing Zone-I, Zone-II and Zone-III for founding level & net allowable bearing pressure	**Revised** Area Plan showing Zone-I, Zone-II and Zone-III for founding level & net allowable bearing pressure **attached as Appendix-A to Annexure-C (KUDGI)**

SL. NO	SPECIFICATION REFERENCE				EXISTING SPECIFICATION	TO BE READ AS
	SEC/ PART	SUB SEC.	PAGE NO.	CLAUSE NO.		
30.	VI/A	I-B Appendix-9		Annexure-C (SOLAPUR)	Annexure-C (SOLAPUR) **SOIL DATA AND FOUNDATION SYSTEM**	Annexure-C (SOLAPUR) -R1 **SOIL DATA AND FOUNDATION SYSTEM**
31.	VI/A	I-B Appendix-9		Annexure-C (MOUDA)	Annexure-C (Mouda) **SOIL DATA AND FOUNDATION SYSTEM**	Annexure-C (Mouda) -R1 **SOIL DATA AND FOUNDATION SYSTEM**
32.	VI/A	II	15 of 26	2.00.00 17. (a)	**Fire Detection & Protection System:** Fire detection & protection system for BESS including automatic **NOVEC**/AEROSOL fire protection system with cylinders, piping, fire/gas detectors, fire control panel, fire dampers, manual call points, abort & emergency release switches, cabling & integration with fire alarm panel provided in BESS control room along with trays, switches & racks. Fire protection system shall be provided as per **IEC 62897/NFPA 72.A/NFPA 855** compliance as per proven & standard practice of industry/OEM meeting statutory/regulatory requirements in India.	**Fire Detection and Protection System:** Fire detection & protection system for BESS including automatic **clean agent (FK-5-1-12)**/AEROSOL fire protection system with cylinders, piping, fire/gas detectors, fire control panel, fire dampers, manual call points, abort & emergency release switches, cabling & integration with fire alarm panel provided in BESS control room along with trays, switches & racks. Fire detection & protection system shall be provided as per r**elevant applicable codes/standards (BIS/NFPA/IEC/ Equivalent)** compliance **and** as per proven & standard practice of industry/OEM meeting statutory/regulatory requirements in India.
33.	VI/A	II	15 of 26	2.00.00 18.	**HVAC System:** The BESS shall include HVAC system designed to maintain battery temperatures at levels acceptable to the Battery Manufacturer's normal Battery warranty conditions, conducive to acceptable battery life, and as required to maintain battery capacity for all seasons/climatic conditions at the site. The air handling/distribution system shall be designed to ensure temperature uniformity within the battery. The HVAC/ventilation system shall be	**HVAC/Cooling System:** The BESS shall include HVAC/Cooling system designed to maintain battery temperatures at levels acceptable to the Battery Manufacturer's normal Battery warranty conditions, conducive to acceptable battery life, and as required to maintain battery capacity for all seasons/climatic conditions at the site. The HVAC/Cooling System shall be designed to ensure temperature uniformity within the battery. The HVAC/Cooling system shall be designed as per applicable codes/standards for such applications and in line with relevant CEA regulations (as applicable).

SL. NO	SPECIFICATION REFERENCE				EXISTING SPECIFICATION	TO BE READ AS
	SEC/ PART	SUB SEC.	PAGE NO.	CLAUSE NO.		
					designed as per applicable codes/standards for such applications and in line with relevant CEA regulations (as applicable). Further, mechanical ventilation system (comprising of supply air fans & exhaust air fans, etc.) shall also be provided for switchgear rooms, pantries, toilets, etc. Air Conditioning System comprising of ductable/non-ductable air conditioners shall be provided in Control Room, office space, etc.	Further, mechanical ventilation system (comprising of supply air fans & exhaust air fans, etc.) shall also be provided for switchgear rooms, pantries, toilets, etc. Air Conditioning System comprising of ductable/non-ductable air conditioners shall be provided in Control Room, office space, etc.
EE 01	A	Sub section II	19 of 26	2.02.02 (iv)	II. Switchyard materials: Circuit Breaker, Isolators with/without earth switches, current transformer, Surge arrestors, Bus post insulators, Capacitor Voltage Transformers, Wave Trap etc. (as applicable for each project) • 400kV GIS for Bongaigaon along with associated Pothead yard • EHIPS Aluminum tube as required …….	II. Switchyard materials: Circuit Breaker, Isolators with/without earth switches, current transformer, Surge arrestors, Bus post insulators, Capacitor Voltage Transformers, Wave Trap etc. (as applicable for each project) • Deleted. • EHIPS Aluminum tube as required …….
EE 02	A	Sub section II	20 of 26	2.02.02 (iv)	The scope of work shall also include construction of the new cable trenches required for cable laying of present scope of bays and its interconnection with existing cable trenches etc.	The scope of work shall also include construction of the new cable trenches required for cable laying of present scope of bays and its interconnection with existing cable trenches etc. Bidder may use existing cable trenches if sufficient space is available, else bidder shall built new cable trenches.
EE 03	A	Sub section II	20 of 26	2.02.02 (iv)	A Separate 220V DC system is to be provided in case of Bongaigaon TPP. This DC system may be utilized for DC control supply to switchyard as well as to BESS.	Deleted.

SL. NO	SPECIFICATION REFERENCE				EXISTING SPECIFICATION	TO BE READ AS
	SEC/ PART	SUB SEC.	PAGE NO.	CLAUSE NO.		
EE 04	A	Sub section II	20 of 26	2.02.02 (v)	400kV Transmission Line: Materials including…….	Deleted.
EE 05	~~A~~	Sub section II	20 of 26	2.02.02 (vi)	The equipment and materials to be supplied by the Contractor shall form a complete transmission line. The equipment and services as detailed in all sections of the bidding documents and as shown on the Single Line diagram shall be within the scope of supply of the Contractor. It is in the interest of the contractor to acquaint himself with the site conditions and scope before submission of offer.	The equipment and materials to be supplied by the Contractor shall form a complete switchyard/ switchyard Bay/ transmission line. The equipment and services as detailed in all sections of the bidding documents and as shown on the Single Line diagram shall be within the scope of supply of the Contractor. It is in the interest of the contractor to acquaint himself with the site conditions and scope before submission of offer.
EE 06	B	17	4	1.01.22	The required cable trenches for the scope of present bays in the switchyard shall be designed to cater the total cables as required for bays indicated in SLD. The Bidder shall use the space available in existing cable tray for laying of cables for the scope of present bays. If space is not available, the bidder shall provide the new cable trays along with supports for the cables.	The required cable trenches for the scope of present bays in the switchyard shall be designed to cater the total cables as required for bays indicated in SLD. The Bidder shall use the space available in existing cable trays**/ trench** for laying of cables for the scope of present bays. If space is not available, the bidder shall provide the new cable trays**/ trench** along with supports for the cables.
EE 07	Part A	I-A	6 of 9	5.10.00 (A)	400 KV SWITCHYARD: The Bidder /Sub-Vendor should have designed, supplied, constructed / erected, tested and commissioned at least one (1) no of Air Insulated substation/switchyard of 400 kV or above voltage class having at least two (2) bays which should have been in successful operation for a period of minimum 3 months.	400 KV AIS SWITCHYARD: The Bidder /Sub-Vendor should have designed, supplied, constructed / erected, tested and commissioned at least one (1) no of Air Insulated substation/switchyard of 400 kV or above voltage class having at least two (2) bays which should have been in successful operation for a period of minimum 3 months. NOTE:

SL. NO	SPECIFICATION REFERENCE				EXISTING SPECIFICATION	TO BE READ AS
	SEC/ PART	SUB SEC.	PAGE NO.	CLAUSE NO.		
					NOTE: For the purpose of qualifying requirement, one no. of bay shall be considered as a bay comprising of Circuit Breakers (3 Phase), two disconnectors (3 Phase) and current transformers (3 Phase)	1. For the purpose of qualifying requirement, one no. of bay shall be considered as a bay comprising of Circuit Breakers (3 Phase), two disconnectors (3 Phase) and current transformers (3 Phase) 2. Bays executed in extension substation/switchyard shall also be considered.
EE 08	Part A	I-A	7 of 9	5.10.00 (B)	220 KV SWITCHYARD: The Bidder /Sub-Vendor should have designed, supplied, constructed / erected, tested and commissioned at least one (1) no of Air Insulated substation/switchyard of 220 kV or above voltage class having at least two (2) bays which should have been in successful operation for a period of minimum 3 months. NOTE: For the purpose of qualifying requirement, one no. of bay shall be considered as a bay comprising of Circuit Breakers (3 Phase), two disconnectors (3 Phase) and current transformers (3 Phase)	220 KV AIS SWITCHYARD: The Bidder /Sub-Vendor should have designed, supplied, constructed / erected, tested and commissioned at least one (1) no of Air Insulated substation/switchyard of 220 kV or above voltage class having at least two (2) bays which should have been in successful operation for a period of minimum 3 months. NOTE: 1. For the purpose of qualifying requirement, one no. of bay shall be considered as a bay comprising of Circuit Breakers (3 Phase), two disconnectors (3 Phase) and current transformers (3 Phase) 2. Bays executed in extension substation/switchyard shall also be considered.
EE 09	Part A	I A	8 of 9	5.10.00 (C)	132 KV SWITCHYARD: The Bidder /Sub-Vendor should have designed, supplied, constructed / erected, tested and commissioned at least one (1) no of Air Insulated substation/switchyard of 132 kV or above voltage class having at least two (2) bays which should	132 KV AIS SWITCHYARD: The Bidder /Sub-Vendor should have designed, supplied, constructed / erected, tested and commissioned at least one (1) no of Air Insulated substation/switchyard of 132 kV or above voltage class having at least two (2) bays which should have been in successful operation for a period of minimum 3 months.

SL. NO	SPECIFICATION REFERENCE				EXISTING SPECIFICATION	TO BE READ AS
	SEC/ PART	SUB SEC.	PAGE NO.	CLAUSE NO.		
					have been in successful operation for a period of minimum 3 months. NOTE: For the purpose of qualifying requirement, one no. of bay shall be considered as a bay comprising of Circuit Breakers (3 Phase), two disconnectors (3 Phase) and current transformers (3 Phase)	NOTE: 1. For the purpose of qualifying requirement, one no. of bay shall be considered as a bay comprising of Circuit Breakers (3 Phase), two disconnectors (3 Phase) and current transformers (3 Phase) 2. Bays executed in extension substation/switchyard shall also be considered.
EE 10					New Inclusion	Drawings of exiting switchyard 1. SLD 2. Sectional Layout 3. Trench Layout 4. Earthing layout Refer Annexure 01
EE 11					New Inclusion	Bay details for Point of interconnection Refer Annexure 02
EE 12	E				Tender SLD	Tender SLD Rev 1
EE 13	A	II	5 of 26	1.01.10	A dedicated building shall be provided to house the 33 kV pooling switchgear. In addition, a common control room building shall be provided for the BESS installation, which shall accommodate all LT panels Battery Management Systems (BMS) …….	A dedicated building shall be provided to house the 33 kV pooling switchgear. A common control room shall be provided for the BESS installation in the same or separate building, which shall accommodate all LT panels, DC system, Battery Management system…….
EE 14	A	II	5 of 26	1.01.11	…….. Additionally, OWS shall also be provided in Central Control Room (CCR), and switchyard to ensure reliable monitoring and control. control and relay panels associated with switchyard may	Additionally, OWS shall also be provided in Central Control Room (CCR), ~~and switchyard~~ to ensure reliable monitoring and control. control and relay panels associated with switchyard shall be kept in AC Kiosk~~/existing switchyard control room~~.

SL. NO	SPECIFICATION REFERENCE				EXISTING SPECIFICATION	TO BE READ AS
	SEC/ PART	SUB SEC.	PAGE NO.	CLAUSE NO.		
					be kept in AC Kiosk/existing switchyard control room.	
EE 15	A	II	8 of 26	2.01.00	4. Auxiliary transformer …… Auxiliary transformers may be fed from 33kV pooling switchgear or LV side of the Inverter Duty Transformer as per standard practice of the system Integrator……	4. Auxiliary transformer …… Auxiliary transformers shall be fed from 33kV pooling switchgear……
EE 16	A	II	9 of 26	2.01.00	6. Energy Management System ……..Protection, control, and SOE data for associated 400 kV/220/132/33 kV system shall be integrated with EMS of the system. Following minimum equipment shall be included for EMS interface:…….	……..Protection, control, and SOE data for associated 400 kV/220/132/33 kV system shall be integrated with the existing switchyard SAS system. Following minimum equipment shall be included for EMS interface:…….
EE 17	A	II	9 of 26	2.01.00	8. LT Switchgear for BESS Auxiliaries: ……The auxiliary power system shall be designed with adequate redundancy such that failure of any single BESS container/PCS shall not affect the continuity of auxiliary power supply…….	8. LT Switchgear for BESS Auxiliaries: ……The auxiliary power system shall be designed with adequate redundancy such that failure of any single equipment/system shall not affect the continuity of auxiliary power supply…….
EE 18	A	II	12 of 26	2.01.00	10 Switchgear /Numerical Relay Networking …….. The AC source for both Charger/UPS shall be wired to LT switchgear/ACDB which is under bidder's scope. All equipment's shall comply to relevant IEC/IS standards. For Bongaigaon TPP, separate 220V DC battery and Charger is to be provided which shall meet the load requirements of GIS switchyard also.	10 Switchgear /Numerical Relay Networking …….. The AC source for both Charger/UPS shall be wired to LT switchgear/ACDB which is under bidder's scope. All equipment's shall comply to relevant IEC/IS standards. ~~For Bongaigaon TPP, separate 220V DC battery and Charger is to be provided which shall meet the load requirements of GIS switchyard also.~~

SL. NO	SPECIFICATION REFERENCE				EXISTING SPECIFICATION	TO BE READ AS
	SEC/ PART	SUB SEC.	PAGE NO.	CLAUSE NO.		
EE 19	A	II	12 of 26	2.01.00	11 BESS SCADA System	Deleted
EE 20	A	II	16 of 26	2.01.00	21. Auxiliary building including Control Room: An common…… illumination Etc.	21. Auxiliary building including Control Room: A common…… illumination Etc. Bidder may choose to have an integrated building housing both 33kV pooling switchgear, Auxiliary systems and Control room.
EE 21	A	II	16 of 26	2.01.00	24. UPS and / or DC system …….. ……..voltage shall be 220V DC. For BESS project located with Bongaigaon TPP, where new 400kV GIS switchyard is envisaged, 220V DC system with backup of 3 hours is to be provided in line with the requirements of CEA technical standards for construction.	24. UPS and / or DC system …….. ……..voltage shall be 220V DC. ~~For BESS project located with Bongaigaon TPP, where new 400kV GIS switchyard is envisaged, 220V DC system with backup of 3 hours is to be provided in line with the requirements of CEA technical standards for construction.~~
EE 22	A	II	18 of 26	2.02.02(iii)	1 Kudgi STPP 240MW 480MWh 220kV 245kV, 1600Amp, 40kA	1 Kudgi STPP 240MW 480MWh 220kV 245kV, 1600Amp, 50kA
EE 23	A	II	18 of 26	2.02.02(iii)	Note#1 (Simhadri STPP-II): No switchyard is envisaged with Simhadri Stage-II Note#2 (Simhadri STPP-1): Complete DIA is to be provided under Simhadri Stage-I BESS package.	Deleted
EE 24	A	II	21 of 26	2.02.03	2. Cabling All control and fiber optic cabling within the switchyard and main plant—including interfaces between the switchgears, transformers, and switchyard for extended bays—shall be provided to realize the control and protection scheme.	2. Cabling All control and fiber optic cabling within the switchyard and BESS area—including interfaces between the switchgears, transformers, and switchyard for extended bays—shall be provided to realize the control and protection scheme.

SL. NO	SPECIFICATION REFERENCE				EXISTING SPECIFICATION	TO BE READ AS
	SEC/ PART	SUB SEC.	PAGE NO.	CLAUSE NO.		
EE 25	A	II	21 of 26	2.02.03	4. Space Provision Provision for all BCU/BPU, PMU and networking panels shall be kept in AC kiosk or Control room as per requirement.	4. Space Provision Provision for all BCU/BPU, PMU and networking panels shall be kept in AC kiosk ~~or Control room~~ as per requirement.
EE 26	A	II	7 of 26	2.01.00	2. Power Conversion System (PCS): ……..provided to prevent inadvertent operation in islanded mode.	2. Power Conversion System (PCS): ……..provided to prevent inadvertent operation in islanded mode. ACB shall be provided between PCS and IDT. PCS with inbuilt fixed type ACB shall also be accepted. PCS may be placed outdoor under shed as per OEM standard practice and equipment environmental capability.
EE-27	B	B-01	2 of 11	1.02.00	…….. fault level of 40kA for 132kV and 220kV system and 50kA for 400KV system.	…….. fault level of 40kA for 132kV and 50kA for 220kV system and 63kA for 400KV system.
EE 28	B	B-01	3 of 11	2.00.00	……. Electrical supply for Auxiliary Power Distribution may be taken from the 33kV pooling switchgear through suitably rated 33/0.433kV distribution transformers. Additionally bidder may also tap auxiliary supply from LV side of the Inverter duty transformer using adequately rated PCS voltage/0.433kV transformers subject to consent from PCS manufacturer. Both the schemes shall be acceptable ……	……. Electrical supply for Auxiliary Power Distribution may be taken from the 33kV pooling switchgear through suitably rated 33/0.433kV distribution transformers. ~~Additionally bidder may also tap auxiliary supply from LV side of the Inverter duty transformer using adequately rated PCS voltage/0.433kV transformers subject to consent from PCS manufacturer. Both the schemes shall be acceptable~~ ……
EE 29	B	B-01	4 of 11	3.03.00	Auxiliary Transformers Adequate number of auxiliary transformers shall be provided to meet the demand on 415V auxiliary supply system systems under most onerous conditions. Auxiliary transformers may	Auxiliary Transformers Adequate number of auxiliary transformers shall be provided to meet the demand on 415V auxiliary supply system systems under most onerous conditions. Auxiliary transformers shall be fed from 33kV pooling switchgear …….

SL. NO	SPECIFICATION REFERENCE				EXISTING SPECIFICATION	TO BE READ AS
	SEC/ PART	SUB SEC.	PAGE NO.	CLAUSE NO.		
					be fed from 33kV pooling switchgear or LV side of the Inverter Duty Transformer as per standard practice of the system Integrator…….	
EE 30	B	B-01	8 of 11	3.11.00	D.C. Systems for switchyard (applicable for Bongaigaon)	Deleted
EE-31	B	B-01	9 of 11	4.00.00	EHV cables and accessories ……..The cable screen shall be designed for solidly grounded system for the system fault level of 40kA for 1 sec. The BIL of the 132kV cable shall be 650 kVp.	EHV cables and accessories ……..The cable screen shall be designed for solidly grounded system for the system fault level of 40kA for 1 sec for 132kV and 50kA for 1 sec for 220kV. The BIL of the 132kV cable shall be 650 kVp and 220kV cable shall be 1050 kVp.
EE 32	B	B-02B	3 of 10	1.00.00	Note (common for Oil filled and dry type transformer): c) In case Ester Oil filled Transformers are offered, then 50% quantity shall be Natural ester filled and balance 50% quantity shall be of Synthetic Ester oil filled.	Note (common for Oil filled and dry type transformer): ~~c) In case Ester Oil filled Transformers are offered, then 50% quantity shall be Natural ester filled and balance 50% quantity shall be of Synthetic Ester oil filled.~~
EE 33	A	II	6 of 26	1.01.31	New Clause	PCS may be placed outdoor under shed as per OEM standard practice and equipment environmental capability. All other equipment/systems such as HT panel, UPS with Battery bank and auxiliary supply equipment etc. shall be placed indoor.

Location and Approach):

1. **Kudgi Super Thermal Power Station**

Thermal Project Location	Place: Kudgi, District: Bijapur, State: Karnataka
Latitude and Longitude of project:	16° 29′ 43″ (N), 75° 50′ 33″ (E)
Nearest Major Town & its distance from site	Bijapur, 50 KM approx.
Nearest Railway station & its distance from site	Kudgi, 7 KM approx.
Nearest Commercial Airport & its distance from site	Hubli Airport, 170 KM approx.
Proposed BESS Capacity	240 MW/ 480 MWh
Area **Identified**	~10 Acres
Location of BESS Plant	**The location for the BESS is proposed in between the following grids as shown in the layout plan**: **1100-1500N & 1200-1500E**
Approach to the area	The approach to the area will be provided from the existing available roads.
Foundations System	Open Foundations are proposed considering the geo-tech details of nearby areas.
Finished Ground level	RL (+) ~~580M~~ 583M

2. Mouda Super Thermal Power Station, Stage I & II

Thermal Project Location	Place: Mauda, District: Nagpur, State: Maharashtra
Latitude and Longitude of project:	21° 10' 50" (N), 79° 23' 52" (E)
Nearest Major Town & its distance from site	Mauda, 4 KM approx.
Nearest Railway station & its distance from site	Chacher, 8 KM approx.
Nearest Commercial Airport & its distance from site	Dr. Babasaheb Ambedkar International Airport, Nagpur 50 KM approx.
Proposed BESS Capacity	100 MW / 200MWh (for Mauda-I) 100 MW/ 200MWh (for Mauda-II)
Area Identified	~ 9 Acres
Location of BESS Plant	The area identified for installation of BESS I within the following grids: (a) 6200N-6600N (b) 5000E-5400E Within the identified area, approx. ~9 Acres land will be provided by owner based on the availability as per site condition.
Approach to the area	Approach to area to be provided from existing nearby road
Foundations System	Open Foundations are proposed considering the geo-tech details of nearby areas.
Finished Ground level	RL271M

3. Solapur Super Thermal Power Station

Thermal Project Location	Place: Fatatewadi and Aherwadi, District: Solapur, State: Maharashtra
Latitude and Longitude of project	17° 33′ 28″ (N), 75° 58′ 54″ (E)
Nearest Major Town & its distance from site	Solapur, 18 KM approx.
Nearest Railway station & its distance from site	Hotgi Junction, 2 KM approx.
Nearest Commercial Airport & its distance from site	Pune International Airport, 270 KM approx.
Proposed BESS Capacity	132MW / 264MWh
Area Identified	~7 Acres
Location of BESS Plant	In between 400N-800N and 1100E-1300E co-ordinates.
Approach to the area	Will be provided from the existing road along 1165E
Foundations System	Open Foundations are proposed considering the geo-tech details of nearby areas.
Finished Ground level	RL (+) 461.00M

4. Barh Super Thermal Power Station, Stage I & II

Thermal Project Location	Place: Barh, District: Barh, State: Bihar
Latitude and Longitude of project:	25° 29' 10"(N), 85° 45' 40"(E)
Nearest Major Town & its distance from site	Barh, 4 KM approx.
Nearest Railway station & its distance from site	Barh, 7 KM approx.
Nearest Commercial Airport & its distance from site	Jay Prakash Narayan International Airport, Patna 75 KM approx.
Proposed BESS Capacity	100 MW / 200MWh (for Barh-I) 100 MW/ 200MWh (for Barh-II)
Area Identified	~ 9 Acres
Location of BESS Plant	The proposed BESS plant is located adjoining the existing switchyard on East side in between the following co-ordinates: (c) 1000E-1200E (d) 100N-400S
Approach to the area	Approach to area to be provided from existing road along 1105E
Foundations System	In view of the filled-up area and available geo-tech details, piling is envisaged.
Finished Ground level	RL (+) 46.20M

5. Nabinagar Super Thermal Power Station, NPGCL

Thermal Project Location	Place: Barun, District: Aurangabad, State: Bihar
Latitude and Longitude of project:	24° 46′ 37″ (N), 84° 9′ 24.63″ (E)
Nearest Major Town & its distance from site	Aurangabad city, 55 KM approx.
Nearest Railway station & its distance from site	Ankorha, 1 KM approx.
Nearest Commercial Airport & its distance from site	Jay Prakash Narayan International Airport, Patna 150 KM approx.
Proposed BESS Capacity	200MW / 400MWh
Area Identified	~ 9 Acres
Location of BESS Plant	The location of BESS is within the Stage-II SWYD area on Southern side in between the following co-ordinates: (e) 1400E-1600E (f) 400N-600N
Approach to the area	Approach to area to be provided from existing road along 962N
Foundations System	Open Foundations are proposed considering the geo-tech details of nearby areas.
Finished Ground level	RL (+)121.20M

