TENDER DOCUMENTS
FOR
SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF DG, TRANSFORMER (CSS TYPE), PANEL ETC. FOR EXTERNAL ELECTRICAL SYSTEM OF 33/11 KV IN CONNECTION WITH PROPOSED K D MALAVIYA NATIONAL OIL MUSEUM AT KHANAPARA, GUWAHATI, ASSAM

TENDER NO. CMD007.12.35(WORKS)/23-24/02, DATE – 02.05.2023

.....

(Name of the Company)

CREATIVE MUSEUM DESIGNERS

(Section 8 company guaranteed by National Council of Science Museums)

NCSM Campus, 33, Block- GN

6th Floor, CRTL Building – II, Sector-V

Bidhan Nagar, Kolkata-700091

Website: www.cmdncsm.in

TENDER DOCUMENT

FOR

SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF EXTERNAL ELECTRICAL WORK

FOR

CONSTRUCTION OF K.D. MALAVIYA NATIONAL OIL MUSEUM, GUWAHATI

FOR

CREATIVE MUSEUM DESIGNERS

ISSUED TO: .....

INDEX OF TENDER DOCUMENT

Sl. No	Heading	Page No
1.	Notice Inviting Tender & Qualifying Criteria in **ANNEXURE – A, ANNEXURE – A1, ANNEXURE – A2, ANNEXURE – A3.**	4-18
2.	Appendix to Notice Inviting Tender (NIT) & Instructions to Bidder (ITB).	19-26
3.	Format for Letter of Submission, No-Deviation Certificate, Declaration & Undertaking as per **ANNEXURE – B, ANNEXURE- C1, ANNEXURE – C2, ANNEXURE – C3 & ANNEXURE – C4.**	27-32
4.	Format for BANK GUARANTEE BOND (EMD).	33
5.	Format for BANK GUARANTEE BOND (Security Deposit/ Performance Bank Guarantee).	34-35
6.	Format for OFFER FORM.	36
7.	Format for LETTER OF INTENT.	37
8.	Format for ARTICLES OF AGREEMENT.	38-40
9.	General Conditions of Contract (GCC).	41-66
10.	Special Conditions of Contarct (SCC).	67-80
11.	Notes on External Electrical Installation Works.	81-91
12.	Technical Specifications.	92-151
13.	List of Approved Makes.	152
14.	Schedule of Quantities & Rates (SOQR) as per **ANNEXURE - D** & Summary of Price as per **ANNEXURE - E** *(To be filled by tenderer).*	153-162
15.	**BAR CHART** Programme .	163
16.	Tender Drawings: (a)KDMN/OMG/ELEC/TD-1 (b)KDMN/OMG/ELEC/TD-2	02 Nos

NOTICE INVITING TENDER

Tender No. CMD007.12.35(WORKS)/23-24/02

No. CMD007.12.35(WORKS)/23-24/02 **Date: 02.05.2023**

1. The Creative Museum Designers is a Section 8 Company guaranteed by National Council of Science Museums, Kolkata.

2. Sealed tenders are hereby invited from reputed and experienced Engineering/Technical contractors capable of carrying out the work of **"Supply, Installation, Testing & Commissioning of DG, Transformer (CSS type), Panel etc. for External Electrical system of 33/11 KV in connection with Proposed K. D. Malaviya National Oil Museum at Khanapara, Guwahati, Assam**" having resource and adequate past experience during the preceding five years in executing works successfully of similar nature to that referred herein above.

3. The place of work would be **K D Malaviya National Oil Museum, Khanapara, Guwahati, Assam, 2 Kms from the City Centre and 0.5 Kms away from NH-37.**

4. Estimated cost of the work is approximately ₹**3,30,67,339.00 (including GST)**

5. Time of completion of work will be **06 (Six)** months from the date of issuance of Letter of Intent for Supply, installation,testing and commissioning of external work. Order for equipments like CSS, DG & Panels should be places immidiatley after receiving of Letter of Intent (LOI).

Defect Liability Period will be up to 01 (One) year after successful completion of SITC of entire electrical system under scope of the tender.

6. Contract documents consist of the NIT, General Conditions of the Contract, Special Condition of Contract, one set of tender drawings, Technical Specifications, schedule of quantities and rates of various items, Summary of Price etc.