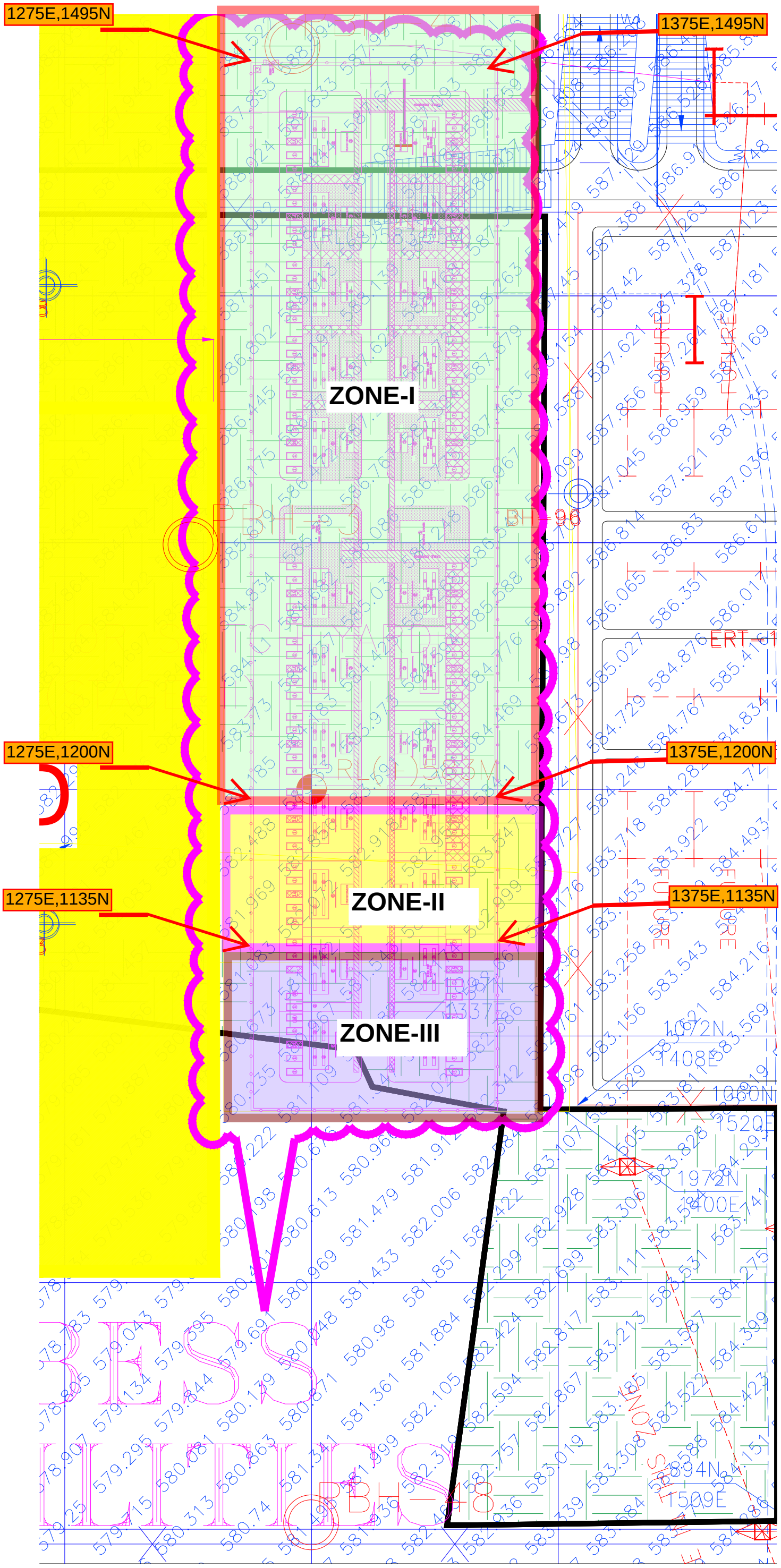
6. Simhadri Super Thermal Power Station, Stage I & II

Thermal Project Location	Place: Pittavanipalem, District: Anakapalli, State: Andhra Pradesh
Latitude and Longitude of project:	17° 36′ 7″(N), 83° 5′ 17.11″(E)
Nearest Major Town & its distance from site	Visakhapatnam, 25 KM approx.
Nearest Railway station & its distance from site	Duvvada, 20 KM approx..
Nearest Commercial Airport & its distance from site	Visakhapatnam International Airport 30 KM approx.
Proposed BESS Capacity	75MW / 150MWh (for Simhadri-I) 70MW / 140MWh (for Simhadri-II)
Area Requirement	~ 7.50 Acres
Location of BESS Plant	The proposed BESS plant is adjoining the existing switchyard on East side in between the following co-ordinates: (g) 2000W-2200W (h) 1400N-1600N
Approach to the area	Approach to area to be provided from existing road along 1408N
Foundations System	Open Foundations are proposed considering the geo-tech details of nearby areas.
Finished Ground level	RL (+) 8.50M- 9.0M

7. Ramagundam-III Super Thermal Power Station, Stage-III

Thermal Project Location	Place: Jyothinagar, District: Karimnagar, State: Telangana
Latitude and Longitude of project:	18°45′18″(N), 79°27′22″(E)
Nearest Major Town & its distance from site	Karimnagar, 60 KM approx.
Nearest Railway station & its distance from site	Ramagundam, 6 KM approx.
Nearest Commercial Airport & its distance from site	Rajiv Gandhi International Airport, Hyderabad 250 KM approx.
Proposed BESS Capacity	50MW / 100MWh (for Ramagundam St-III)
Area Identified	~ 3 Acres
Location of BESS Plant	The proposed BESS plant located adjoining the existing switchyard of St-I on East side in between the following co-ordinates: (a) 1400E-1600E (b) 400N-600N
Approach to the area	Approach to area to be provided from existing road along 356N
Foundations System	Open Foundations are proposed considering the geo-tech details of nearby areas.
Finished Ground level	RL (+) 153.50M

Appendix-A to Annexure-C (KUDGI)



Annexure-C (SOLAPUR) – R1

SOIL DATA AND FOUNDATION SYSTEM

Employer has carried out geotechnical investigation in the proposed area. Logs of boreholes of proposed area are enclosed with this Annexure.

a) The minimum founding level and the corresponding net allowable bearing pressure shall be as given in Table – 1 below

Table-1

Area	Founding RL	Net Allowable Bearing Pressure T/m2		
		Isolated and combined footings		Rafts (width > 6m)
		Width upto 3.0m	Width > 3.0m upto 6m	
ZONE-I	RL (+) 460.0 M	18	15	20
	RL (+) 459.5 M	25	25	25
ZONE-II	RL (+) 459.0 M	18	15	20
	RL (+) 458.5 M	25	25	25
ZONE-III	RL (+) 458.5 M	18	15	20
	RL (+) 458.0 M	25	25	25

For Finished ground level (FGL) refer General layout plan (GLP)

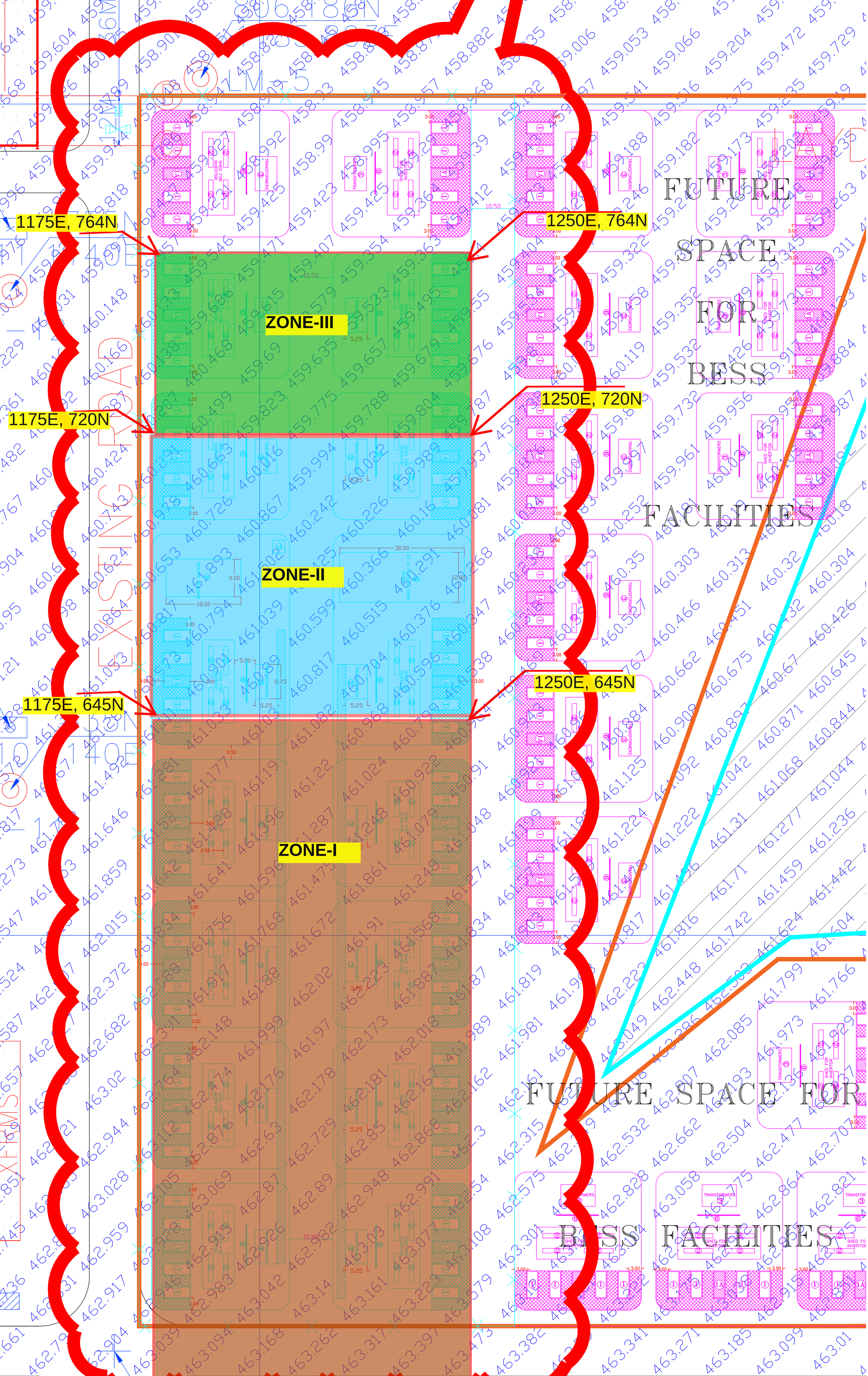
In case any loose/soft pockets is encountered at founding level, the same shall be removed completely upto the hard strata and filled up with PCC (1:4:8).

The net allowable bearing pressure higher than above-mentioned values shall not be permitted. At intermediate levels the bearing capacity shall be same as the net allowable bearing pressure corresponding to the immediate shallower level mentioned above.

For open foundations, the total permissible settlement shall be governed by IS: 1904 / IS: 13063 and from functional requirements whichever is more stringent. However, total settlement shall be restricted to the following:

Isolated & Strip	40 mm
Raft	75 mm
Foundations in Weathered rock / rock	12 mm

In case the total permissible settlement is to be restricted to less than as above specified from functional requirements, then the net allowable bearing pressure shall be reduced after review in consultation with Engineer.


1175E, 764N
1250E, 764N
ZONE-III
1175E, 720N
1250E, 720N
ZONE-II
1175E, 645N
1250E, 645N
ZONE-I
FUTURE SPACE FOR BESS FACILITIES
FUTURE SPACE FOR BESS FACILITIES
EXISTING XFRMS

GEOTECHNICAL INVESTIGATION FOR NTPC

SFE

DRILLING INFORMATION

Project: Geotechnical Investigation for Plant, Ash disposal area, Ash pipe corridor & Township, Solapur (STPP)

Borehole No : BH-17	GEOLOGICAL LOG OF DRILL HOLE	Page: 01 of 01
Bearing of Hole:		Feature:
Collar Elevation:	Location: Main Plant Area (Main Power Block)	Total Depth: 13.50m BGL
Type of Bit Used (with Depth) : Diamond Bit	Co-ordinates: 1105.87 E / 751.16 N	Water Table: 6.70m BGL
Casing depth (m) : 3.00m BGL	Angle with Horizontal: 90°	Type of Core Barrel Used: Double Tube
Job No. : 0931	Ground Elevation: 454.900m BGL	Type of Drilling: Rotary Drilling
Started: 30/05/2010	Completed: 31 / 05 / 2010	Drilling Agency : M/s Sohams Foundation Engg. Pvt. Ltd.

From	To	Date	Lithology Description	Log	No. of core pieces with Size > 10 cm	10 to 25 cm	25 to 75 cm	75 to 150 cm	>150 cm	Structural Conditions Log	Description	SPT No.	SPT Value 15	30	45	60	N	Sampling/ Test Run	Percent Core Recovery 0	20	40	60	80	100	RQD (%)	Run Length (m)	Casing (m)	Drill Water Loss No Partial 25	50	75	100	Colour of wash water	Wash Description	Special Observations & Interpretations
0.00	0.00																																	
	0.30		Fine to Medium grained Black Cotton Soil																															
0.00	1.00	30/5/10	Highly weathered rock (murum)																							1.00	Nx - Casing							
1.00	1.75				-	-	-	-	-			01	>100	-	-	-	R		27.00						Nil	0.75						Brownish Grey		
	1.95																																	
1.75	2.50		Fine to Medium grained highly jointed Fractured Highly Weathered Rock		-	-	-	-	-										29.00						Nil	0.75								
2.50	3.25				1	-	-	-	-										29.00						Nil	0.75								
3.25	4.00				5	1	-	-	-										30.00						Nil	0.75								
4.00	4.50				-	3	-	-	-										65.00						65.00	0.75								
	4.75																																	
4.75	5.50				2	3	-	-	-										87.00						60	0.75								
5.50	6.25		Fine to Medium grained Moderatly Weathered Basalt Rock		4	1	-	-	-										68.00						17.33	0.75								
	6.70				2	-	-	-	-										52.00						Nil	0.75								
6.25	7.00																																	
7.00	7.75				4	-	-	-	-										41.00						Nil	0.75								
7.75	8.50	31/5/10			3	1	-	-	-										80.00						16.00	0.75								
8.50	9.25		Fine to Medium grained Slightly Weathered Vesicular Rock.		1	4	-	-	-										87.00						82.67	0.75						Light Greyish		
9.25	10.00				5	3	-	-	-										92.00						58.64	0.75								
10.00	10.70				1	1	1	-	-										95.00						72.00	0.75								
10.75	11.50				3	4	-	-	-										97.00						77.33	0.75								
11.50	12.25				-	2	1	-	-										92.00						92.00	0.75								
12.25	13.00				-	-	1	-	-										100.00						67.00	0.75								
13.00	13.50				1	2	-	-	-										86.00						68.00	0.50								

GEOTECHNICAL INVESTIGATION FOR NTPC

SFE

DRILLING INFORMATION

Project: Geotechnical Investigation for Plant, Ash disposal area, Ash pipe corridor & Township, Solapur (STPP)

Borehole No : BH- 23	GEOLOGICAL LOG OF DRILL HOLE	Page: 01 of 02
Bearing of Hole:		Feature:
Collar Elevation:	Location: Main Plant Area (Main Power Block)	Total Depth: 18.50m BGL
Type of Bit Used (with Depth) : Diamond Bit	Co-ordinates: 1122.20 E / 670.37 N	Water Table: 7.90m BGL
Casing depth (m) : 2.50m BGL	Angle with Horizontal: 90°	Type of Core Barrel Used: Double Tube
Job No. : 0931	Ground Elevation: 462.141m BGL	Type of Drilling: Rotary Drilling
Started: 21 / 05 / 2010	Completed: 23/05/ 2010	Drilling Agency :. M/s Sohams Foundation Engg. Pvt. Ltd.

From	To	Date	Lithology: Description	Log	No. of core pieces with Size: < 10 cm	10 to 25 cm	25 to 75 cm	75 to 150 cm	>150 cm	Structural Conditions: Log	Description	SPT: SPT No.	SPT Value					Sampling/ Test Run	Percent Core Recovery: 0	20	40	60	80	100	RQD (%)	Run Length (m)	Casing (m)	Drill Water Loss: No	Partial	25	50	75	100	Colour of wash water	Wash Description	Special Observations & Interpretations
0.00	0.00												15	30	45	60	N																			
	0.50	21/ 05/10	Fine to Medium grained Black Cotton Soil																								Nx - Casing									
0.00	1.00		Highly weathered rock (murum)																						Nil	1.00										
	1.39											1	25	44	66	-	R																			
1.00	1.75																								Nil	0.75										
												>100	-	-	-	-	R																			
1.75	2.50		Fine to Medium grained light greyish Highly		-	-	1	-	-										46						Nil	0.75								yellow		
2.50	3.25		Weathered Rock		-	-	1	-	-										40						Nil	0.75										
3.25	4.00				5	1	-	-	-										78						32.00	0.75										
4.00	4.75				9	-	1	-	-										89						36.00	0.75								Light grey		
4.75	5.50				2	2	-	-	-										45						Nil	0.75										
5.50	6.25				9	-	-	-	-										53						Nil	0.75										
6.25	7.00		Fine to Medium grained Moderatly Jointed Fractured Moderately Weathered Vesicular Basalt Rock.		9	1	-	-	-										46						Nil	0.75										
7.00	7.75				11	-	-	-	-										69						Nil	0.75										
	7.90																																			
7.75	8.50				11	-	-	-	-										66						Nil	0.75										
8.50	9.25				6	1	-	-	-										61						Nil	0.75										
9.25	10.00				9	-	-	-	-										48						Nil	0.75										
10.00	10.75				7	2	-	-	-										84						26.33	0.75										
10.75	11.50				8	-	-	-	-										61						Nil	0.75								Greyish		
11.50	12.25				12	-	-	-	-										53						Nil	0.75										
12.25	13.00				6	-	-	-	-										40						53.33	0.75										
13.00	13.75				7	-	-	-	-										38						Nil	0.75										
13.75	14.50				6	2	-	-	-										65						17.33	0.75										

GEOTECHNICAL INVESTIGATION FOR NTPC

SFE

DRILLING INFORMATION

Project: Geotechnical Investigation for Plant, Ash disposal area, Ash pipe corridor & Township, Solapur (STPP)

Borehole No : BH- 23	GEOLOGICAL LOG OF DRILL HOLE	Page: 01 of 02
Bearing of Hole:		Feature:
Collar Elevation:	Location: Main Plant Area (Main Power Block)	Total Depth: 18.50m BGL
Type of Bit Used (with Depth) : Diamond Bit	Co-ordinates: 1122.20 E / 670.37 N	Water Table: 7.90m BGL
Casing depth (m) : 2.50m BGL	Angle with Horizontal: 90°	Type of Core Barrel Used: Double Tube
Job No. : 0931	Ground Elevation: 462.141m BGL	Type of Drilling: Rotary Drilling
Started: 21 / 05 / 2010	Completed: 23/05/ 2010	Drilling Agency :. M/s Sohams Foundation Engg. Pvt. Ltd.

From	To	Date	Lithology: Description	Lithology: Log	No. of core pieces with Size: < 10 cm	10 to 25 cm	25 to 75 cm	75 to 150 cm	>150 cm	Structural Conditions: Log	Structural Conditions: Description	SPT: SPT No.	SPT Value: 15	30	45	60	N	Sampling/ Test Run	Percent Core Recovery: 0	20	40	60	80	100	RQD (%)	Run Length (m)	Casing (m)	Drill Water Loss: No Partial: 25	50	75	100	Colour of wash water	Wash Description	Special Observations & Interpretations
13.75	14.50		Fine to Medium grained Moderatly Jointed Fractured Moderately Weathered Vesicular Basalt Rock.		6	2	-	-	-												65				17.33	0.75		Nil	Nil	Nil	Nil	Black Greyish		
14.50	15.25				4	3	-	-	-												89				50.66	0.75								
15.25	16.00		Light Gryeish to Black Gryeish Slightly Weathered Vesicular Basalt Rock.		-	-	-	1	-												100				100.00	0.75								
16.00	17.50				-	6	1	-	-												99				99.00	1.50								
17.50	18.50				1	4	-	-	-												85				77.00	1.00								

GEOTECHNICAL INVESTIGATION FOR NTPC

SFE

DRILLING INFORMATION

Project: Geotechnical Investigation for Plant, Ash disposal area, Ash pipe corridor & Township, Solapur (STPP)

Borehole No : BH - 30	GEOLOGICAL LOG OF DRILL HOLE	Page: 01 of 02
Bearing of Hole:		Feature:
Collar Elevation:	Location: Main Plant Area (Main Power Block)	Total Depth: 18.75m BGL
Type of Bit Used (with Depth) : Diamond Bit	Co-ordinates:1128.60 E / 858.00 N	Water Table: 6.50m BGL
Casing depth (m) : 2.50m BGL	Angle with Horizontal: 90°	Type of Core Barrel Used: Double Tube
Job No. : 0931	Ground Elevation: 454.910m BGL	Type of Drilling: Rotary Drilling
Started: 20 / 05 / 2010	Completed: 24/05/2010	Drilling Agency :. M/s Sohams Foundation Engg. Pvt. Ltd.

From	To	Date	Lithology: Description	Log	No. of core pieces with Size: < 10 cm	10 to 25 cm	25 to 75 cm	75 to 150 cm	>150 cm	Structural Conditions: Log	Description	SPT: SPT No.	SPT Value: 15	30	45	60	N	Sampling/ Test Run	Percent Core Recovery: 0	20	40	60	80	100	RQD (%)	Run Length (m)	Casing (m)	Drill Water Loss: No Partial 25	50	75	100	Colour of wash water	Wash Description	Special Observations & Interpretations
0.00	0.00																																	
	0.30		Fine to Medium grained Black Cotton Soil																															
0.00	1.00		Highly weathered rock (murum)																30						Nil	1.00								
	1.39																																	
1.00	1.75																		33						Nil	0.75								
1.75	2.50																		33						Nil	0.75								
2.50	3.25				7	-	-	-	-										61						61.00	0.75								
3.25	4.00				4	1	-	-	-										63						13.33	0.75								
4.00	4.75		Ashay grey coloured Fine to Medium grained Highly Weathered Rock		3	-	-	-	-										73						Nil	0.75								
4.75	5.50				4	-	-	-	-										53						Nil	0.75								
5.50	6.25				4	1	-	-	-										61						16.00	0.75								
	6.50																																	
6.25	7.00				8	-	-	-	-										83						Nil	0.75								
7.00	7.75				11	-	-	-	-										73						Nil	0.75								
7.75	8.50				5	3	-	-	-										96						49.33	0.75								
8.50	9.25				6	1	-	-	-										83						38.67	0.75								
9.25	10.00		Light grey to Dark grey coloured Fine to Medium grained, Moderately Weathered Vesicular Basalt Rock		8	-	-	-	-										69						Nil	0.75								
10.00	10.75				4	2	-	-	-										68						26.67	0.75								
10.75	11.50				3	3	-	-	-										93						68.00	0.75								
11.50	12.25				7	-	-	-	-										81						13.33	0.75								
12.25	13.00				5	2	-	-	-										70						36.00	0.75								
13.00	13.75				3	2	-	-	-										73						13.33	0.75								
13.75	14.00				1	3	-	-	-										88						66.66	0.75								

GEOTECHNICAL INVESTIGATION FOR NTPC

SFE

DRILLING INFORMATION

Project: Geotechnical Investigation for Plant, Ash disposal area, Ash pipe corridor & Township, Solapur (STPP)

Borehole No : BH - 30	GEOLOGICAL LOG OF DRILL HOLE	Page: 02 of 02
Bearing of Hole:		Feature:
Collar Elevation:	Location: Main Plant Area (Main Power Block)	Total Depth: 18.75m BGL
Type of Bit Used (with Depth) : Diamond Bit	Co-ordinates:1128.60 E / 858.00 N	Water Table: 6.50m BGL
Casing depth (m) : 2.50m BGL	Angle with Horizontal: 90°	Type of Core Barrel Used: Double Tube
Job No. : 0931	Ground Elevation: 454.910m BGL	Type of Drilling: Rotary Drilling
Started: 20 / 05 / 2010	Completed: 24/05/2010	Drilling Agency :. M/s Sohams Foundation Engg. Pvt. Ltd.

From	To	Date	Lithology: Description	Lithology: Log	No. of core pieces with Size: < 10 cm	10 to 25 cm	25 to 75 cm	75 to 150 cm	>150 cm	Structural Conditions: Log	Structural Conditions: Description	SPT: SPT No.	SPT Value: 15	30	45	60	N	Sampling/ Test Run	Percent Core Recovery: 0 20 40 60 80 100	RQD (%)	Run Length (m)	Casing (m)	Drill Water Loss: No Partial 25	50	75	100	Colour of wash water	Wash Description	Special Observations & Interpretations
13.75	14.00																												
14.00	14.50		Fine to Medium dark greyish moderatly Weathered Rock		1	3	-	-	-										88	66.66	0.75								
14.50	15.25				2	3	-	-	-										80	50.67	0.75								
15.25	16.00				1	3	-	-	-										68	58.67	0.75								
	16.20																												
16.00	16.75		Fine to Medium dark greyish to Black greyish fractured Slightly Weathered , Vesicular Basalt Rock		2	-	1	-	-										88	69.33	0.75								
16.75	17.50				-	1	1	-	-										87	86.67	0.75								
17.50	18.25				2	-	2	-	-										93	84.00	0.75								
18.25	18.75				1	3	-	-	-										100	84.00	0.50								

GEOTECHNICAL INVESTIGATION FOR NTPC

SFE

DRILLING INFORMATION

Project: Geotechnical Investigation for Plant, Ash disposal area, Ash pipe corridor & Township, Solapur (STPP)

Borehole No : BH- 97	GEOLOGICAL LOG OF DRILL HOLE	Page: 01 of 02
Bearing of Hole:		Feature:
Collar Elevation:	Location: Main Plant Area (Main Power Block)	Total Depth: .19.50m BGL
Type of Bit Used (with Depth) : Diamond Bit	Co-ordinates: 1102.52 E / 701.41 N	Water Table:7.10m BGL
Casing depth (m) : 3.25m BGL	Angle with Horizontal: 90°	Type of Core Barrel Used: Double Tube
Job No. : 0931	Ground Elevation: 461.009m BGL	Type of Drilling: Rotary Drilling
Started: 19/4/ 2010	Completed: 22 / 04 / 2010	Drilling Agency : M/s Sohams Foundation Engg. Pvt. Ltd.

From	To	Date	Lithology: Description	Log	No. of core pieces with Size: < 10 cm	10 to 25 cm	25 to 75 cm	75 to 150 cm	>150 cm	Structural Conditions: Log	Description	SPT: SPT No.	SPT Value					Sampling/ Test Run	Percent Core Recovery: 0	20	40	60	80	100	RQD (%)	Run Length (m)	Casing (m)	Drill Water Loss: No Partial 25	50	75	100	Colour of wash water	Wash Description	Special Observations & Interpretations
0.00	0.00												15	30	45	60	N																	
	0.40	19/04/2010	Fine to Medium grained Black Cotton Soil																															
0.00	1.00		Highly weathered rock (murum)																							1.00	Nx - Casing					Blrownish Grey		
	1.25											01	58	>100	-	-	>100									0.75								
1.00	1.75		Grey coloured Fine to medium grained Highly Fractured jointed Highly weathered rock																															
1.75	2.50											02	>100	-	-	-	>100									0.75								
2.50	3.25											03	>100	-	-	-	>100									0.75		Nil	Nil	Nil	Nil			
3.25	4.00				4	-	-	-	-			04	>100	-	-	-	>100		40						Nil	0.75								
4.00	4.75				4	-	-	-	-										39						Nil	0.75								
4.75	5.50				1	1	-	-	-										39						22.00	0.75								
5.50	6.25				3	-	-	-	-										47						Nil	0.75								
6.25	7.00				3	1	-	-	-										72						20.00	0.75								
	7.10																																	
7.00	7.75				3	1	-	-	-										52						24.00	0.75								
7.75	8.50				1	1	-	-	-										42						37.30	0.75								
8.50	9.25				3	1	-	-	-										35						16.00	0.75								
9.25	10.00				3	1	-	-	-										33						13.30	0.75								
10.00	10.75				4	1	-	-	-										49						14.60	0.75					Light Greyish		
10.75	11.40		Grey colored Fine to medium grained fractured, jointed moderately weathered vesicular basalt		5	-	-	-	-										43						Nil	0.75								
11.50	12.25				3	-	1	-	-										57						34.70	0.75								
12.25	13.0				8	-	-	-	-										60						Nil	0.75								
13.00	13.75				12	-	-	-	-										68						Nil	0.75								
13.75	14.50				13	-	-	-	-										93						Nil	0.75								

GEOTECHNICAL INVESTIGATION FOR NTPC

SFE

DRILLING INFORMATION

Project: Geotechnical Investigation for Plant, Ash disposal area, Ash pipe corridor & Township, Solapur (STPP)

Borehole No : BH- 97	GEOLOGICAL LOG OF DRILL HOLE	Page: 02 of 02
Bearing of Hole:		Feature:
Collar Elevation:	Location: Main Plant Area (Main Power Block)	Total Depth: .19.50m BGL
Type of Bit Used (with Depth) : Diamond Bit	Co-ordinates: 1102.52 E / 701.41 N	Water Table:7.10m BGL
Casing depth (m) : 3.25m BGL	Angle with Horizontal: 90°	Type of Core Barrel Used: Double Tube
Job No. : 0931	Ground Elevation: 461.009m BGL	Type of Drilling: Rotary Drilling
Started: 19/4/ 2010	Completed: 22 / 04 / 2010	Drilling Agency : M/s Sohams Foundation Engg. Pvt. Ltd.

From	To	Date	Lithology: Description	Lithology: Log	No. of core pieces with Size: < 10 cm	10 to 25 cm	25 to 75 cm	75 to 150 cm	>150 cm	Structural Conditions: Log	Structural Conditions: Description	SPT: SPT No.	SPT Value					Sampling/ Test Run	Percent Core Recovery: 0	20	40	60	80	100	RQD (%)	Run Length (m)	Casing (m)	Drill Water Loss: No Partial: 25	50	75	100	Colour of wash water	Wash Description	Special Observations & Interpretations
13.75	13.75												15	30	45	60	N																	
13.75	14.50		Moderately weathered vesicular basalt		13	-	-	-	-										93.00						Nil	0.75								
14.50	15.25		Fine to medium grained Slightly weathered basalt rock		2	1	1	-	-										96.00						82.60	0.75								
15.25	16.75				-	3	2	-	-										95.00						95.00	1.50								
16.75	18.25				1	1	1	1	-										100						94.00	1.50								
18.25	18.75				-	1	1	-	-										100						100	0.50								
18.75	19.50				2	1	1	-	-										92						73.30	0.75								

Annexure-C (MOUDA-I &II)-R1

SOIL DATA AND FOUNDATION SYSTEM

Employer has carried out geotechnical investigation in the proposed area. Logs of boreholes of proposed area are enclosed with this Annexure.

a) The minimum founding level and the corresponding net allowable bearing pressure shall be as given in Table – 1 below

Table-1

Founding RL	Net Allowable Bearing Pressure T/m2		
	Isolated and combined footings		Rafts (width > 6m)
	Width upto 3.0m	Width > 3.0m upto 6m	
2.0 m below NGL	9	7	10
3.0 m below NGL	14	12	15
4.0 m below NGL	17	15	18
5.0 m below NGL	20	18	22

For Finished ground level (FGL) refer General layout plan (GLP).

For variation in Natural Ground Level (NGL) bidder may refer APPENDIX-I.

As per topographical survey drawing, Natural ground level at proposed location varies from RL (+) 268.3 M to RL (+)270.7 M.

In case any loose/soft pockets is encountered at founding level, the same shall be removed completely upto the hard strata and filled up with PCC (1:4:8).

The net allowable bearing pressure higher than above mentioned values shall not be permitted. At intermediate levels the bearing capacity shall be same as the net allowable bearing pressure corresponding to the immediate shallower level mentioned above.

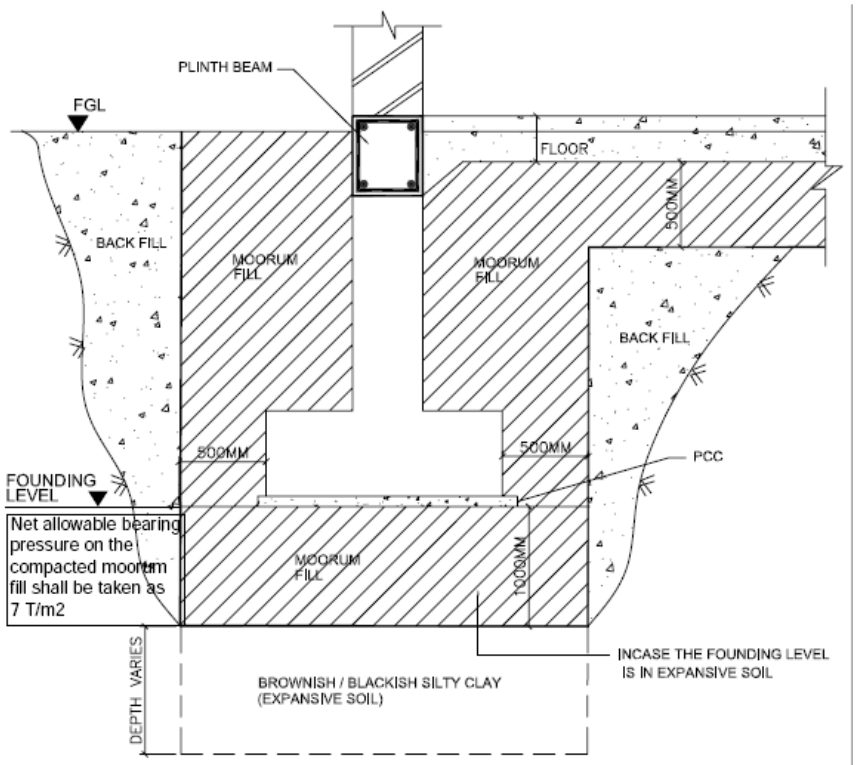
For open foundations, the total permissible settlement shall be governed by IS: 1904 / IS: 13063 and from functional requirements whichever is more stringent. However, total settlement shall be restricted to the following:

Isolated & Strip	40 mm
Raft	75 mm

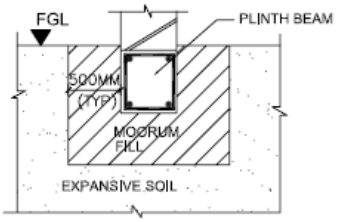
In case the total permissible settlement is to be restricted to less than as above specified from functional requirements, then the net allowable bearing pressure shall be reduced after review in consultation with Engineer.

b) In any case, black cotton soil shall not be used in back filling without providing cushion of non-expansive cohesive soil/moorum around the footings as per the sketch below. In case of roads in the area of black cotton soil, minimum 0.4m moorum shall be provided.

TECHNICAL REQUIREMENTS



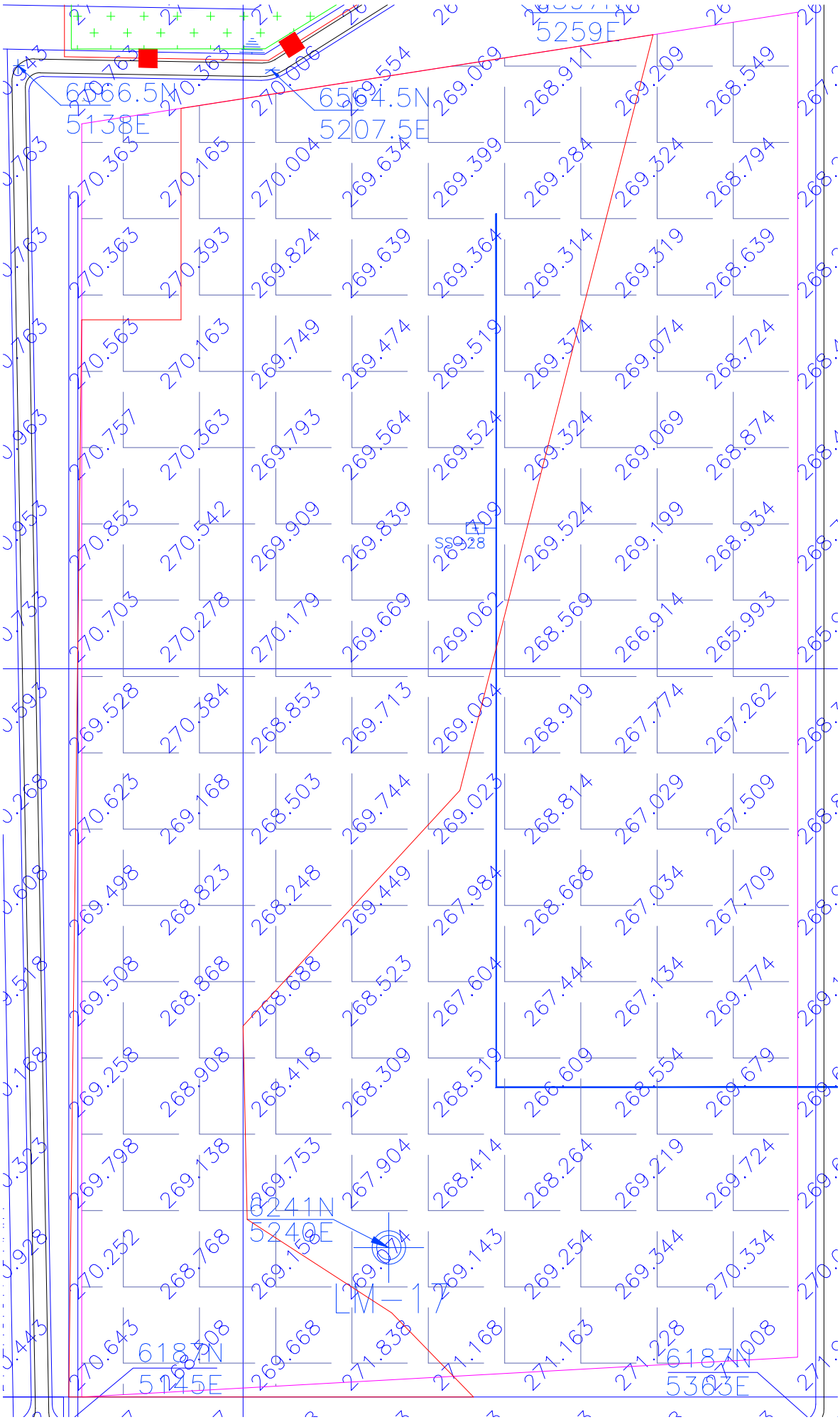
TYP. ARRANGEMENT OF FOOTING & FLOOR ON COMPACTED MOORUM ON EXPANSIVE SOIL



MOORUM FILLING BELOW & AROUND PLINTH BEAM

DRG. NOT TO SCALE

APPENDIX-I



5259E
6566.5N
5138E
6564.5N
5207.5E
6241N
5240E
LM-17
6187N
5145E
6187N
5363E

Table . No- 28

SITE : Detailed Geo-technical Investigation of Mouda TPP Stage - II (2 x 660 MW)										BORE HOLE N0.		**28**
							C.I.		N-6227.430	R. L.	G. W. L.
CLIENT:	**NTPC Limited**						271.185		E-5640.800	270.885	9.00 m
CASING	: -	100/150 mm	**Location: WTP Area**						Date Start :-		26.04.2010
BORING METHOD : -			ROTARY / DIAMOND						Date End :-		11.05.2010

Depth (m)	Casing (m)	Thick-ness (m)	Log	Soil/Rock Discription	Sample No.	Sample Depth (m)	SPT 15	SPT 30	SPT 45	N Value	Core Recovery %	RQD %
							Core Recovery 25	50	75	100		
0.0												
		2.00		Black Cotton Soil	DS-1	0.10-0.30						
1.0												
2.0					SPT-1	1.50-1.95	4	6	12	N=18		
3.0												
					UDS-1	3.00-3.45						
4.0												
5.0					SPT-2	4.50-4.95	8	10	15	N=25		
6.0												
		13.00		Yellowish Brown Silty Clay	UDS-2	6.00-6.45						
7.0												
8.0					SPT-3	7.50-7.95	10	14	18	N=32		
9.0												
					UDS-3	9.00-9.45						
10.0												
11.0	25.00				SPT-4	10.50-10.95	14	18	22	N=40		
12.0												
					UDS-4	12.00-12.45						
13.0												
14.0					SPT-5	13.50-13.95	18	20	26	N=46		
15.0												
					SPT-6	15.00-15.45	22	26	35	N=61		
16.0												
17.0					SPT-7	16.50-16.95	26	30	38	N=68		
18.0												
					SPT-8	18.00-18.45	30	34	43	N=77		
19.0		10.00		Yellowish Brown Kanker								
20.0					SPT-9	19.50-19.95	34	39	48	N=87		
21.0												
					SPT-10	21.00-21.45	39	45	53	N=98		
22.0												
23.0					SPT-11	22.50-22.95	45	52	58	N>100		
24.0												
					SPT-12	24.00-24.45	48	55	65	N>100		
25.0					SPT-13	24.50-24.95	60	75	100	N>100		
26.0												
27.0												
			Borehole terminated at a depth of 25.00 m below G.L.									
28.0												

DS	Disturbed Sample	WS	Wash Sample	X -- Y	Rock Piece No.
UDS	Undisturbed Sample	SPT	Standard Penetration Test	sp	Small Pieces

Table . No- 31

SITE : Detailed Geo-technical Investigation of Mouda TPP Stage - II (2 x 660 MW)			BORE HOLE N0.		**31**
		C.I.	N-6445.95	R. L.	G. W. L.
CLIENT:	**NTPC Limited**	268.945	E-5572.38	268.645	5.00 m
CASING : -	100/150 mm **Location: CW Area**		Date Start :-		20.11.2010
BORING METHOD : -	ROTARY / DIAMOND		Date End :-		22.11.2010

Depth (m)	Casing (m)	Thick-ness (m)	Log	Soil/Rock Discription	Sample No.	Sample Depth (m)	SPT 15	SPT 30	SPT 45	N Value	Core Recovery %	RQD %
							Core Recovery 25	50	75	100		
0.0												
		1.80		Black Cotton Soil	DS-1	0.10-0.30						
1.0												
2.0					SPT-1	1.50-1.95	2	3	5	N=8		
3.0												
					UDS-1	3.00-3.45						
4.0												
5.0		8.70		Yellowish Brown Silty Clay	SPT-2	4.50-4.95	5	8	10	N=18		
6.0												
					UDS-2	6.00-6.45						
7.0												
8.0					SPT-3	7.50-7.95	8	12	16	N=28		
9.0												
	18.10				UDS-3	9.00-9.45						
10.0												
11.0					SPT-4	10.50-10.95	11	18	29	N=47		
12.0												
					SPT-5	12.00-12.45	16	20	31	N=51		
13.0												
14.0		7.60		Yellowish Brown Kanker	SPT-6	13.50-13.95	19	22	33	N=55		
15.0												
					SPT-7	15.00-15.45	23	25	35	N=60		
16.0												
17.0					SPT-8	16.50-16.95	24	28	37	N=65		
18.0					SPT-9	18.00-18.10	100			N>100		
					sp	18.10-18.85					21.33	NIL
19.0												
					1--7	18.85-19.60					24.00	NIL
20.0												
					8--13	19.60-20.35					20.00	NIL
21.0					14--19	20.35-21.10					26.67	NIL
		6.90		Light Olive Gray Weathered								
22.0				Granitic Schist Rock	20--24	21.10-21.85					30.67	NIL
					25--29	21.85-22.60					33.33	NIL
23.0												
					30--34	22.60-23.35					37.33	NIL
24.0					35--38	23.35-24.10					41.33	21.33
					39--42	24.10-24.85					46.67	16.00
25.0					43	24.85-25.00					73.33	73.33
26.0												
27.0												
				Borehole terminated at a depth of 25.00 m below G.L.								
28.0												

DS	Disturbed Sample	WS	Wash Sample	X -- Y	Rock Piece No.
UDS	Undisturbed Sample	SPT	Standard Penetration Test	sp	Small Pieces

Table . No- 32

SITE : Detailed Geo-technical Investigation of Mouda TPP Stage - II (2 x 660 MW)										BORE HOLE N0.		**32**
							C.I.		N-6373.890	R. L.	G. W. L.
CLIENT:	**NTPC Limited**						269.880		E-5572.740	269.580	5.00 m
CASING	: -	100/150 mm	**Location: CW Area**						Date Start :-		27.04.2010
BORING METHOD : -			ROTARY / DIAMOND						Date End :-		06.05.2010

Depth (m)	Casing (m)	Thick-ness (m)	Log	Soil/Rock Discription	Sample No.	Sample Depth (m)	SPT 15	SPT 30	SPT 45	N Value	Core Recovery %	RQD %
							Core Recovery 25	50	75	100		
0.0												
		1.75		Black Cotton Soil	DS-1	0.10-0.30						
1.0												
2.0					SPT-1	1.50-1.95	2	4	6	N=10		
3.0												
					UDS-1	3.00-3.45						
4.0												
		8.75		Yellowish Brown Silty Clay								
5.0					SPT-2	4.50-4.95	6	9	12	N=21		
6.0												
					UDS-2	6.00-6.45						
7.0												
8.0	18.50				SPT-3	7.50-7.95	8	12	18	N=30		
9.0												
					UDS-3	9.00-9.45						
10.0												
11.0					SPT-4	10.50-10.95	35	42	54	N=96		
12.0												
					UDS-4	12.00-12.45						
13.0												
14.0		8.00		Yellowish Brown Kanker	SPT-5	13.50-13.95	40	59	65	N>100		
15.0												
					SPT-6	15.00-15.45	42	60	67	N>100		
16.0												
17.0					SPT-7	16.50-16.95	44	64	70	N>100		
18.0												
					SPT-8	18.00-18.45	48	60	78	N>100		
19.0					1--4	18.50-19.25					26.67	NIL
20.0					5--10	19.25-20.00					29.33	NIL
					11--16	20.00-20.75					32.00	NIL
21.0												
		6.50		Light Olive Gray Weathered	17--21	20.75-21.50					33.33	NIL
22.0				Granitic Schist Rock	22--26	21.50-22.25					38.67	NIL
23.0					27--31	22.25-23.00					44.00	NIL
					32--37	23.00-23.75					48.00	NIL
24.0												
					38--45	23.75-24.50					58.67	NIL
25.0					46--48	24.50-25.00					58.00	40.00
26.0												
27.0												
				Borehole terminated at a depth of 25.00 m below G.L.								
28.0												

DS	Disturbed Sample	WS	Wash Sample	X -- Y	Rock Piece No.
UDS	Undisturbed Sample	SPT	Standard Penetration Test	sp	Small Pieces

Table . No- 33

SITE : Detailed Geo-technical Investigation of Mouda TPP Stage - II (2 x 660 MW)			BORE HOLE N0.		**33**
		C.I.	N-6321.140	R. L.	G. W. L.
CLIENT:	**NTPC Limited**	270.170	E-5594.820	269.870	5.00 m
CASING	: - 100/150 mm **Location: CW Area**		Date Start :-		26.04.2010
BORING METHOD : -	ROTARY / DIAMOND		Date End :-		30.04.2010

Depth (m)	Casing (m)	Thick-ness (m)	Log	Soil/Rock Discription	Sample No.	Sample Depth (m)	SPT 15	SPT 30	SPT 45	N Value	Core Recovery %	RQD %
							Core Recovery 25	50	75	100		
0.0												
		1.50		Black Cotton Soil	DS-1	0.10-0.30						
1.0												
2.0					SPT-1	1.50-1.95	3	5	7	N=12		
3.0												
					UDS-1	3.00-3.45						
4.0		6.00		Yellowish Brown Silty Clay								
5.0					SPT-2	4.50-4.95	11	13	18	N=31		
6.0												
					UDS-2	6.00-6.45						
7.0												
8.0					SPT-3	7.50-7.95	13	15	50	N=65		
9.0	21.25											
					UDS-3	9.00-9.45						
10.0												
11.0					SPT-4	10.50-10.95	22	26	48	N=74		
12.0												
					UDS-4	12.00-12.45						
13.0												
14.0					SPT-5	13.50-13.75	64	100	-	N>100		
		13.75		Yellowish Brown Kanker								
15.0												
					SPT-6	15.00-15.22	48	100	-	N>100		
16.0												
17.0					SPT-7	16.50-16.63	100	-	-	N>100		
18.0												
					SPT-8	18.00-18.09	100	-	-	N>100		
19.0												
20.0					SPT-9	19.50-19.55	100	-	-	N>100		
21.0												
					SPT-10	21.00-21.02	100	-	-	N>100		
22.0					1--3	21.25-22.00					26.67	NIL
					4--9	22.00-22.75					33.33	NIL
23.0		3.75		Light Olive Gray Weathered								
				Granitic Schist Rock	10--14	22.75-23.50					33.33	NIL
24.0					15--17	23.50-24.25					37.33	22.67
25.0					18--22	24.25-25.00					45.33	13.33
26.0												
27.0												
				Borehole terminated at a depth of 25.00 m below G.L.								
28.0												

DS	Disturbed Sample	WS	Wash Sample	X -- Y	Rock Piece No.
UDS	Undisturbed Sample	SPT	Standard Penetration Test	sp	Small Pieces

ANNEXURE 01

KUDGI

220 kV CURRENT TRANSFORMER (1600A) CORE DETAILS :
(120% EXTENDED RATING)

CORE NO	APPLICATION	CURRENT RATIO	OUTPUT BURDEN(VA)	ACCURACY CLASS	MIN. KNEE POINT VOLT. (V)	MAX. CT S.W.R (ohm)	MAX. EXCITING CURRENT AT KPV (mA)
01	BUS DIFFERENTIAL CHECK	1600 / 800 / 1	-	PS	1600 / 800	8/ 4	30 on 1600/1 TAP 60 on 800/1 TAP
02	BUS DIFFERENTIAL MAIN	1600 / 800 / 1	-	PS	1600 / 800	8/ 4	30 on 1600/1 TAP 60 on 800/1 TAP
03	METERING AND SYNCHRONISING	1600 / 800 / 400 / 200 / 1	20 20 20 20	0.2S	-	-	-
04	TRAFO, BACKUP / LINE PROTECTION	1600 / 800 / 400 / 200 / 1	-	PS	3200 / 1600 / 800 / 400	8/ 4/ 2/ 1	30 on 1600/1 TAP 60 on 800/1 TAP 120 on 400/1 TAP 240 on 200/1 TAP
05	TRAFO, DIFF. / LINE PROTECTION	1600 / 800 / 400 / 200 / 1	-	PS	3200 / 1600 / 800 / 400	8/ 4/ 2/ 1	30 on 1600/1 TAP 60 on 800/1 TAP 120 on 400/1 TAP 240 on 200/1 TAP

220 kV CURRENT TRANSFORMER (2500A) CORE DETAILS :
(120% EXTENDED RATING)

CORE NO	APPLICATION	CURRENT RATIO	OUTPUT BURDEN(VA)	ACCURACY CLASS	MIN. KNEE POINT VOLT. (V)	MAX. CT S.W.R (ohm)	MAX. EXCITING CURRENT AT KPV (mA)
01	BUS DIFFERENTIAL CHECK	2500 / 1250 / 1	-	PS	2500 / 1250	12.5/ 6.25	30 on 2500/1 TAP 60 on 1250/1 TAP
02	BUS DIFFERENTIAL MAIN	2500 / 1250 / 1	-	PS	2500 / 1250	12.5/ 6.25	30 on 2500/1 TAP 60 on 1250/1 TAP
03	METERING AND SYNCHRONISING	2500 / 1250 / 1	20 20	0.2S	-	-	-
04	TRAFO, BACKUP / LINE PROTECTION	2500 / 1250 / 1	-	PS	2500 / 1250	12.5/ 6.25	30 on 2500/1 TAP 60 on 1250/1 TAP
05	TRAFO, DIFF. / LINE PROTECTION	2500 / 1250 / 1	-	PS	2500 / 1250	12.5/ 6.25	30 on 2500/1 TAP 60 on 1250/1 TAP

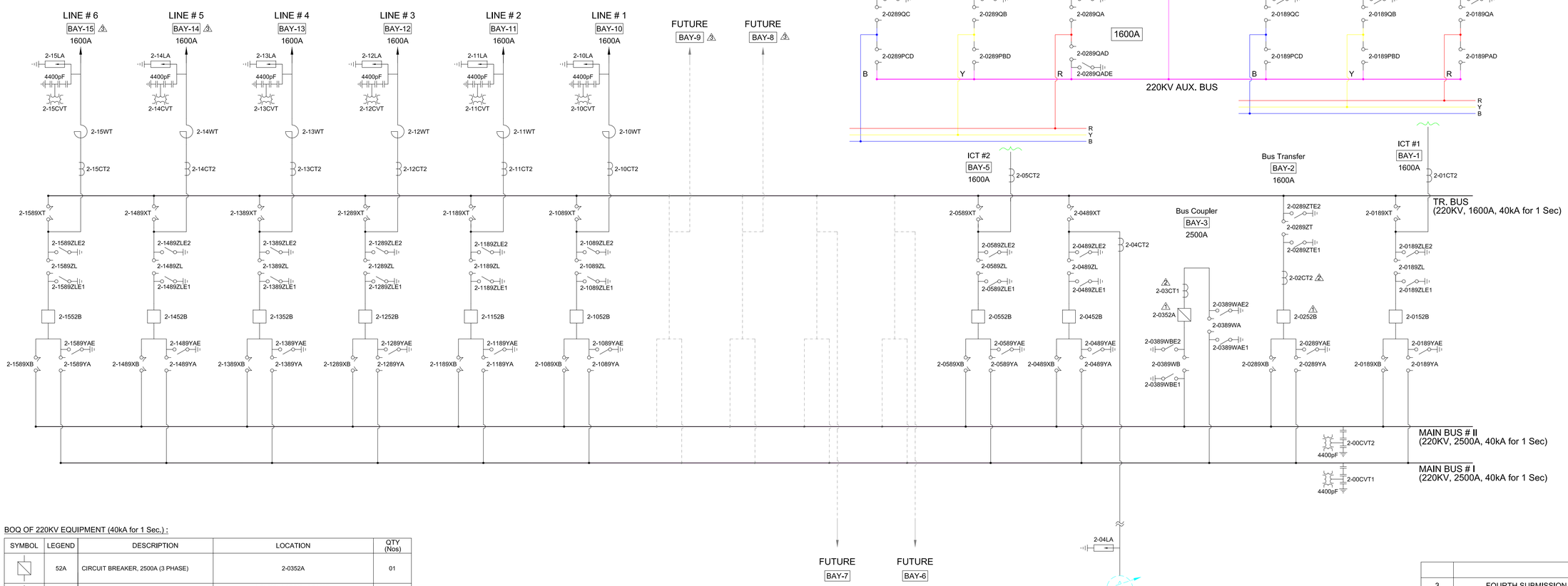
220kV CVT CORE DETAILS:

PARTICULARS	SECONDARY-1	SECONDARY-2	SECONDARY-3
RATED SECONDARY VOLTAGE	$110/\sqrt{3}$	$110/\sqrt{3}$	$110/\sqrt{3}$
APPLICATION	PROTECTION	PROTECTION	METERING
ACCURACY	3P	3P	0.2
OUTPUT BURDEN(MIN)	75 VA	75 VA	75 VA

1 NOTE : THE ACCURACY OF 0.2 ON SECONDARY-III CORE OF CVT SHALL BE MAINTAINED THROUGH THE ENTIRE BURDEN RANGE UPTO 75VA ON ALL THREE WINDINGS WITHOUT ANY ADJUSTMENTS DURING OPERATION.

BOQ OF 400KV EQUIPMENT (63kA for 1 Sec.) :

SYMBOL	LEGEND	DESCRIPTION	LOCATION	QTY (Nos)
	89P 1	HCB ISOLATOR without E/S, 2000A (1 PHASE)	1 4-0189PAD, 4-0189PBD, 4-0189PCD, 4-0289PBD, 4-0289PCD	05
	89Q 1	HCB ISOLATOR with 1 E/S, 2000A (1 PHASE)	1 4-0189QA, 4-0189QB, 4-0189QC, 4-0289QA, 4-0289QB, 4-0289QC, 4-0289QAD	07
	LA	336 kV, LIGHTNING ARRESTOR (1 PHASE)	4-01LAA, 4-01LAB, 4-01LAC, 4-LAD, 4-02LAA, 4-02LAB, 4-02LAC,	07



LEGEND :

- PRESENT SCOPE
- FUTURE
- SUPPLY NOT IN SCOPE
- 1 - FIRST REVISION MARK
- 2 - SECOND REVISION MARK
- 3 - THIRD REVISION MARK

BOQ OF 220KV EQUIPMENT (40kA for 1 Sec.) :

SYMBOL	LEGEND	DESCRIPTION	LOCATION	QTY (Nos)
	52A	CIRCUIT BREAKER, 2500A (3 PHASE)	2-0352A	01
	52B	CIRCUIT BREAKER, 1600A (3 PHASE)	2-0152B, 2-0252B, 2-0452B, 2-0552B, 2-1052B, 2-1152B, 2-1252B, 2-1352B, 2-1452B, 2-1552B	10
	89W	HCB ISOLATOR with 2 E/S, 2500A (3 PHASE)	2-0389WA, 2-0389WB	02
	89X	HCB ISOLATOR without E/S, 1600A (3 PHASE) (TANDEM TYPE)	2-0189XB, 2-0189XT, 2-0289XB, 2-0489XB, 2-0489XT, 2-0589XB, 2-0589XT, 2-1089XB, 2-1089XT, 2-1189XB, 2-1189XT, 2-1289XB, 2-1289XT, 2-1389XB, 2-1389XT, 2-1489XB, 2-1489XT, 2-1589XB, 2-1589XT	19
	89Y	HCB ISOLATOR with 1 E/S, 1600A (3 PHASE)	2-0189YA, 2-0289YA, 2-0489YA, 2-0589YA, 2-1089YA, 2-1189YA, 2-1289YA, 2-1389YA, 2-1489YA, 2-1589YA	10
	89Z	HCB ISOLATOR with 2 E/S, 1600A (3 PHASE)	2-0189ZL, 2-0289ZT, 2-0489ZL, 2-0589ZL, 2-1089ZL, 2-1189ZL, 2-1289ZL, 2-1389ZL, 2-1489ZL, 2-1589ZL	10
	89P 1	HCB ISOLATOR without E/S, 1600A (1 PHASE)	2-0189PAD, 2-0189PBD, 2-0189PCD, 2-0289PBD, 2-0289PCD 1	05
	89Q 1	HCB ISOLATOR with 1 E/S, 1600A (1 PHASE)	2-0189QA, 2-0189QB, 2-0189QC, 2-0289QAD, 2-0289QA, 2-0289QB, 2-0289QC 1	07

BOQ OF 220KV EQUIPMENT (40kA for 1 Sec.) :

SYMBOL	LEGEND	DESCRIPTION	LOCATION	QTY (Nos)
	CT1	CURRENT TRANSFORMER, 2500A 120% EXTENDED RATING (1 PHASE)	2-03CT1	03
	CT2	CURRENT TRANSFORMER, 1600A 120% EXTENDED RATING (1 PHASE)	2-01CT2, 2-02CT2, 2-04CT2, 2-05CT2, 2-10CT2, 2-11CT2, 2-12CT2, 2-13CT2, 2-14CT2, 2-15CT2	30
	CVT	CAPACITOR VOLTAGE TRANSFORMER, 4400pF (1 PHASE)	3 2-00CVT1, 2-00CVT2, 2-10CVT, 2-11CVT 2-12CVT, 2-13CVT, 2-14CVT1, 2-15CVT	24 3
	LA	LIGHTNING ARRESTOR, 216 kV (1 PHASE)	2-01LAA, 2-01LAB, 2-01LAC, 2-LAD, 2-02LAA, 2-02LAB, 2-02LAC, 2-04LA, 2-10LA, 2-11LA, 2-12LA, 2-13LA, 2-14LA, 2-15LA	28
	WT	WAVE TRAP, 0.5 mH (1 PHASE)	2-10WT, 2-11WT, 2-12WT, 2-13WT, 2-14WT, 2-15WT	06 3

SYSTEM PARAMETERS

SL No	DESCRIPTION	400 KV	220 KV
1.0	RATED VOLTAGE	400 KV	220 KV
2.0	HIGHEST SYSTEM VOLTAGE	420 KV rms	245 KV rms
3.0	RATED FREQUENCY	50 Hz	50 Hz
4.0	MAX. FAULT LEVEL (1 Sec.)	63 KA	40 KA
5.0	RATED 1 min POWER FREQ. WITHSTAND VOLTAGE	630 KV rms	460 KV rms
6.0	RATED LIGHTING IMPULSE VOLTAGE	±1425 KVp	±1050 KVp
7.0	RATED SWITCHING IMPULSE VOLTAGE	±1050 KVp	-
8.0	MINIMUM CREEPAGE DISTANCE	10500 mm	6125 mm

NOTES :

1. ALL THE 400KV CIRCUIT BREAKERS AND 220KV LINE BAYS CIRCUIT BREAKERS SHALL BE CAPABLE OF SINGLE/THREE PHASE AUTO RECLOSING.
2. 3 WAVE TRAP SHALL BE PLACED IN B PHASE FOR BAY NO. 10 & 11 AND IN R PHASE FOR BAY NO. 12,13,14 & 15.

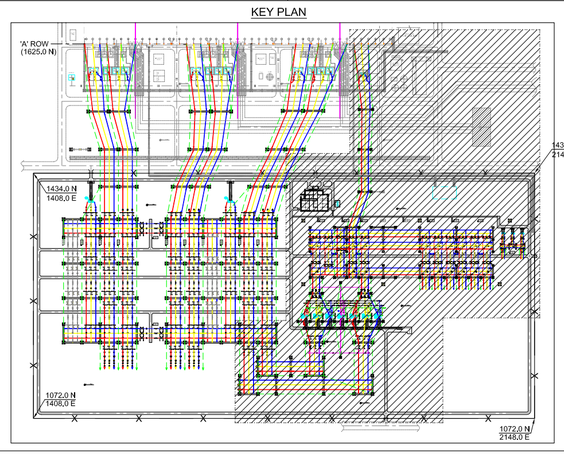
REFERENCE :

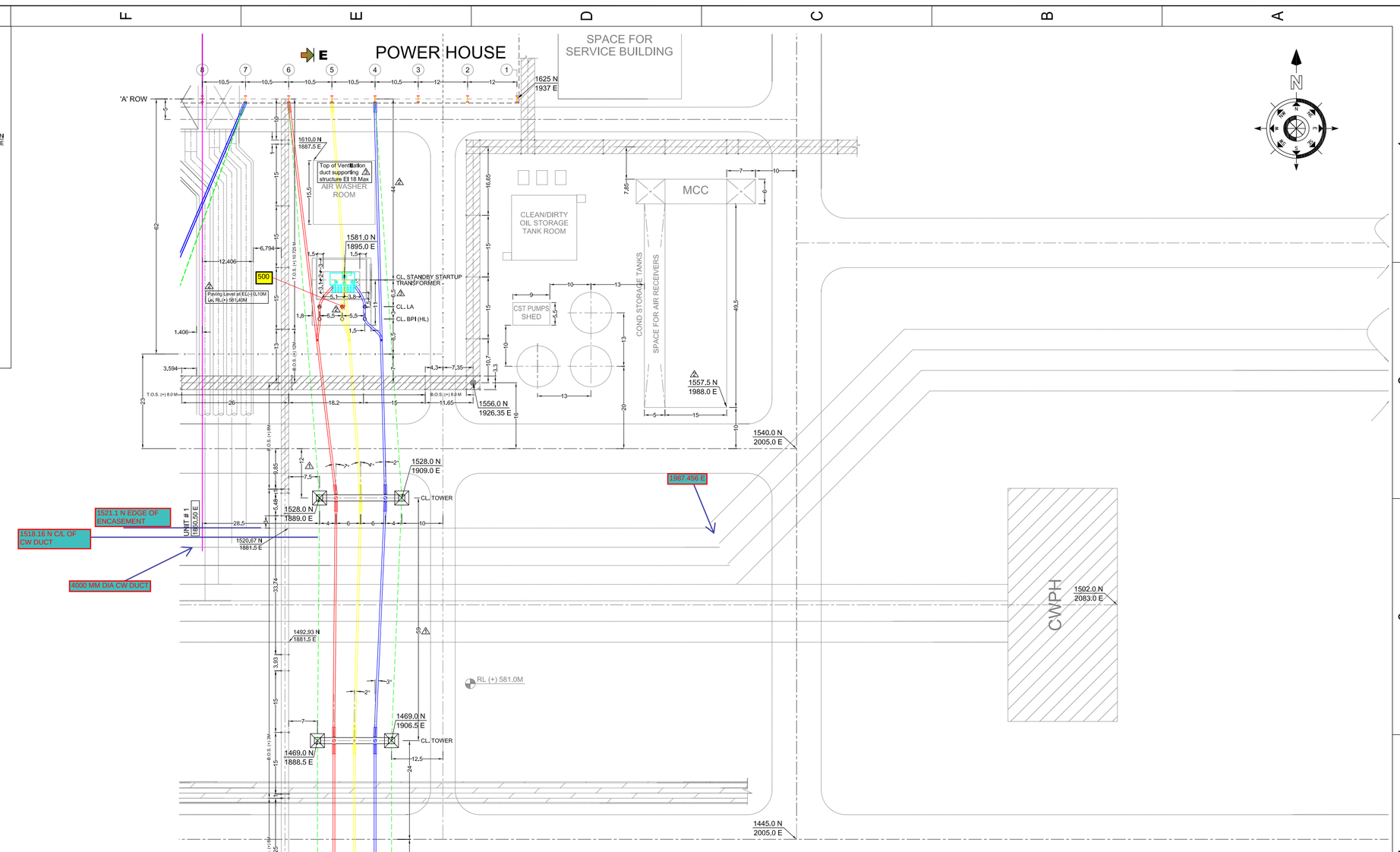
1. 400KV SINGLE LINE DIAGRAM (DRG. NO. - 9573-572-PVE-P-001)
2. 66KV SINGLE LINE DIAGRAM (DRG. NO. - 9573-572-PVE-P-003)
3. Delta Formation and Neutral Earthing Arrangement - SLD (DRG. NO. - 9573-572-PVE-P-004)

REV.	DESCRIPTION	PREP.	CHKD.	APPD.	DATE
3	FOURTH SUBMISSION	A.K.C.	A.B.	A.K.M	02.12.13
2	THIRD SUBMISSION	A.K.C.	A.B.	R.N.S.	26.07.13
1	SECOND SUBMISSION	A.K.C.	A.B.	R.N.S.	20.06.13
0	FIRST SUBMISSION	A.K.C.	A.B.	R.N.S.	14.05.13

CLIENT	एन.टी.पी.सी NTPC — NTPC LIMITED, A GOVT. OF INDIA ENTERPRISE
EPCC	TECHNO ELECTRIC & ENGG. CO. LTD. ENGINEERS & CONSTRUCTORS KOLKATA , INDIA
NOA NO.	CS-9573-572-2-SC-NOA-5889 dated 19.03.2013
PROJECT	KUDGI STPP STAGE-I (3x800 MW)
PACKAGE	SWITCHYARD PACKAGE
DRG. TITLE	220kV SINGLE LINE DIAGRAM
DRG .No.	NTPC 9573-572-PVE-P-002 / TECHNO 05686_KDGI_SWYD_E_DRG_45_012 — REV : 3
SCALE : N.T.S	JOB No. : 05686 — SHEET : 1 OF 1

KEY PLAN





NOTES:

1. ALL DIMENSIONS & CO-ORDINATES ARE IN METRE UNLESS OTHERWISE SPECIFIED.
2. PLINTH LEVEL SHALL BE 300 MM ABOVE THE FGL. FGL OF SWITCHYARD AREA CORRESPONDS TO RL (+) 583.0 M.
3. EL 0.0M CORRESPONDS TO RL (+) 581.50M. WHICH IS FFL OF MAIN POWER HOUSE BUILDING. PAVING LEVEL IN TRANSFORMER YARD AREA SHALL BE AT EL(-) 0.10M.
4. SUPPLY OF ICT AND STARTUP TRANSFORMER ARE NOT IN TECHNO SCOPE. HOWEVER, CIVIL AND STRUCTURAL WORKS ASSOCIATED WITH FOUNDATION FOR 7 NOS 167 MVA 1 PHASE TRANSFORMER ARE IN SCOPE.
5. ENTIRE AREA OF SWITCHYARD SHALL BE PROVIDED WITH BROKEN STONE FILLING WHICH SHALL BE CONSIST OF TWO LAYERS. THE FIRST LAYER SHALL BE 75MM THICK BASE COURSE OF 20MM OF NOMINAL SIZE AND SECOND LAYER SHALL BE 75MM THICK SURFACE COURSE OF 40MM NOMINAL SIZE.
6. THE WAVE TRAP SHALL BE PROVIDED IN ONE PHASE OF THE LINES. HOWEVER THE FOUNDATION FOR THE WAVE TRAP SHALL BE PROVIDED IN ALL THE PHASES OF LINES AND SHOULD BE SUITABLE FOR MOUNTING OF BUS POST INSULATOR ALSO.
7. TOWER AND GIRDER ARRANGEMENT FOR THE ICT AREA TO BE PROVIDED BASED ON ICT DRAWING ARRANGEMENT.
8. DISTANCE BETWEEN EQUIPMENTS /OTHER FACILITIES IS SUBJECT TO MEETING CLEARANCE.
9. LM SHALL BE USED FOR MOUNTING LIGHTING FIXTURES FOR 220 KV SWITCHYARD LIGHTING.
10. REFER SHEET 2 OF 2 FOR SECTIONAL DETAILS.

THE WAVE TRAP SHALL BE INSTALLED IN ONE PHASE IN SUCH A WAY THAT IT SHOULD MATCH WITH THE LOCATION OF WAVE TRAPS ON THE PHASES OF OTHER SIDE OF THE LINE.

11. SYSTEM PARTICULARS :-		
a) NOMINAL VOLTAGE	400kV	220kV
b) HIGHEST SYSTEM VOLTAGE	420kV rms	245kV rms
c) RATED FREQUENCY	50Hz	50Hz
d) RATED 1 min POWER FREQ. WITHSTAND VOLTAGE	630 KV rms	460 KV rms
e) RATED LIGHTING IMPULSE VOLTAGE	±1425kVp	±1050kVp
f) RATED SWITCHING IMPULSE VOLTAGE	±1050kVp	-
g) MAX. FAULT LEVEL (1 Sec.)	63 KA	40 KA
h) MINIMUM CREEPAGE DISTANCE	10500 mm	6125 mm
12. MINIMUM CLEARANCES :-		
a) PHASE TO PHASE	4000 mm	2100 mm
b) PHASE TO EARTH	3500 mm	2100 mm
c) SECTIONAL CLEARANCE	6500 mm	5000 mm
13. CONDUCTOR DETAILS :-		
a) MAIN BUS	"QUAD BERSIMIS" ACSR	"QUAD MOOSE" ACSR
b) TRANSFER BUS	-	"TWIN MOOSE" ACSR
c) ICT / GT / ST / REACTOR BAY/STAND BY/ START UP TRANSFORMER (as applicable) JACK BUS	"TWIN BERSIMIS" ACSR	"TWIN MOOSE" ACSR
d) FEEDER BAY / BC BAY JACK BUS (as applicable)	"QUAD BERSIMIS" ACSR	"TWIN MOOSE" / "QUAD MOOSE" ACSR
e) ICT / GT / ST / REACTOR BAY/STAND BY/ START UP TRAFO, (as applicable) EQPT. CONNECTION	4" IPS AL. TUBE / "TWIN/ QUAD BERSIMIS" ACSR	4" IPS AL. TUBE / "TWIN/ QUAD MOOSE" ACSR
f) FEEDER / BC / BUS TRANSFER BAY EQPT CONNECTION (as applicable)	4" IPS AL. TUBE / "TWIN/ QUAD BERSIMIS" ACSR	4" IPS AL. TUBE / "TWIN MOOSE" ACSR / "TWIN/ QUAD MOOSE" ACSR
14. NO.OF STRINGS/ PHASE :-		
a) FOR TENSION	"DOUBLE TENSION"	"DOUBLE TENSION"
b) FOR SUSPENSION	"SINGLE SUSPENSION"	"SINGLE SUSPENSION"
15. SUB CONDUCTOR SPACING :-	450 mm	450 mm

LEGENDS :

220KV EQUIPMENTS :

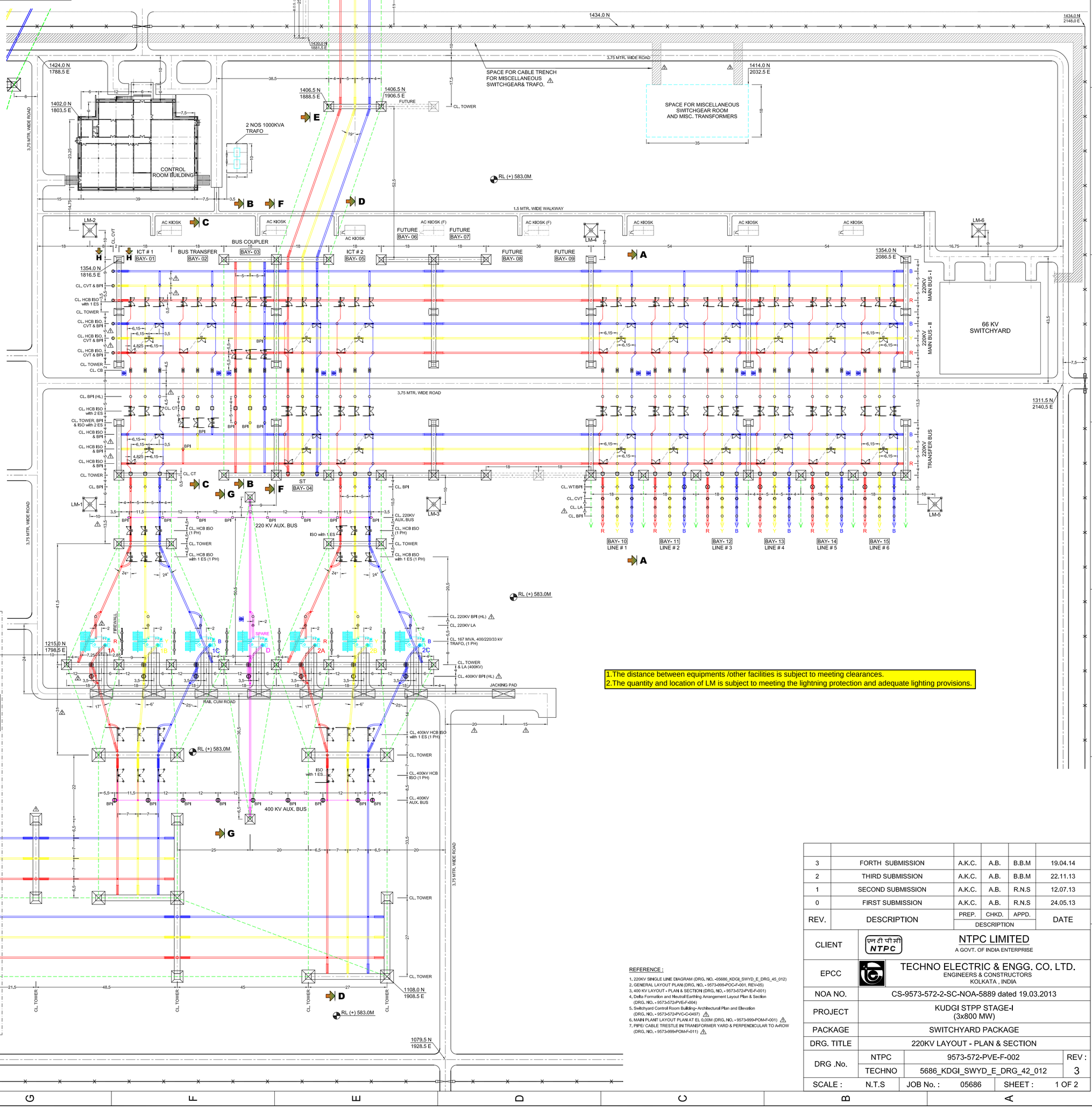
- 220 KV SF6 CB (3 Phase)
- 220 KV HCB ISOLATOR with 2 ES (3 Phase)
- 220 KV HCB ISOLATOR with 1 ES (3 Phase) (EARTH SWITCH ON LEFT HAND SIDE)
- 220 KV HCB ISOLATOR with 1 ES (3 Phase) (EARTH SWITCH ON RIGHT HAND SIDE)
- 220 KV HCB ISOLATOR without ES (3 Phase)
- 220 KV HCB ISOLATOR TANDEM TYPE without ES (3 Phase)
- 220 KV HCB ISOLATOR with 1 ES (1 Phase)
- 220 KV HCB ISOLATOR without ES (1 Phase)
- 220 KV CT (1 Phase)
- 220 KV CVT (1 Phase)
- 220 KV LA (1 Phase)
- 220 KV WT (1 Phase)
- 220 KV BPI (1 Phase)

400KV EQUIPMENTS :

- 400 KV HCB ISOLATOR with 1ES (1 Phase) (EARTH SWITCH ON RIGHT HAND SIDE)
- 400 KV HCB ISOLATOR with 1ES (1 Phase) (EARTH SWITCH ON LEFT HAND SIDE)
- 400 KV HCB ISOLATOR without ES (1 Phase)
- 400 KV LA (1 Phase)
- 400 KV BPI (1 Phase)

GENERAL :

- "R" PHASE
- "Y" PHASE
- "B" PHASE
- PRESENT SCOPE
- FUTURE (NOT IN SCOPE)
- SUPPLY NOT IN SCOPE
- FENCE
- EARTHWIRE
- RAIL
- FIRST REVISION MARK
- SECOND REVISION MARK
- THIRD REVISION MARK



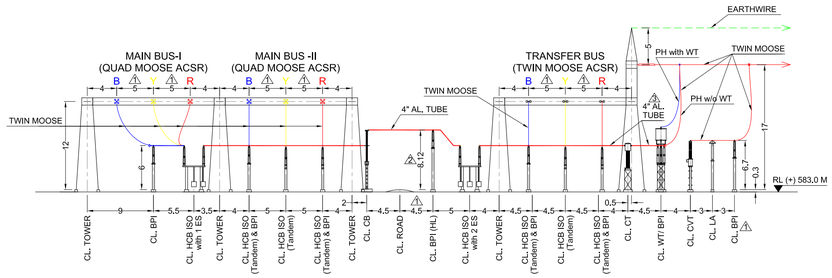
1.The distance between equipments /other facilities is subject to meeting clearances.
2.The quantity and location of LM is subject to meeting the lightning protection and adequate lighting provisions.

REFERENCE :

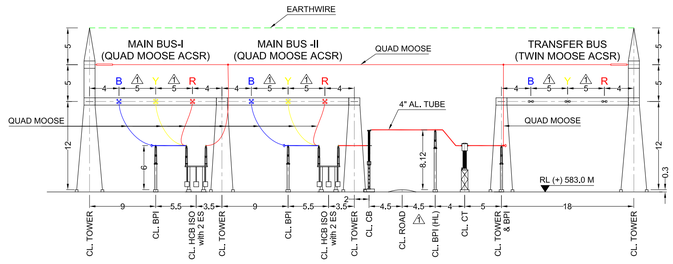
1. 220KV SINGLE LINE DIAGRAM (DRG. NO. -05686_KDGI_SWYD_E_DRG_45_012)
2. GENERAL LAYOUT PLAN (DRG. NO. - 9573-999-POC-F-001, REV-05)
3. 400 KV LAYOUT - PLAN & SECTION (DRG. NO. - 9573-572-PVE-F-001)
4. Delta Formation and Neutral Earthing Arrangement Layout Plan & Section (DRG. NO. - 9573-572-PVE-F-004)
5. Switchyard Control Room Building- Architectural Plan and Elevation (DRG. NO. - 9573-572-PVC-C-0497)
6. MAIN PLANT LAYOUT PLAN AT EL 0.00M (DRG. NO. - 9573-999-POM-F-001)
7. PIPE/ CABLE TRESTLE IN TRANSFORMER YARD & PERPENDICULAR TO A-ROW (DRG. NO. - 9573-999-POM-F-011)

REV.	DESCRIPTION	PREP.	CHKD.	APPD.	DATE
3	FORTH SUBMISSION	A.K.C.	A.B.	B.B.M	19.04.14
2	THIRD SUBMISSION	A.K.C.	A.B.	B.B.M	22.11.13
1	SECOND SUBMISSION	A.K.C.	A.B.	R.N.S	12.07.13
0	FIRST SUBMISSION	A.K.C.	A.B.	R.N.S	24.05.13

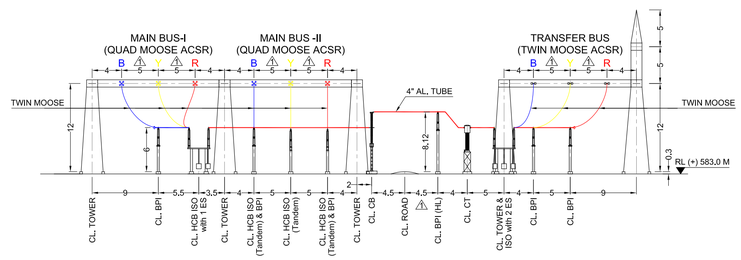
CLIENT	NTPC LIMITED — A GOVT. OF INDIA ENTERPRISE
EPCC	TECHNO ELECTRIC & ENGG. CO. LTD. — ENGINEERS & CONSTRUCTORS, KOLKATA , INDIA
NOA NO.	CS-9573-572-2-SC-NOA-5889 dated 19.03.2013
PROJECT	KUDGI STPP STAGE-I (3x800 MW)
PACKAGE	SWITCHYARD PACKAGE
DRG. TITLE	220KV LAYOUT - PLAN & SECTION
DRG .No.	NTPC: 9573-572-PVE-F-002; TECHNO: 5686_KDGI_SWYD_E_DRG_42_012 — REV : 3
SCALE : N.T.S	JOB No. : 05686 — SHEET : 1 OF 2



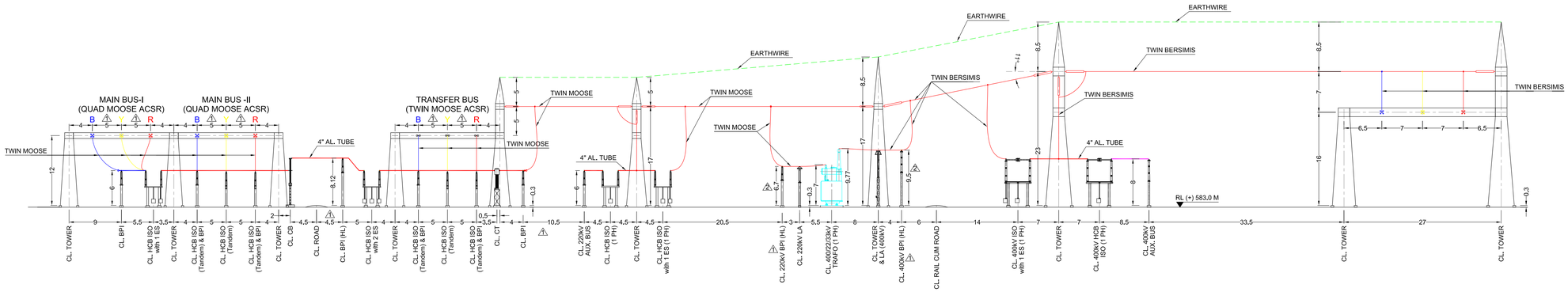
SECTION A-A
(220KV LINE BAY)



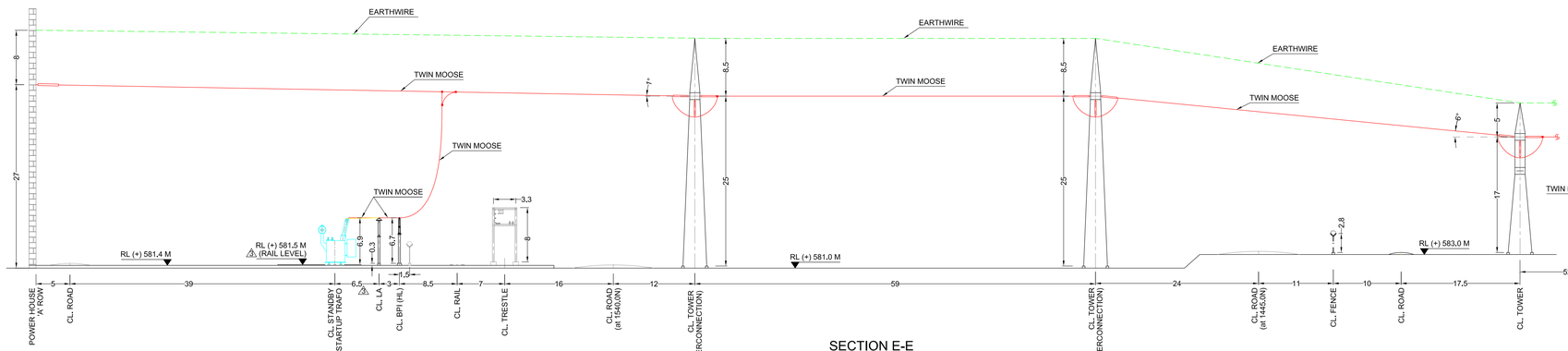
SECTION B-B
(220KV BUS COUPLER BAY)



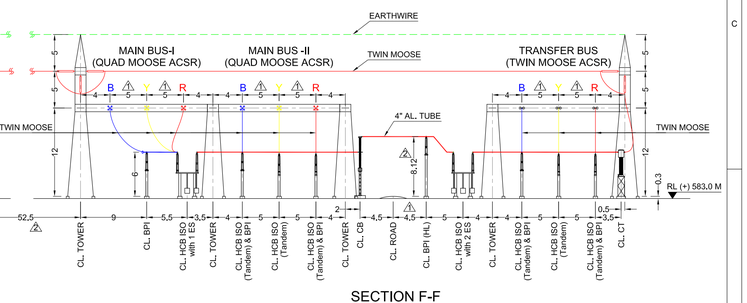
SECTION C-C
(220KV BUS TRANSFER BAY)



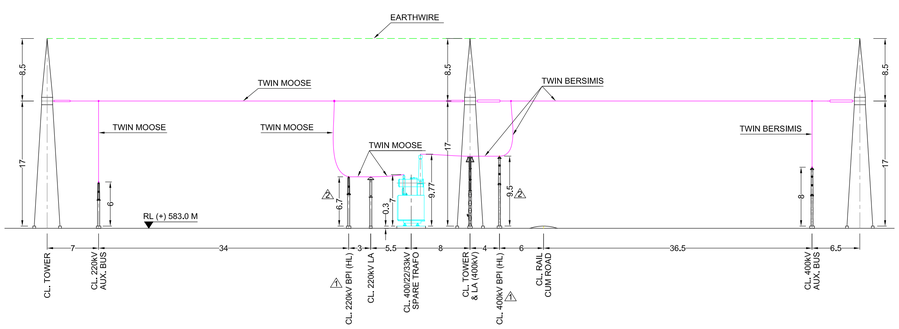
SECTION D-D
(220KV ICT # 2 BAY & TRANSFORMER INTERCONNECTION)



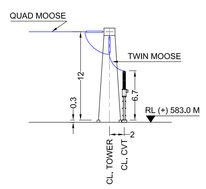
SECTION E-E
(220KV STANDBY/STARTUP TRAFO.
BAY INTERCONNECTION)



SECTION F-F
(220KV STANDBY/STARTUP TRAFO. BAY)



SECTION G-G
(SPARE TRANSFORMER)



SECTION H-H
(BUS CVT FOR 220KV MAIN BUS-I & II)

NOTES:

1. ALL DIMENSIONS & CO-ORDINATES ARE IN METRE UNLESS OTHERWISE SPECIFIED.

REV.	DESCRIPTION	PREP.	CHKD.	APPD.	DATE
		DESCRIPTION			
3	FOURTH SUBMISSION	A.K.C.	A.B.	B.B.M	19.04.14
2	THIRD SUBMISSION	A.K.C.	A.B.	B.B.M	22.11.13
1	SECOND SUBMISSION	A.K.C.	A.B.	R.N.S	12.07.13
0	FIRST SUBMISSION	A.K.C.	A.B.	R.N.S	24.05.13

CLIENT	एन टी पी सी NTPC	NTPC LIMITED A GOVT. OF INDIA ENTERPRISE	
EPCC		TECHNO ELECTRIC & ENGG. CO. LTD. ENGINEERS & CONSTRUCTORS KOLKATA , INDIA	
NOA NO.	CS-9573-572-2-SC-NOA-5889 dated 19.03.2013		
PROJECT	KUDGI STPP STAGE-I (3x800 MW)		
PACKAGE	SWITCHYARD PACKAGE		
DRG. TITLE	220KV LAYOUT - PLAN & SECTION		
DRG .No.	NTPC	9573-572-PVE-F-002	REV :
	TECHNO	5686_KDGI_SWYD_E_DRG_42_012	3
SCALE : N.T.S	JOB No. : 05686	SHEET : 2 OF 2	

DETAILS OF 220kV EQUIPMENTS FOUNDATION:

SL.NO.	DESCRIPTION	RATING	UNIT	QTY.	FDN MKD.	SIZE (mm) (LxB)	FOUNDING DEPTH (mm) 2	REF. DRG. NO
1	400/220/33 kV TRAFO (1 PH.)	167 MVA	NOS	07	FICT	(13400x10000)	1100 Below FGL	9573-572-PVC-C-054 2
2	CIRCUIT BREAKER (3 PH)	2500A 40kA/1 Sec	SET	01	2FCB	1900 X 1900 2	2400 Below FGL	9573-572-PVC-C-003
3	CIRCUIT BREAKER (3 PH)	1600A 40kA/1 Sec	SET	10	2FCB	1900 X 1900 2	2400 Below FGL	9573-572-PVC-C-003
4	HCB ISOLATOR with 2 E/S (3PH)	2500A 40kA/1 Sec	SET	02	2FISO	3000 X 1750 2	2400 Below FGL	9573-572-PVC-C-013
5	HCB ISOLATOR without E/S,(3 PH) (TANDEM TYPE)	1600A 40kA/1 Sec	SET	19	2FISO(T)	3000 X 1750 2	2400 Below FGL	9573-572-PVC-C-013
6	HCB ISOLATOR with 1 E/S,(3 PH)	1600A 40kA/1 Sec	SET	10	2FISO	3000 X 1750 2	2400 Below FGL	9573-572-PVC-C-013
7	HCB ISOLATOR with 2 E/S,(3 PH)	1600A 40kA/1 Sec	SET	10	2FISO	3000 X 1750 2	2400 Below FGL	9573-572-PVC-C-013
8	HCB ISOLATOR without E/S,(1 PH)	1600A 40kA/1 Sec	NOS	05	2FISO-1	3000 X 1750 2	2400 Below FGL	9573-572-PVC-C-013
9	HCB ISOLATOR with 1 E/S,(1 PH)	1600A 40kA/1 Sec	NOS	07	2FISO-1	3000 X 1750 2	2400 Below FGL	9573-572-PVC-C-013
10	CURRENT TRANSFORMER(120%) (1 PH. , 5 CORE)	2500A 40kA/1 Sec	NOS	03	2FCT	2000 X 2000 2	2400 Below FGL	9573-572-PVC-C-06
12	CURRENT TRANSFORMER(120%) (1 PH. , 5 CORE)	1600A 40kA/1 Sec	NOS	30	2FCT	2000 X 2000 2	2400 Below FGL	9573-572-PVC-C-06
13	220kV CVT (1 PH.)	4400pF 40kA/1 Sec	NOS	24	2FCVT	1900 X 1900	2400 Below FGL	9573-572-PVC-C-09
14	216kV LA (1 PH.)	--	NOS	28	2FLA	2100 X 2100	2400 Below FGL	9573-572-PVC-C-017
15	WAVE TRAP	0.5 mH, 40KA	NOS	18	2FWT	2200 X 2200 2	2400 Below FGL	9573-572-PVC-C-024
16	BPI (6M & 8.12 M)		NOS	140	2FBPI	2100 X 2100	2400 Below FGL	9573-572-PVC-C-020
17	BPI (6.7 M)		NOS	28	2FBPI'	2150 X 2150	2400 Below FGL	9573-572-PVC-C-020
18	BAY MARSHALLING KIOSK 2		NOS	12	FBMK	4 1200 X 1200	1000 Below FGL	9573-572-PVC-C-251
19	CT/ CVT JB 2		NOS	19	FJB	4 1200 X 1000	1000 Below FGL	9573-572-PVC-C-251

NOTES :

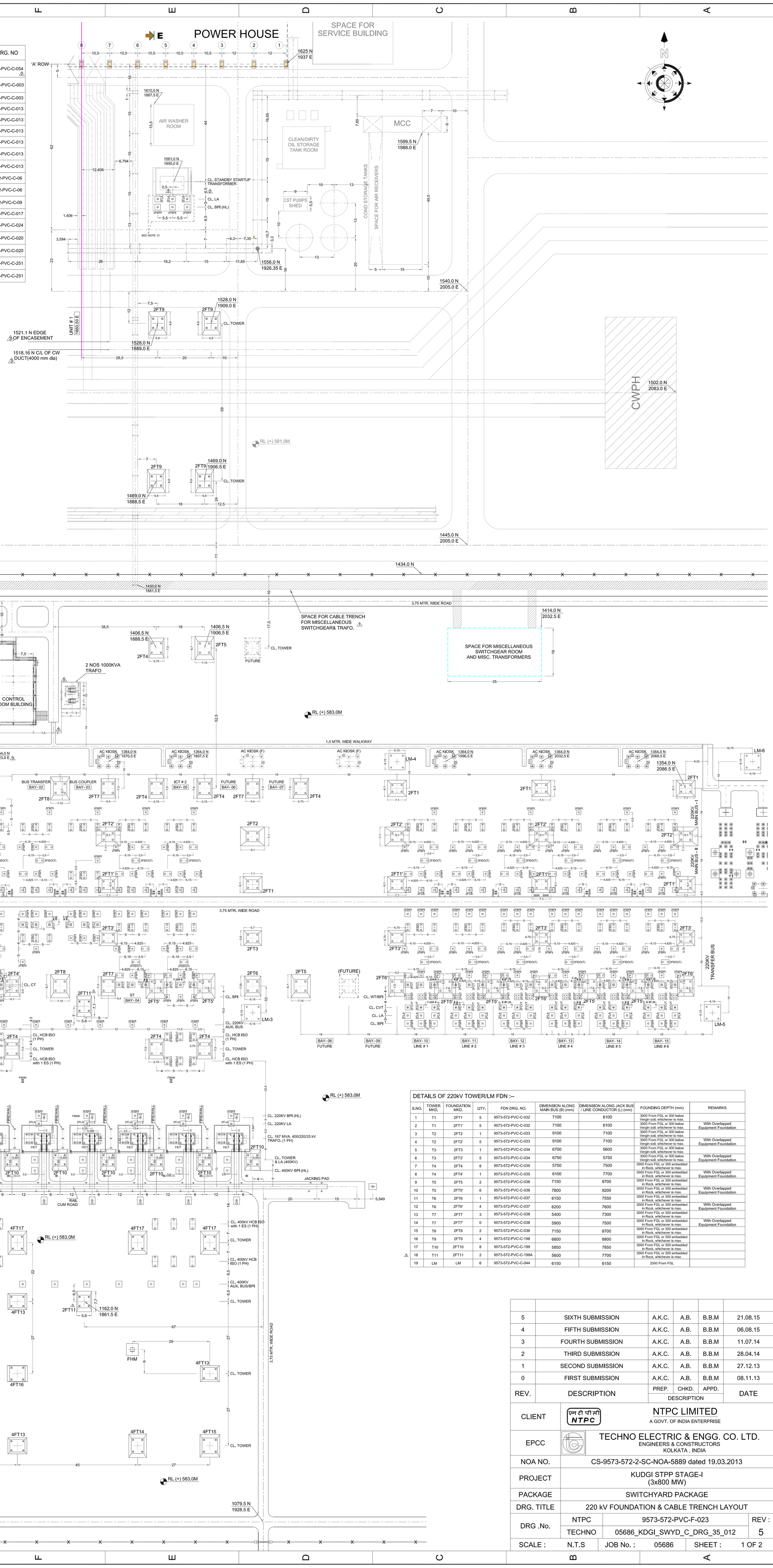
1. ALL DIMENSIONS ARE IN METER UNLESS OTHERWISE SPECIFIED.
2. THIS DRAWING TO BE READ IN CONJUNCTION WITH 220KV ELECTRICAL LAYOUT DRAWING, DRG. NO. 9573-572-PVE-F-002.
3. FOUNDATION DETAILS SHOWN IN THIS DRAWING ARE INDICATIVE ONLY. CONSTRUCTION SHALL BE CARRIED OUT AS PER 'APPROVED RELEASED FOR CONSTRUCTION' DRAWING.
4. 220KV WAVE TRAPS WILL BE INSTALLED ON ONE PHASE ONLY AS PER REQUIREMENT, BUT WAVE TRAP FOUNDATION WILL BE PROVIDED ON ALL THREE PHASES AND SHALL BE SUITABLE FOR BPI ALSO.
5. BEFORE EXCAVATION CHECK WITH ELECTRICAL LAYOUT DRG. AND IF ANY DISCREPANCY, NOTICED. CLARIFY BEFORE STARTING ANY WORK AT SITE.
6. LOCATION OF WT,BPI,LA & CVT SHALL BE FINALISED BASED ON TRANSMISSION LINE TOWER LOCATION.
7. REFER "OUTDOOR CABLE TRENCH SECTION DETAILS (DRG. NO. - 9573-572-PVC-F-035)" FOR RESPECTIVE SECTIONS OF CABLE TRENCH.
8. FGL OF SWITCHYARD AREA CORRESPONDS TO RL(+) 583.0M AND GT AREA CORRESPONDS TO RL(+) 581.0M
9. 2 PROPER PLANNING SHALL BE MADE AT SITE SUCH THAT THE LA, PI & CSE FOUNDATION IN TRANSFORMER YARD AREA SHALL BE CAST BEFORE CONSTRUCTION OF SOAK/OIL PIT OF GT & ST. LA FOUNDATIONS NEAR OTHER TRANSFORMERS / REACTORS SHALL ALSO BE CAST BEFORE CONSTRUCTION OF SOAK PIT.
10. ORIENTATION OF FOUNDATION SHALL BE VERIFIED WITH RESPECT TO LAYOUT BEFORE CONSTRUCTION.
11. 2 PROPER PLANING SHALL BE MADE AT SITE SUCH THAT DEEPER FOUNDATION OF CW DUCT ARE CONSTRUCTED BEFORE THE CONSTRUCTION OF TOWERS FALLING IN THE EXCAVATION PROFILE OF CW DUCT.
12. 2 NO FOUNDATION SHALL REST ON FILLED UP SOIL. ANY EXTRA EXCAVATION/LOSS EARTH BELOW FOUNDATION SHALL BE FILLED UP WITH PCC M 7.5.
13. 2 PEDESTAL OF THE LA AND BPI FOUNDATIONS NEAR STANDBY STARTUP TRANSFORMER SHALL BE RAISED 500 MM ABOVE FGL.
14. 2 REFER SHEET 2 OF 2 FOR CABLE TRENCH DETAILS.
15. 2 PROPER PLANNING SHALL BE MADE AT SITE SUCH THAT THE DEEPER FOUNDATIONS OF TOWERS OR EQUIPMENTS IN THE VICINITY OF ICT, REACTOR, 16 MVA TRANSFORMERS ETC ARE CAST BELOW THE CASTING OF SOAK PIT OF THE TRANSFORMER.
16. 2 FOR 400KV TOWER & EQPT. AND HIGH MAST(HM) FOUNDATION DETAILS, PLEASE REFER 400KV FOUNDATION & CABLE TRENCH LAYOUT (DRG. NO. - 9573-572-PVC-F-022).

LEGENDS :

- PRESENT SCOPE
- FUTURE (NOT IN SCOPE)
- FENCE

REFERENCE :

1. 220 KV LAYOUT - PLAN & SECTION (DRG, NO. - 9573-572-PVE-F-002)
2. 220 KV STRUCTURAL LAYOUT PLAN & SECTION (DRG, NO. - 9573-572-PVE-F-006)
3. OUTDOOR CABLE TRENCH SECTION DETAILS (DRG, NO. - 9573-572-PVC-F-035)
4. 2 SWITCHYARD SERVICE TRANSFORMER - FDN DRG (DRG. NO. - 9573-572-PVC-C-053)
5. 2 GA DRG FOR SWITCHYARD SERVICE TRANSFORMER (DRG. NO. - 9573-215-PVE-B-083)



TYPICAL PLAN SHOWING FOULING OF EQUIPMENT FOUNDATION WITH TOWER FOUNDATION.

TYPICAL SECTION SHOWING FOULING OF EQUIPMENT FOUNDATION WITH TOWER FOUNDATION. IN ONE DIRECTION 2

TYPICAL SECTION SHOWING FOULING OF EQUIPMENT FOUNDATION WITH TOWER FOUNDATION. IN ANOTHER DIRECTION 2

TYPICAL DETAIL IN CASE OF FOULING OF EQUIPMENTS/ TOWERS WITH SAME FOUNDING LEVEL 4

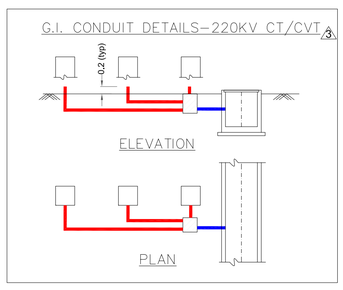
2 NOS 1000KVA TRAFO (EQPT LOCATION) DETAILS

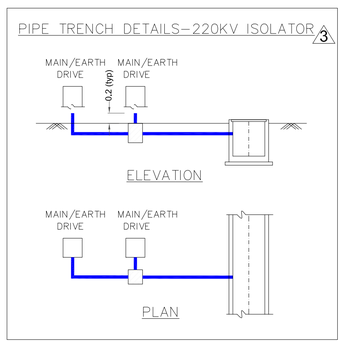
DETAILS OF 220kV TOWER/LM FDN :--

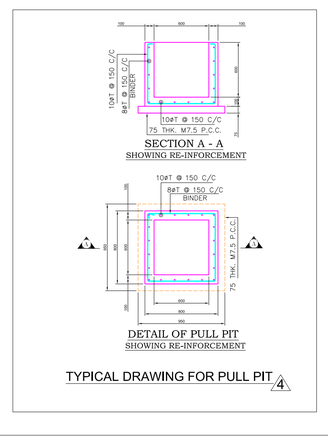
S.NO.	TOWER MKD.	FOUNDATION MKD.	QTY.	FDN DRG. NO.	DIMENSION ALONG MAIN BUS (B) (mm)	DIMENSION ALONG JACK BUS / LINE CONDUCTOR (L) (mm)	FOUNDING DEPTH (mm)	REMARKS
1	T1	2FT1	5	9573-572-PVC-C-032	7100	6100	3000 From FGL or 300 below Vergin soil, whichever is max.	
2	T1	2FT1'	5	9573-572-PVC-C-032	7100	6100	3000 From FGL or 300 below Vergin soil, whichever is max.	With Overlapped Equipment Foundation
3	T2	2FT2	1	9573-572-PVC-C-033	9100	7100	3000 From FGL or 300 below Vergin soil, whichever is max.	
4	T2	2FT2'	5	9573-572-PVC-C-033	9100	7100	3000 From FGL or 300 below Vergin soil, whichever is max.	With Overlapped Equipment Foundation
5	T3	2FT3	1	9573-572-PVC-C-034	6700	5600	3000 From FGL or 300 below Vergin soil, whichever is max.	
6	T3	2FT3'	5	9573-572-PVC-C-034	6750	5750	3000 From FGL or 300 below Vergin soil, whichever is max.	With Overlapped Equipment Foundation
7	T4	2FT4	8	9573-572-PVC-C-035	5750	7500	3000 From FGL or 300 embedded in Rock, whichever is max.	
8	T4	2FT4'	1	9573-572-PVC-C-035	6100	7700	3000 From FGL or 300 embedded in Rock, whichever is max.	With Overlapped Equipment Foundation
9	T5	2FT5	2	9573-572-PVC-C-036	7150	8700	3000 From FGL or 300 embedded in Rock, whichever is max.	
10	T5	2FT5'	6	9573-572-PVC-C-036	7800	9200	3000 From FGL or 300 embedded in Rock, whichever is max.	With Overlapped Equipment Foundation
11	T6	2FT6	1	9573-572-PVC-C-037	6150	7550	3000 From FGL or 300 embedded in Rock, whichever is max.	
12	T6	2FT6'	4	9573-572-PVC-C-037	6200	7600	3000 From FGL or 300 embedded in Rock, whichever is max.	With Overlapped Equipment Foundation
13	T7	2FT7	3	9573-572-PVC-C-038	5400	7300	3000 From FGL or 300 embedded in Rock, whichever is max.	
14	T7	2FT7'	0	9573-572-PVC-C-038	5900	7500	3000 From FGL or 300 embedded in Rock, whichever is max.	With Overlapped Equipment Foundation
15	T8	2FT8	2	9573-572-PVC-C-036	7150	8700	3000 From FGL or 300 embedded in Rock, whichever is max.	
16	T9	2FT9	4	9573-572-PVC-C-198	6800	8800	3000 From FGL or 300 embedded in Rock, whichever is max.	
17	T10	2FT10	8	9573-572-PVC-C-199	5850	7850	3000 From FGL or 300 embedded in Rock, whichever is max.	
18	T11	2FT11	2	9573-572-PVC-C-199A	5600	7700	3000 From FGL or 300 embedded in Rock, whichever is max.	
19	LM	LM	6	9573-572-PVC-C-044	6150	6150	2500 From FGL	

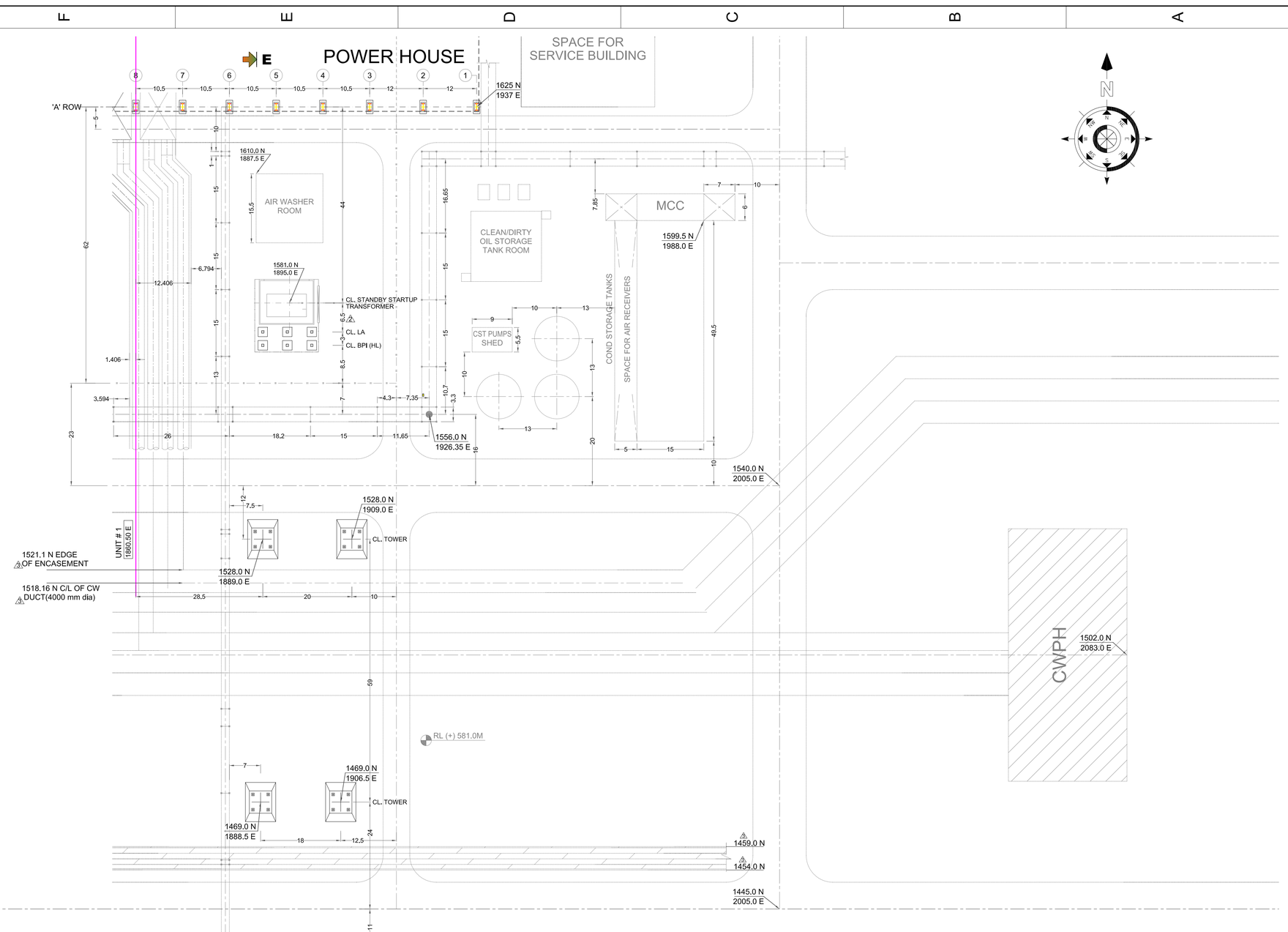
REV.	DESCRIPTION	PREP.	CHKD.	APPD.	DATE
		DESCRIPTION			
5	SIXTH SUBMISSION	A.K.C.	A.B.	B.B.M	21.08.15
4	FIFTH SUBMISSION	A.K.C.	A.B.	B.B.M	06.08.15
3	FOURTH SUBMISSION	A.K.C.	A.B.	B.B.M	11.07.14
2	THIRD SUBMISSION	A.K.C.	A.B.	B.B.M	28.04.14
1	SECOND SUBMISSION	A.K.C.	A.B.	B.B.M	27.12.13
0	FIRST SUBMISSION	A.K.C.	A.B.	B.B.M	08.11.13

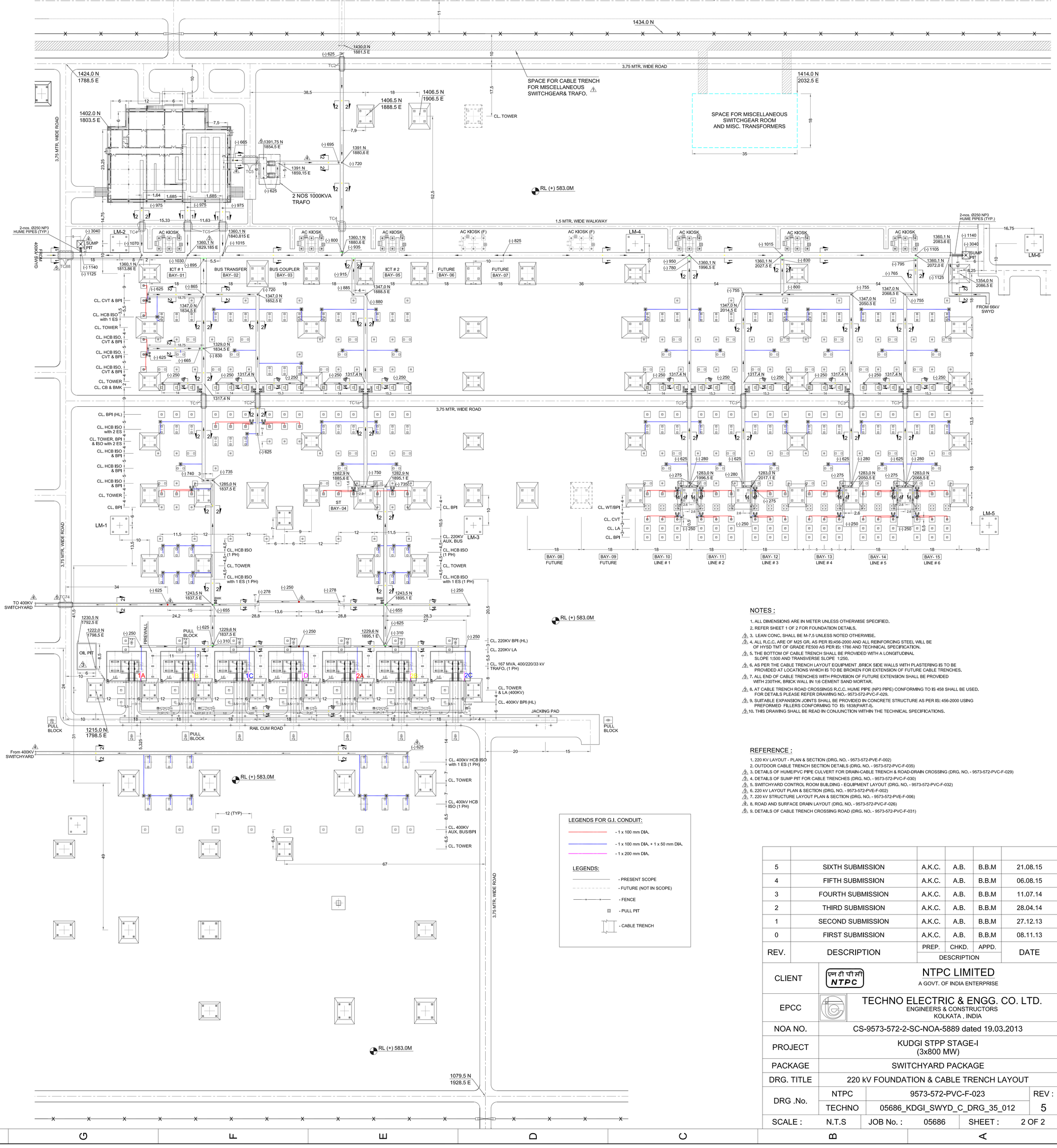
CLIENT	NTPC LIMITED — A GOVT. OF INDIA ENTERPRISE
EPCC	TECHNO ELECTRIC & ENGG. CO. LTD. — ENGINEERS & CONSTRUCTORS, KOLKATA , INDIA
NOA NO.	CS-9573-572-2-SC-NOA-5889 dated 19.03.2013
PROJECT	KUDGI STPP STAGE-I (3x800 MW)
PACKAGE	SWITCHYARD PACKAGE
DRG. TITLE	220 kV FOUNDATION & CABLE TRENCH LAYOUT
DRG .No.	NTPC: 9573-572-PVC-F-023 — REV : 5; TECHNO: 05686_KDGI_SWYD_C_DRG_35_012
SCALE :	N.T.S — JOB No. : 05686 — SHEET : 1 OF 2











NOTES :

1. ALL DIMENSIONS ARE IN METER UNLESS OTHERWISE SPECIFIED.
2. REFER SHEET 1 OF 2 FOR FOUNDATION DETAILS.
3. LEAN CONC. SHALL BE M-7.5 UNLESS NOTED OTHERWISE.
4. ALL R.C.C. ARE OF M25 GR. AS PER IS:456-2000 AND ALL REINFORCING STEEL WILL BE OF HYSD TMT OF GRADE FE500 AS PER IS: 1786 AND TECHNICAL SPECIFICATION.
5. THE BOTTOM OF CABLE TRENCH SHALL BE PROVIDED WITH A LONGITUDINAL SLOPE 1:500 AND TRANSVERSE SLOPE 1:250.
6. AS PER THE CABLE TRENCH LAYOUT EQUIPMENT ,BRICK SIDE WALLS WITH PLASTERING IS TO BE PROVIDED AT LOCATIONS WHICH IS TO BE BROKEN FOR EXTENSION OF FUTURE CABLE TRENCHES.
7. ALL END OF CABLE TRENCHES WITH PROVISION OF FUTURE EXTENSION SHALL BE PROVIDED WITH 230THK. BRICK WALL IN 1:6 CEMENT SAND MORTAR.
8. AT CABLE TRENCH ROAD CROSSINGS R.C.C. HUME PIPE (NP3 PIPE) CONFORMING TO IS 458 SHALL BE USED. FOR DETAILS PLEASE REFER DRAWING NO.- 9573-572-PVC-F-029.
9. SUITABLE EXPANSION JOINTS SHALL BE PROVIDED IN CONCRETE STRUCTURE AS PER IS: 456-2000 USING PREFORMED FILLERS CONFORMING TO IS: 1838(PART-I).
10. THIS DRAWING SHALL BE READ IN CONJUNCTION WITHIN THE TECHNICAL SPECIFICATIONS.

REFERENCE :

1. 220 KV LAYOUT - PLAN & SECTION (DRG. NO. - 9573-572-PVE-F-002)
2. OUTDOOR CABLE TRENCH SECTION DETAILS (DRG. NO. - 9573-572-PVC-F-035)
3. DETAILS OF HUME/PVC PIPE CULVERT FOR DRAIN-CABLE TRENCH & ROAD-DRAIN CROSSING (DRG. NO. - 9573-572-PVC-F-029)
4. DETAILS OF SUMP PIT FOR CABLE TRENCHES (DRG. NO. - 9573-572-PVC-F-030)
5. SWITCHYARD CONTROL ROOM BUILDING - EQUIPMENT LAYOUT (DRG. NO. - 9573-572-PVC-F-032)
6. 220 kV LAYOUT PLAN & SECTION (DRG. NO. - 9573-572-PVE-F-002)
7. 220 kV STRUCTURE LAYOUT PLAN & SECTION (DRG. NO. - 9573-572-PVE-F-006)
8. ROAD AND SURFACE DRAIN LAYOUT (DRG. NO. - 9573-572-PVC-F-026)
9. DETAILS OF CABLE TRENCH CROSSING ROAD (DRG. NO. - 9573-572-PVC-F-031)

LEGENDS FOR G.I. CONDUIT:

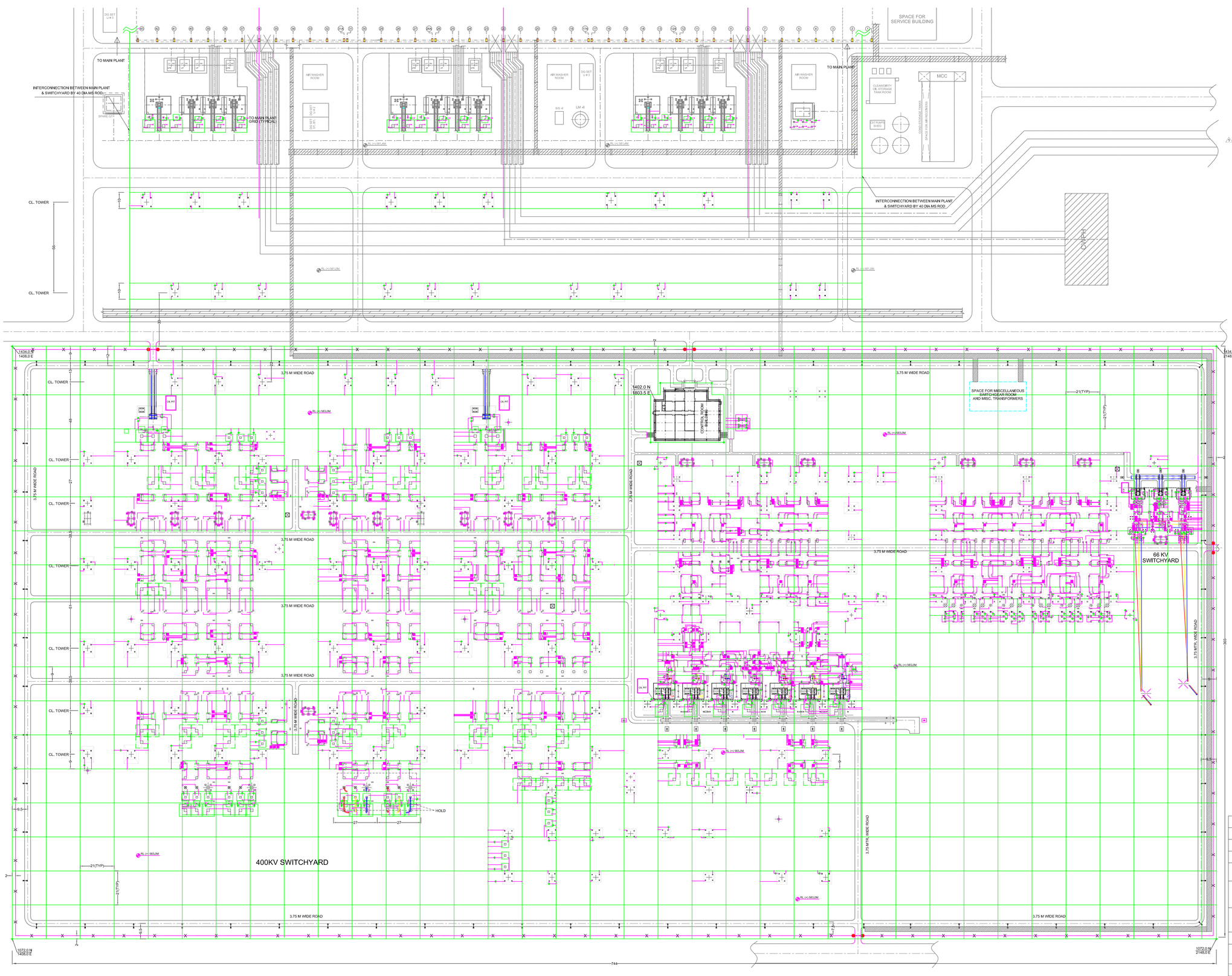
- 1 x 100 mm DIA.
- 1 x 100 mm DIA. + 1 x 50 mm DIA.
- 1 x 200 mm DIA.

LEGENDS:

- PRESENT SCOPE
- FUTURE (NOT IN SCOPE)
- FENCE
- PULL PIT
- CABLE TRENCH

REV.	DESCRIPTION	PREP.	CHKD.	APPD.	DATE
5	SIXTH SUBMISSION	A.K.C.	A.B.	B.B.M	21.08.15
4	FIFTH SUBMISSION	A.K.C.	A.B.	B.B.M	06.08.15
3	FOURTH SUBMISSION	A.K.C.	A.B.	B.B.M	11.07.14
2	THIRD SUBMISSION	A.K.C.	A.B.	B.B.M	28.04.14
1	SECOND SUBMISSION	A.K.C.	A.B.	B.B.M	27.12.13
0	FIRST SUBMISSION	A.K.C.	A.B.	B.B.M	08.11.13

CLIENT	NTPC LIMITED — A GOVT. OF INDIA ENTERPRISE
EPCC	TECHNO ELECTRIC & ENGG. CO. LTD. — ENGINEERS & CONSTRUCTORS, KOLKATA , INDIA
NOA NO.	CS-9573-572-2-SC-NOA-5889 dated 19.03.2013
PROJECT	KUDGI STPP STAGE-I (3x800 MW)
PACKAGE	SWITCHYARD PACKAGE
DRG. TITLE	220 kV FOUNDATION & CABLE TRENCH LAYOUT
DRG .No.	NTPC: 9573-572-PVC-F-023; TECHNO: 05686_KDGI_SWYD_C_DRG_35_012; REV : 5
SCALE :	N.T.S; JOB No. : 05686; SHEET : 2 OF 2



BILL OF MATERIALS :

LEGENDS	ITEM	QUANTITY	REMARKS
	MAIN EARTHING CONDUCTOR (40 MM DIA MS ROD)	32300 Mtr. (Approx)	Qty. estimated for Main Mat, Ring outside the Switchyard, CRB and Interconnection with Plant Earth Grid.
	MAIN MAT AUXILIARIES-40 MM DIA MS ROD (FOR EQUIPMENT, STRUCTURE RISER CONNECTION)	38000 Mtr. (Approx)	Qty. estimated for Main Mat to Equipment Structure Riser Connection.
	75x12 MM GS FLAT	16600 Mtr. (Approx)	Qty. estimated for Above Ground Equipment Structure earthing
	50x6 MM GS FLAT	1750 Mtr. (Approx)	Qty. estimated for Above Ground Cubicle MOM Box earthing
	PIPE ELECTRODE IN TREATED EARTH PIT (3 Mtr. LONG, 40 mm DIA GI PIPE)	18 Nos	For earthing of Transformer Neutral.
	ROD ELECTRODE (3 Mtr. LONG, 40 mm DIA MS ROD)	335 Nos	For earthing of down conductor from LA, CVT,LM and Tower with Peak.
	AUXILIARY EARTHMAT (40 mm Dia MS Rod) (1500 x 1500 mm)	5480 Mtr	For Installation below operating handle of Isolators (304 Nos @ 18 Mtr)
	CLEAT TYPE CLAMP FOR 75 X12 mm GI FLAT	1700 Nos	Support Between Earthflat & Structure
	CLEAT TYPE CLAMP FOR 50 X6 mm GI FLAT	100 Nos	Support Between Earthflat & Structure

GENERAL NOTES:

1. ALL DIMENSIONS ARE IN METER UNLESS OTHERWISE SPECIFIED.
2. THIS MAIN EARTH GRID LAYOUT IS BASED ON EARTHING DESIGN CALCULATION DOC. NO. : 05686_KDGI_SWYD_E_DGN_27_010, R-1
3. SIZE OF MAIN EARTHMAT CONDUCTOR IS 40 DIA MS ROD & SPACING OF MAIN EARTHMAT IS 21 MTRs AND DEPTH OF MAIN EARTHMAT IS 600mm BELOW THE F.G.L.
4. SURFACE DETAIL- CRUSHED ROCK LAYER OF 150mm. THICK FROM FGL. WILL BE PROVIDED.
5. 40mm. DIA ,3 M LONG ELECTRODE AS PER APPD. DRG. SHALL BE PROVIDED IN EARTH PIT FOR TRANSFORMER, LA , LM , PEAK TOWER ,REACTOR , CVT & FENCE.
6. EARTHING CONDUCTOR RUNNING BELOW CABLE TRENCH, DRAINS, ROADS & RAIL WILL BE LAID 300mm BELOW THE BOTTOM OF ABOVE SAID ITEMS.
7. THIS DRG. IS ONLY SYMBOLIC REPRESENTATION OF EARTHING CONDUCTOR LAYOUT. WHEREVER EARTHING GRID INFRINGES WITH FOUNDATION, BUILDING ETC. THE GROUNDING CONDUCTOR (MAIN GRID) SHALL BE DIVERTED SUITING THE SITE CONDITION.
8. ALL EARTHING SHALL BE DONE IN ACCORDANCE WITH IS:3043 UNLESS OTHERWISE STATED IN THE TECHNICAL SPECIFICATION.
9. EARTHING CONDUCTORS AROUND CONTROL ROOM BUILDING WILL BE LAID AT A MINIMUM DISTANCE OF 2.0 M FROM OUTER BOUNDARY OF THE BUILDING.
10. FOR EQUIPMENT & STRUCTURE EARTHING DETAILS REFER (DOC. NO. : 9573-572-PVE-F-0038 , R-1)
11. FOR ISOLATOR OPERATING BOX, AUXILIARY MESH OF SIZE 1500X1500 MM, WITH 300 MM SUB-CONDUCTOR SPACING SHALL BE PROVIDED.AUXILIARY MESH SHALL BE MADE OF 40 mm DIA MS ROD.
12. CONNECTION BETWEEN EARTH LEADS & EQUIPMENT SHALL NORMALLY BE BOLTED TYPE .
13. ALL WELDED JOINTS SHALL BE TREATED WITH RED LEAD AND THERE AFTER THICKLY COATED WITH BITUMEN COMPOUND TO PREVENT CORROSION.
14. ALL GROUND CONNECTIONS SHALL BE MADE BY ELECTRIC ARC WELDING & FOR WELDED JOINTS ELECTRODES SHALL BE USED.
15. ALL ELECTRICAL EQUIPMENT & OTHER NON-CURRENT CARRYING METAL PARTS SHALL BE CONNECTED TO THE MAIN PLANT EARTHING SYSTEM.
16. THE CONNECTION OF SWITCHYARD EARTH-MAT TO POWER PLANT EARTHING IS UNDER SWITCHYARD PACKAGE. VENDOR'S SCOPE AND CONNECTION WOULD BE MADE SUITING THE SITE CONDITIONS.

LEGENDS :

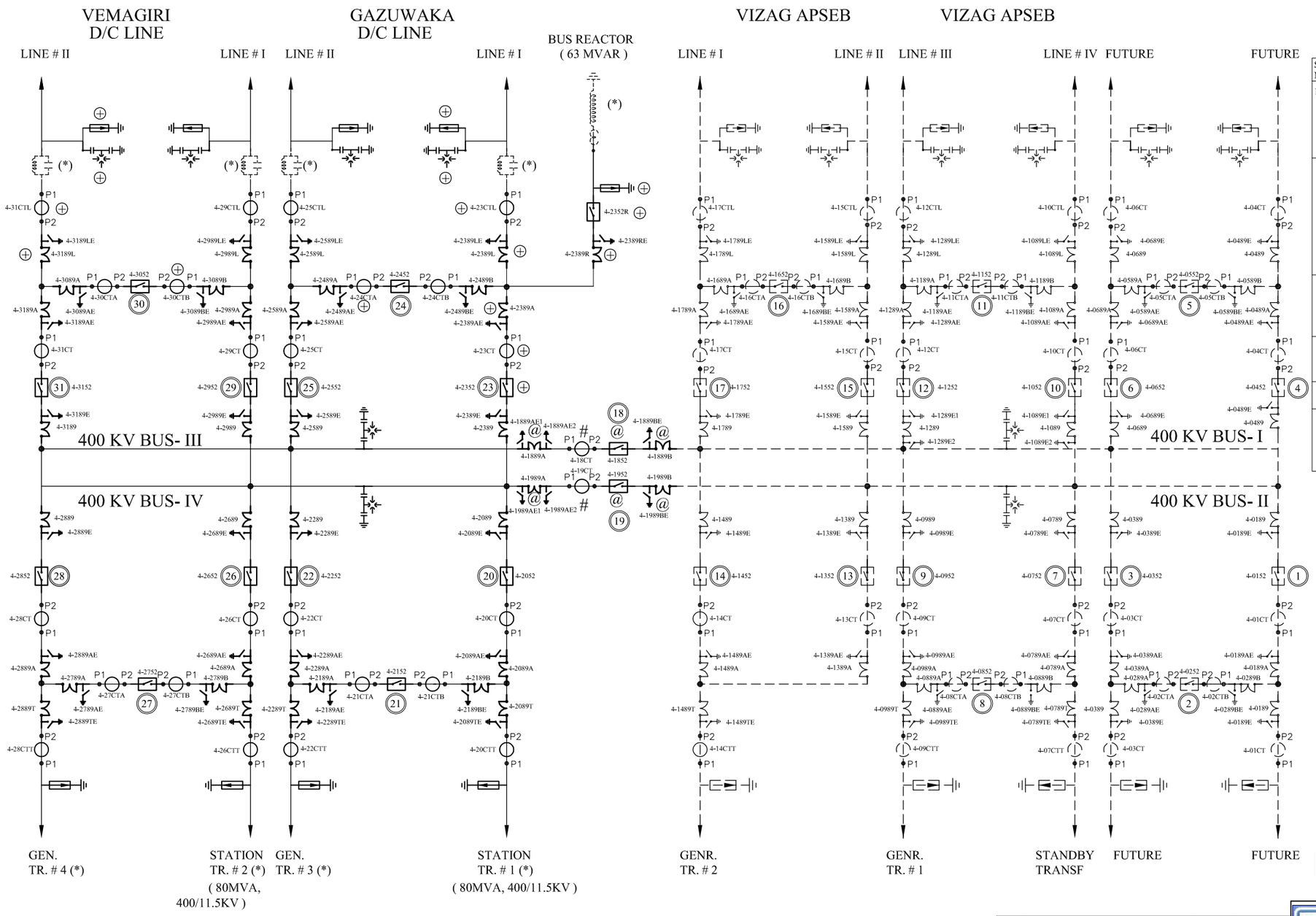
- PRESENT SCOPE
- FUTURE (NOT IN SCOPE)
- FENCE
- RAIL

MODIFICATION AS PER COMMENTS IN REV-0

REV.	DESCRIPTION	PREP.	CHKD.	APPD.	DATE
2	THIRD SUBMISSION	C.R	A.B	B.M	29.07.17
1	SECOND SUBMISSION	C.R	A.B	B.M	28.02.14
0	FIRST SUBMISSION	C.R	A.B	B.M	24.12.13

CLIENT	NTPC LIMITED — A GOVT. OF INDIA ENTERPRISE
EPCC	TECHNO ELECTRIC & ENGG. CO. LTD. — ENGINEERS & CONSTRUCTORS, KOLKATA , INDIA
NOA NO.	CS-9573-572-2-SC-NOA-5889 dated 19.03.2013
PROJECT	KUDGI STPP STAGE-I (3x800 MW)
PACKAGE	SWITCHYARD PACKAGE
DRG. TITLE	EARTHMAT LAYOUT
DRG .No.	NTPC: 9573-572-PVE-F-018 — REV : 2
	TECHNO: 5686_KDGI_SWYD_E_DRG_27_011
SCALE : N.T.S	JOB No. : 05686 — SHEET : 1 OF 1

SIMHADRI



BILL OF QUANTITY

SL. NO.	ITEM DESCRIPTION	QTY. NOS.	SYMBOL
1	400 kV, 40kA CIRCUIT BREAKER (3-Ph.) WITHOUT CLOSING RESISTOR		
	i. 3150AMP	2	
	ii. 2000AMP	13	
2	400kV, 40kA HCB ISOLATOR (3-Ph.) a. WITH ONE EARTH SWITCH		
	i. 3150A, 40kA	2	
	ii. 2000A, 40kA	33	
	b. WITH TWO EARTH SWITCHES		
	i. 3150A, 40KA	2	
3	400kV, 2000A CURRENT TRANSFORMER (1-Ph) FIVE CORES		
	i. 150% EXTENDED CURRENT RATING	6	
	ii. 120% EXTENDED CURRENT RATING	72	
4	400kV,4400pF CAPACITOR VOLTAGE TRANSFORMER (1-Ph) THREE CORES	18	
5	390 kV SURGE ARRESTER (1-Ph) GAPLESS TYPE	27	
6	400 kV WAVE TRAP (1-Ph.) 2000A, 1mH 0.5 mH	8	

LEGEND:

- PRESENT SCOPE
- EXISTING / FUTURE
- @ RATING 3150 AMP CB/ISO
- # 150% RATING CT
- BAY NUMBER
- EQPT. ADDED

(*) - NOT IN JSL SCOPE OF SUPPLY.

REF. NTPC DRG.NO.-3530-572-POE-A-001

NTPC DRG.NO.-3530-572-PVE-P-001 R8.

REV	DESCRIPTION	SIGN	DATE
8	REVISED AS PER NTPC COMMENTS DT. 13/07/09	NNJ	23.09.09
7	AS PER REVISED SLD RECIVED VIDE MAIL DT. 19/06/09 FROM NTPC	NNJ	02.07.09
6	CHANGE IN NOMENCLATURE AS INFORMED BY NTPC.	NNJ	05.11.08
5	REVISED AS PER NTPC COMMENTS DATED 01.09.08	NNJ	24.09.08
4	NOMENCLATURE ADDED FOR EQUIPMENTS UNDER SCOPE.	SMM	25.08.08
3	QTY. REVISED AS PER NTPC COMMENTS.	SMM	06.08.08
2	AS PER MODIFIED ELECTRICAL LAYOUT	SMM	05.08.08
1	NTPC COMMENTS AND REACTOR BAY ADDED.	SMM	27.06.08

CUSTOMER

NTPC LIMITED

(A GOVERNMENT OF INDIA ENTERPRISE)

PROJECT	SIMHADRI SUPER THERMAL POWER PROJECT STAGE - II (2 x 500MW)
LOA NO.	CS-3530-572-2-FC-NOA-5114 DATED 14-05-2008
TITLE	400 KV SWITCHYARD SINGLE LINE DIAGRAM

JYOTI STRUCTURES LTD.

VALECHA CHAMBER'S
5TH&6TH FLR.NEW LINK ROAD,
OSHIWARA, ANDHERI (W)
MUMBAI - 400 053

APPD.	NNJ	DATE	29/05/2008
CHKD.	NNJ		
DESIGN	GAJ	SCALE	NTS
DRAWN	ANKUSH		
DRG. NO.	J-683/SIMHADRI/E-DRG./SLD/001	REV.	R8
SHEET NO.	1 OF 1		

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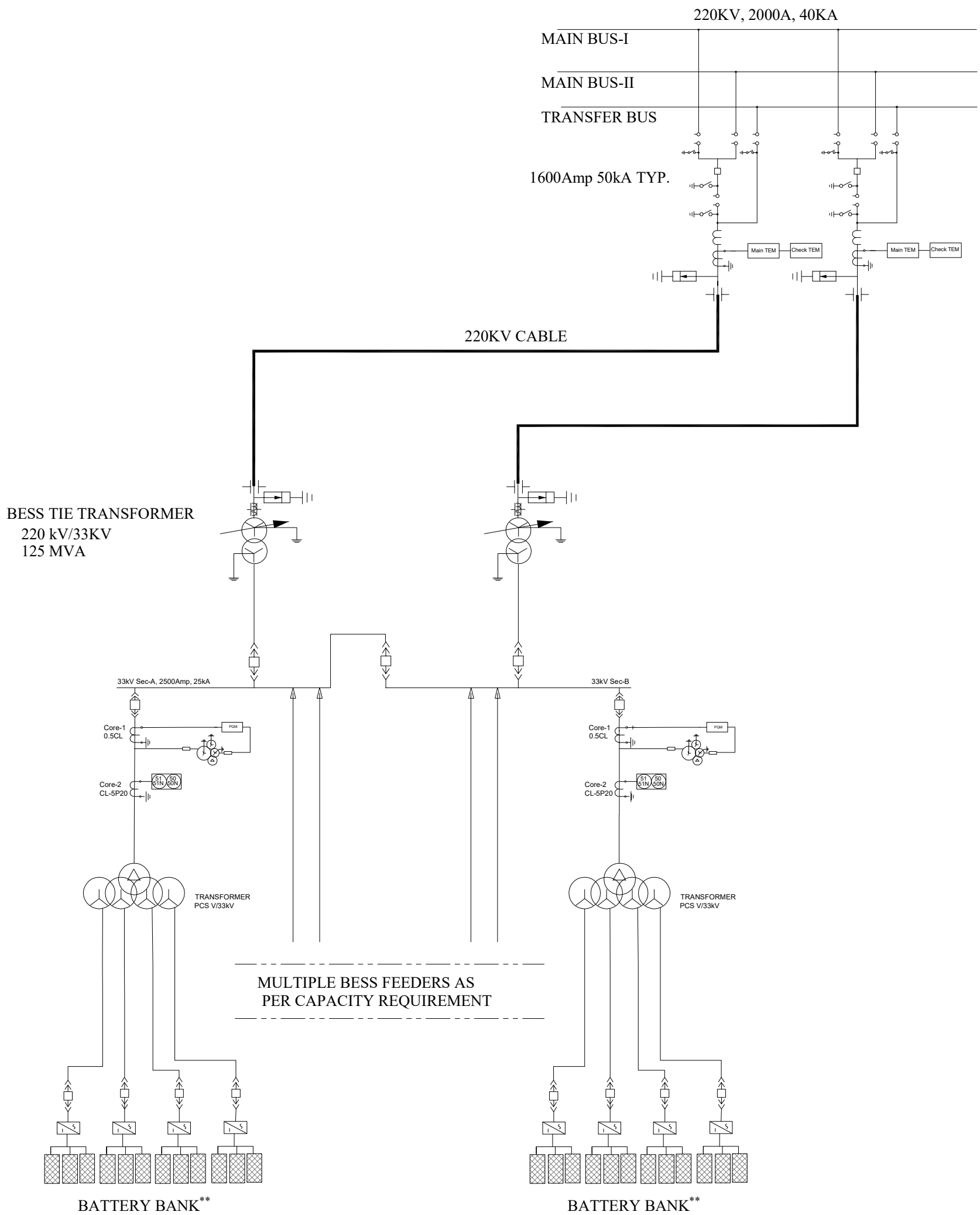
A1 : D:\JSLDRG\NTPC\SIMHADRI\SLD R1.

ANNEXURE 02

Project	Bay details for Point of interconnection
Kudgi 240x 2 Hrs 2 Bays	Existing 220 kV bay no 8 & 9 Main Bus bar available. Only bay equipments are to be provided.
Mouda I & II 200 x 2 Hrs 2 Bays	132 kV One New bay along with Bus extension adjacent to existing bay no 18 & 132 kV, 01 nos new Bay along with Fence extension adjacent to bay no 1
Barh I & II 100 x2 Hrs 2 Bays	132 kV Bay no 12. Main Bus bar available. Only bay equipments are to be provided & 132 kV, 01 nos new Bay along with Fence extension adjacent to bay no 12
Solapur 132 x 2 Hrs 2 Bays	132 kV Bay no 6 & 17 Main Bus bar available. Only bay equipments are to be provided.
Nabinagar 200 x 2 Hrs 2 Bays	132 kV Bay no 115 (Station 4) & Bay no 105 (Station 5) Main Bus bar available. Only bay equipments are to be provided.
Simhadri I & II 75 x 2 Hrs 1 Dia	No spare 400 kV bay is available. New Dia as per SLD along with Bus extension required. Marked bay space 4, 5 & 6 shall be used.

TENDER SLD REV 1



NOTES:-

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH TECHNICAL SPECIFICATION.
2. NUMBER OF BESS FEEDERS SHOWN ARE INDICATIVE. SAME SHALL BE PROVIDED AS PER PROJECT REQUIREMENT.
3. SUITABLE METERING ARRANGEMENT AND FACILITY FOR INTERFACE METERING AS PER CEA METERING REGULATION SHALL BE PROVIDED AT POINT OF INTERCONNECTION
4. BIDDER ARE ADVISED TO VISIT RESPECTIVE STATIONS BEFORE SUBMISSION OF BID FOR ASSESSING BAY AVAILABILITY, SCOPE OF WORK RELATED TO SWITCHYARD AND EHV CABLE ROUTE FROM BESS TIE TRF TO SWITCHYARD
5. ADDITIONAL INCOMER FEEDERS SHOWN IN SLD IN 33KV POOLING SWGR SHALL HAVE RATING EQUAL TO THE BESS TIE TRANSFORMER FEEDER. SPARE SHALL BE PROVIDED IN EACH SECTION OF SWITCHGEAR AS PER TECHNICAL SPECIFICATIONS.
6. INDICATIVE SLD FOR AUX POWER SUPPLY ARRANGEMENT IS INDICATED IN SEPARATE SHEET.

LEGEND:

- LIGHTNING ARESTOR
- VT
- EARTH SWITCH
- CT
- CIRCUIT BREAKER
- DISCONNECTOR
- BUSHING CT
- DOUBLE BREAK LINE ISOLATORS
- CIRCUIT BREAKER DRAWOUT TYPE
- TRANSFORMER

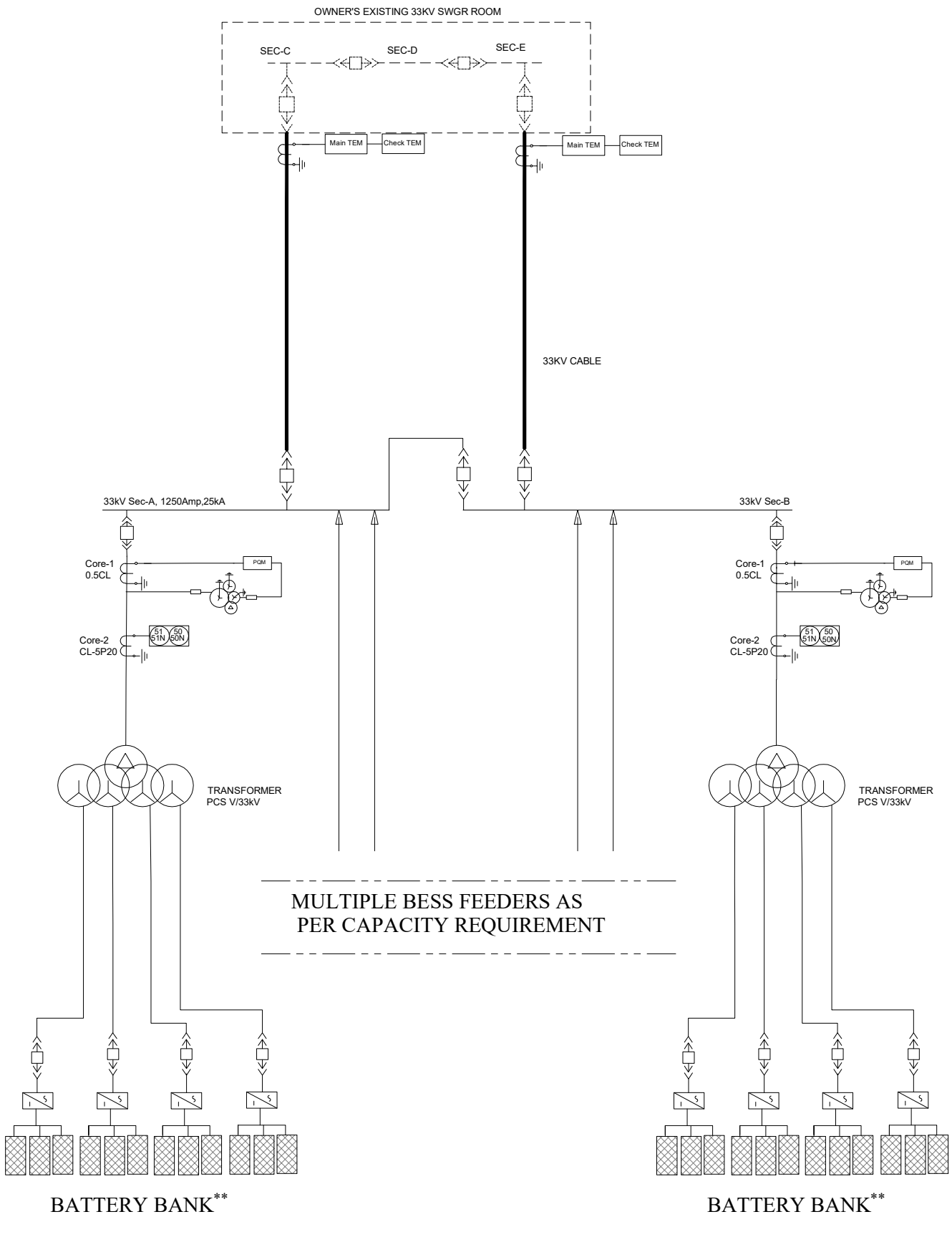
	DRAWN	DESIGN	CHKD.	M	E	C	C&I	ES	APPD	DATE
										29-07-25
				CLEARED BY						

NTPC Limited
(A GOVERNMENT OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT: 240MW/480MWH BATTERY ENERGY STORAGE SYSTEM (BESS) AT KUDGI STPP

TITLE: SINGLE LINE DIAGRAM

SIZE	SCALE	DRG. NO.	REV. NO.
A1	NTS	9999-000-POE-A-001	B



NOTES:-

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH TECHNICAL SPECIFICATION.
2. NUMBER OF BESS FEEDERS SHOWN ARE INDICATIVE. SAME SHALL BE PROVIDED AS PER PROJECT REQUIREMENT.
3. SUITABLE METERING ARRANGEMENT AND FACILITY FOR INTERFACE METERING AS PER CEA MEERTING REGULATION SHALL BE PROVIDED AT POINT OF INTERCONNECTION
4. BIDDER ARE ADVISED TO VISIT RESPECTIVE STATIONS BEFORE SUBMISSION OF BID FOR ASSESSING BAY AVAILABILITY, SCOPE OF WORK RELATED TO SWITCHYARD AND EHV CABLE ROUTE FROM BESS TIE TRF TO SWITCHYARD
5. ADDITIONAL INCOMER FEEDERS SHOWN IN SLD IN 33KV POOLING SWGR SHALL HAVE RATING EQUAL TO THE BESS TIE TRANSFORMER FEEDER. SPARE SHALL BE PROVIDED IN EACH SECTION OF SWITCHGEAR AS PER TECHNICAL SPECIFICATIONS.
6. INDICATIVE SLD FOR AUX POWER SUPPLY ARRANGEMENT IS INDICATED IN SEPARATE SHEET.

LEGEND:

- LIGHTNING ARESTOR
- VT
- EARTH SWITCH
- CT
- CIRCUIT BREAKER
- DISCONNECTOR
- BUSHING CT
- DOUBLE BREAK LINE ISOLATORS
- CIRCUIT BREAKER DRAWOUT TYPE
- TRANSFORMER

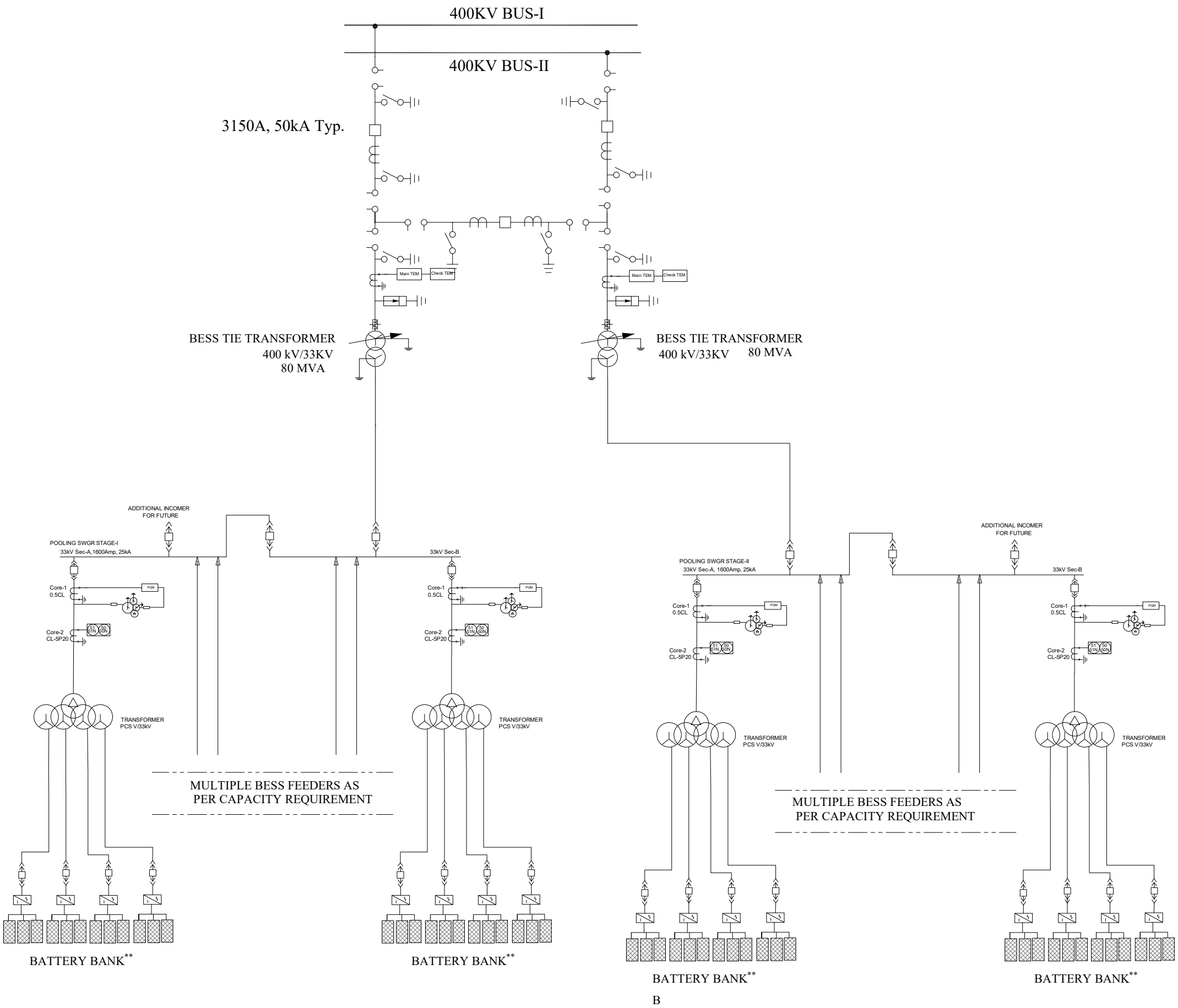
DRAWN	DESIGN	CHKD.	M	E	C	C&I	ES	APPD	DATE
			CLEARED BY						27-10-25

NTPC Limited
(A GOVERNMENT OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT: 50MW/100MWH BATTERY ENERGY STORAGE SYSTEM (BESS) AT RAMAGUNDAM STPP-III

TITLE: SINGLE LINE DIAGRAM

SIZE	SCALE	DRG. NO.	REV. NO.
A1	NTS	9999-000-POE-A-001	B



NOTES:-

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH TECHNICAL SPECIFICATION.
2. NUMBER OF BESS FEEDERS SHOWN ARE INDICATIVE. SAME SHALL BE PROVIDED AS PER PROJECT REQUIREMENT.
3. SUITABLE METERING ARRANGEMENT AND FACILITY FOR INTERFACE METERING AS PER CEA METERING REGULATION SHALL BE PROVIDED AT POINT OF INTERCONNECTION
4. BIDDER ARE ADVISED TO VISIT RESPECTIVE STATIONS BEFORE SUBMISSION OF BID FOR ASSESSING BAY AVAILABILITY, SCOPE OF WORK RELATED TO SWITCHYARD AND EHV CABLE ROUTE FROM BESS TIE TRF TO SWITCHYARD
5. ADDITIONAL INCOMER FEEDERS SHOWN IN SLD IN 33KV POOLING SWGR SHALL HAVE RATING EQUAL TO THE BESS TIE TRANSFORMER FEEDER. SPARE SHALL BE PROVIDED IN EACH SECTION OF SWITCHGEAR AS PER TECHNICAL SPECIFICATIONS.
6. INDICATIVE SLD FOR AUX POWER SUPPLY ARRANGEMENT IS INDICATED IN SEPARATE SHEET.

LEGEND:

- LIGHTNING ARESTOR
- VT
- EARTH SWITCH
- CT
- CIRCUIT BREAKER
- DISCONNECTOR
- BUSHING CT
- DOUBLE BREAK LINE ISOLATORS
- CIRCUIT BREAKER DRAWOUT TYPE
- TRANSFORMER

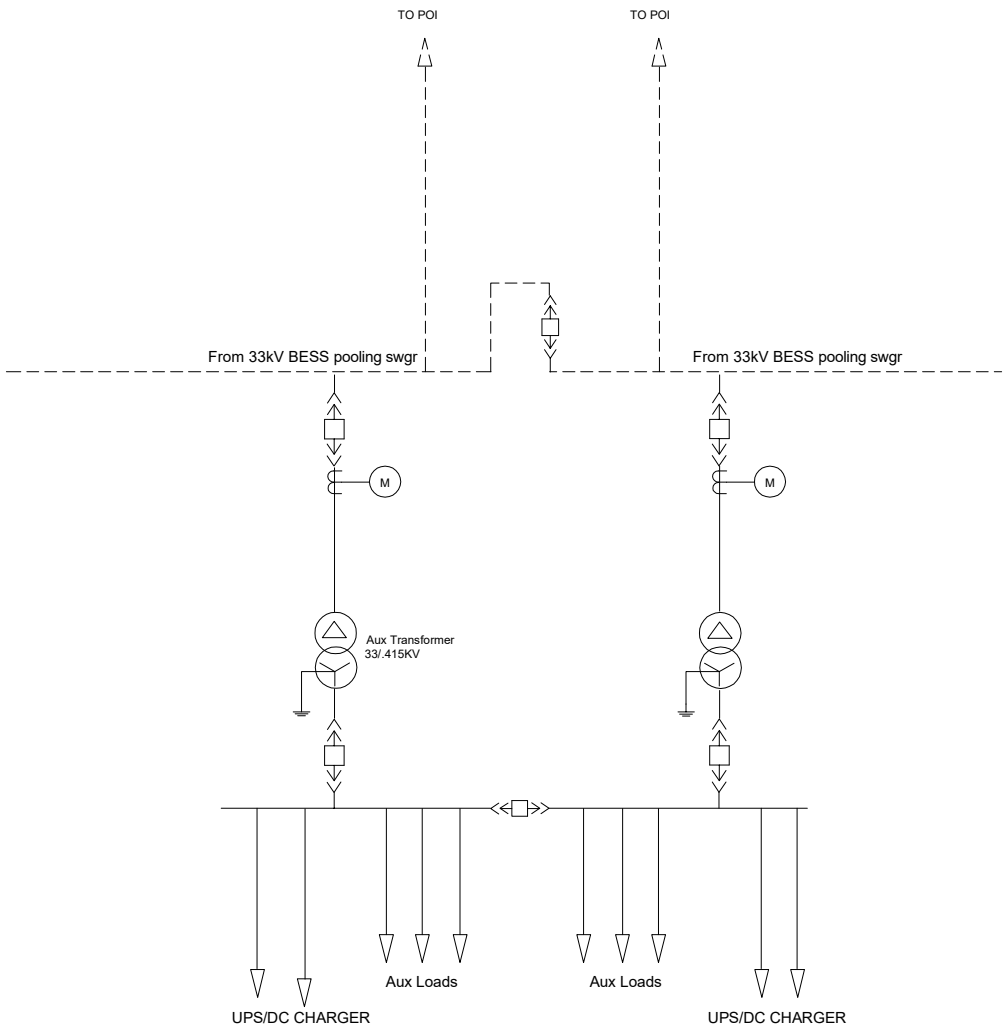
DRAWN	DESIGN	CHKD.	M	E	C	C&I	ES	APPD	DATE
			CLEARED BY						27-10-25

NTPC Limited
(A GOVERNMENT OF INDIA ENTERPRISE)
ENGINEERING DIVISION

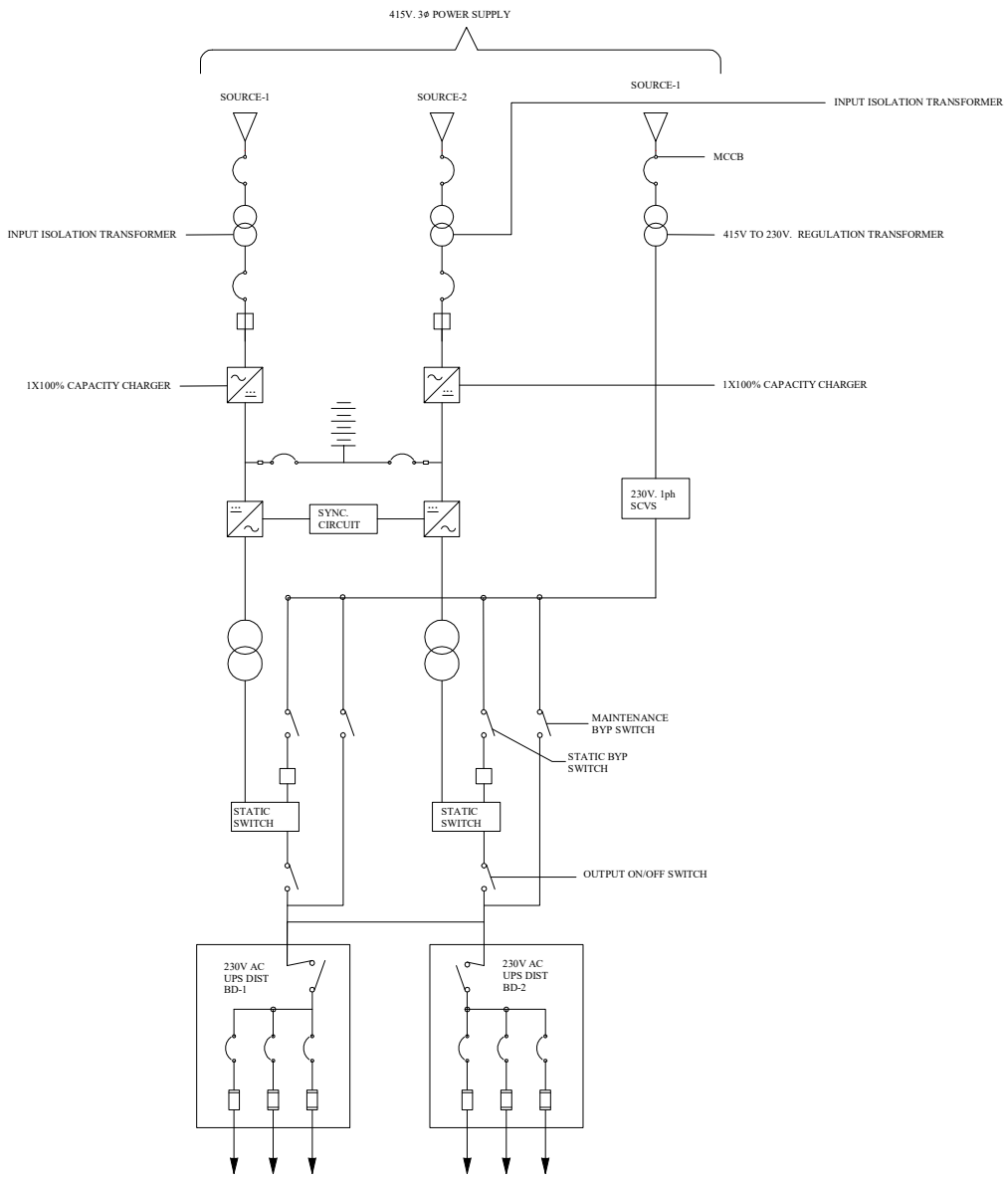
PROJECT: 75MW/150MWH BATTERY ENERGY STORAGE SYSTEM (BESS) AT SIMHADRI STPP- 1 & 2

TITLE: SINGLE LINE DIAGRAM

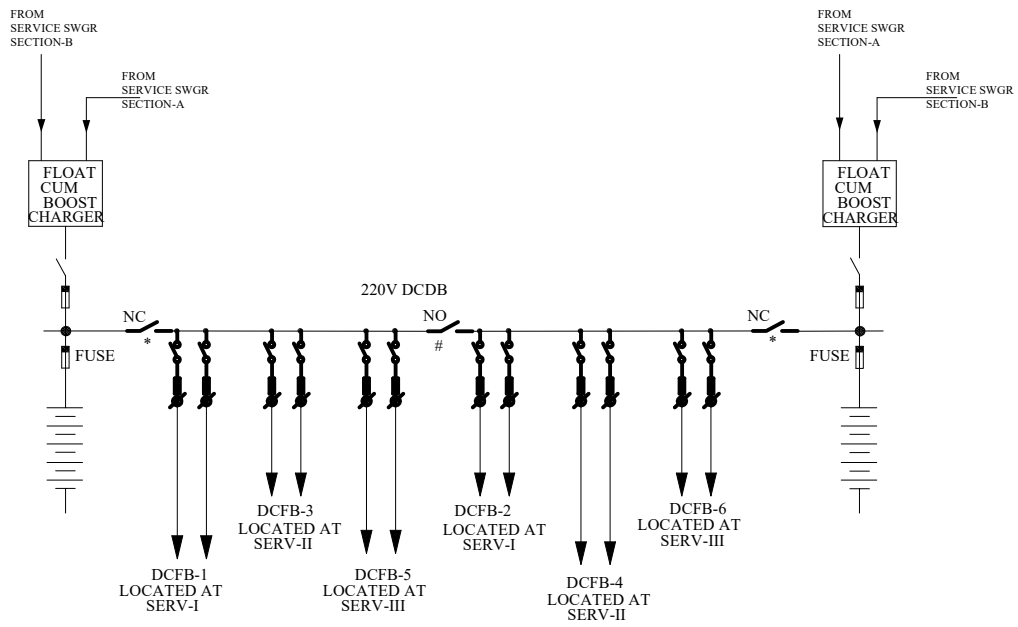
SIZE	SCALE	DRG. NO.	REV. NO.
A1	NTS	9999-000-POE-A-001	B



MULTIPLE LOAD CENTERS AS PER REQUIREMENT



TYPICAL FEEDERS FOR VITAL LOADS



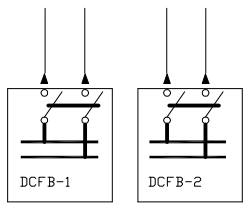
OUTGOING DC FEEDERS AS PER REQUIREMENT

LEGEND:

- LIGHTNING ARESTOR
- VT
- EARTH SWITCH
- CT
- CIRCUIT BREAKER
- DISCONNECTOR
- BUSHING CT
- DOUBLE BREAK LINE ISOLATORS
- CIRCUIT BREAKER DRAWOUT TYPE
- TRANSFORMER

NOTES:-

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH TECHNICAL SPECIFICATION.
2. NUMBER OF FEEDERS SHOWN ARE INDICATIVE. SAME SHALL BE PROVIDED AS PER PROJECT REQUIREMENT.
3. THE SELECTION OF LT OUTGOING FEEDERS SHALL BE AS FOLLOWS:
   (i) UPTO 400 A - MCCB
   (ii) ABOVE 400 A - BREAKER
4. BIDDER SHALL PROVIDE DC SYSTEM/UPS SYSTEM OF ADEQUATE CAPACITY FOR MEETING ALL DC/EMERGENCY AC LOADS.
5. SPARES IN SWITCHGEAR SHALL BE PROVIDED AS PER TECHNICAL SPEC.
6. WHEREVER NO RATING HAS BEEN INDICATED, SIZING SHALL BE CARRIED OUT AS PER SYSTEM REQUIREMENT FINAL FEEDING ARRANGEMENT TO BE DECIDED DURING DETAILED ENGINEERING.



TYPICAL AT EACH LOCATION

	DRAWN	DESIGN	CHKD.	M	E	C	C&I	ES	APPD	DATE
										27-10-25

CLEARED BY

NTPC Limited
(A GOVERNMENT OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT: BATTERY ENERGY STORAGE SYSTEM (BESS) AUX POWER SUPPLY ARRANGEMENT

TITLE: SINGLE LINE DIAGRAM

SIZE	SCALE	DRG. NO.	REV. NO.
A1	NTS	9999-000-POE-A-001	B