7. The set of tender documents will be issued between 11.00 AM and 6.00 PM on any working day from **06.05.2023** to **26.05.2023 and also available in our website (www.cmdncsm.in) from 06.05.2023.** Completed tender documents will be received **up to 27.05.2023 till 11.00 AM** and will be opened on the same day at 03.00 PM in the conference hall of CMD in the presence of the tenderers or their authorized representatives who may like to attend. Tenderers may note that opening of the tenders in their presence or in the presence of their authorized representatives is not obligatory on the part of the Company. In case the tenderers or their authorized representatives are not present, tenders will be opened as per rules and on scheduled time and date unless it is notified otherwise by the Company earlier. The Company reserves the right to alter the dates of issue, receipt and or opening of tenders etc. if so necessary.

Corrigendum, Addendum etc. pertaining to this tender, if any, will be available in Company's website (www.cmdncsm.in) only.

7.1 **Prebid Discussion**: Prebid discussions will be held on **19.05.2023** at **11.00 AM in the office of Creative Museum Designers, Saltlake, Kolkata – 700091** in presence of Consultants and the intending bidders.

8. BIDDER QUALIFICATION CRITERIA:

Bidders intending to participate shall fulfil the following qualification criteria:

8.1 **Experience Criteria (techno- Commercial)**

8.1.1 Bidders shall fulfil the following experience criteria

The bidders should have experience of executing similar work i.e. Supply, Installation, testing & commissioning of DG, Transformer (CSS type), Panel etc. for external electrical system of 33/11 KV of having minimum contract values as indicated below in last 07 (seven) years reckoned from the due date for submission of bid. Bidders have to submit copies of Work Order (s)/ Letter of Intent(s), Job Completion Certificate(s) / relevant documents etc. confirming proof of execution of work/ executed value of work of similar in nature.

a) One contract having minimum value of 80% of estimated value **(₹2,64,53,871.00)**
b) Two contracts each having minimum value of 50% of estimated value **(₹1,65,33,670.00)**
c) Three contracts each having minimum value of 40% of estimated value **(₹1,32,26,936.00)**

Similar work means supply, installation,testing & commissioning of Electrical work for educational institution / software IT park/office buildings, multi storied buildings/ industrial projects etc. successfully with high quality of workmanship & time.

Bidder should have to submit their Bid as an individual agency but not as Joint Venture or Associate / Consortium with other agency. Bidders in the form of Direct or Indirect Joint Venture / Consortium/ Special Purpose Vehicle (SPV)/ Special Purpose Entity (SPE) are not permitted.

8.1.2 The bidders must have experience in execution of High Tension Line work (i.e. 33/11 KV) including Testing & commissioning of all panels and cables with suitable electrical license holder technician as per relevant IE Rules.

8.2 **Financial Criteria**

8.2.1 **Annual turnover :** Bidder must have minimum average annual financial turnover **Rs. 3.30 Crs. (Rupees Three Crore Thirty Lakh Only)** during the last three financial years ending 31st March, 2023 i.e, 2020-2021, 2021-2022 & 2022-2023. The copies of audited balance sheet / Certificate of Chartered Accountant to be submitted.

8.2.2 **Bank Solvency** : Bidder must have a Latest Bank Solvency of **Rs.1.65 Crs**. The Bidder shall have to submit in original/ attested copy of the Latest Bank Solvency Certificate, not older than 03 (three) months prior to date of issue of this Tender., issued by any Nationalized/ Scheduled Bank.

8.2.2a**) Net worth** : Bidder shall not have incurred any loss in more than two years during the last five years ending 31.03.2023. Bidder should submit net worth certificate duly certified by a practising Chartered Accountant.

b) The bidder must have PAN issued by the Income Tax Department of India.

c) Bidder should have GST, PF & ESI registration with the concerned authority.

9. Bidder having pending Litigation / Court Case with CMD/ NCSM / OIL against previous Tender/ Contract, will not be considered.

''ANNEXURE –A''

10. Bidders are requested to furnish the following details in seriatim as under, in support of Prequalification criteria

Conditions for Qualification:

Sl. No.	Description	To be filled by agency
1.	Name of the Agency	
2.	Year of Establishment	
3.	Registered office with full address	
4.	Full Postal Address of communication	
5.	Telephone Number(s) of office	
6.	Contact person Name with Mobile No.	
7.	Fax number	
8.	E-Mail ID	
9.	Website if any	
10.	i. Nature of Entity - Limited Company, Partnership etc. (attach copy of partnership Deed/ Certification of incorporation as applicable) ii. Date of Incorporation	
11.	The bidder should have to submit their Bid as an Individual Agency i.e. not as Joint Venture or Associate/ Consortium with other Agency. Bidders in the form of Direct or Indirect Joint Venture/ Consortium/ Special Purpose Vehicle (SPV) / Special Purpose Entity (SPE) are not permitted	
12.	Name (s) of Director / Proprietor / Partners with address and telephone nos.	
13.	Technical Staff employed (Attach a separate of sheet of the employees with qualifications)	
14.	Qualification Criteria: A. Techno Commercial Criteria: The bidders should have experience of executing similar work i.e. Supply, Installation, Testing & Commissioning of External Electrical work in any	

	educational institution / software IT Park/ office buildings, multi storied buildings/ industrial projects etc. of having minimum contract value as indicated below in last 7(seven) years reckoned from the due date for submission of Bid document **i. One contract having minimum value of 80% of estimated value (₹2,64,53,871.00)** **ii. Two contracts each having minimum value of 50% of estimated value (₹1,65,33,670.00)** **iii. Three contracts each having minimum value of 40% of estimated value (₹1,32,26,936.00)** **The bidders must have experience in execution of High Tension Line work (i.e. 33/11 KV) including Testing & commissioning of all panels and cables with suitable electrical license holder technician as per IE Rules.**	
	B. Financial Criteria: **i. Average Annual Turnover for last 5 (five) years** **ii. Net worth** **iii.Bank Solvency Certificate from Nationalized Bank/ Scheduled Bank**	
15.	**PAN of Bidder with supporting document**	
16.	**PF/ ESIC/ GST Registration etc. of Bidder with documentary evidence**	
17.	**Copy / copies of completion certificate(s) of similar type of work(s) (Notarised Copy) stated in Sl. No. 14.A above duly certified by respective Owner(s) / Client(s) mentioning name and nature of work(s), date(s) of commencement and value(s) of the job(s) executed in last 7(seven) years.**	
18.	**Yearly Sales Turnover and Audited Balance Sheet duly signed by Chartered Accountant with his / her**	

	Seal, Signature & Registration Number for Last 3 (three) years i.e. 2020-2021, 2021-2022 and 2022-2023.	
19.	**P.F. Registration No. (if not registered with PF Department, successful Bidder have to take Registration within one month from the date of Award).**	
20.	**Current Income Tax Deposition Acknowledgement.**	
21.	**Constitution and legal status along with attested copies of Deeds / Articles and Memorandum of Association etc. as applicable.**	
22.	**Power of Attorney in favour of the Signatory, signing the bid document (In case of other than Proprietor / CEO / Partner etc.).**	
23.	**Whether any Civil Suit / Litigation arisen in the contracts executed during the last 5 years / being executed. If yes, please furnish the name of the contract, employer, nature of work, contract value, work order and date & details of litigation briefly**	
24.	**Details of work in hand and current commitment. (As per enclosed ANNEXURE – A2)**	
25.	**No Deviation Certificate in Bidder's Letter Head (ANNEXURE – C1)**	
26.	**List of Plant & Machineries & other construction equipment's owned by the Firm. (As per ANNEXURE – A3)**	
27.	**List of Clients (Details with Location) As per enclosed ANNEXURE – A1**	

Important Notes:

1. **Bidder is liable to be disqualified, even though they meet the qualifying criteria, if they :**

a) **Made misleading or false representations, statements and attachments submitted in proof of the qualification requirements, and / or**

b) **Record of poor performance such as abandoning the works, not properly completing the supply order, inordinate delays in execution or supply, litigation history, or financial failures etc.**

c) **If the tenderer deliberately gives wrong information / submit fake, false, fabricated, forged documents in his tender, CMD reserves the right to reject such tender at any stage or to cancel the contract if awarded and forfeit the Earnest Money / Security Deposit / any other money due.**

2. **The Bidder must provide any further details required for the review upon request from CMD. Failure to comply with any request of CMD for such information will result in rejection of their offer.**
3. **CMD may, in its absolute discretion suspend or disqualify a Bidder/ Bidders who, at any time, is considered to have breached any of the qualification conditions or has performed in an unsatisfactory manner without assigning any reason whatsoever.**
4. **CMD will not be liable for any loss or damages incurred by the bidder/ bidders in the above exercise.**

I / We hereby solemnly declare that all the information / statements are true to the best of my / our knowledge. I / We also declare that my / our firm is not involved in any Litigation or Arbitration with any company for last 5 years. I / We further declare that the decision of Creative Museum Designers regarding finalization of Empanelment of contractors shall be final and binding on me/ us.

Place:

Date:

(Signature with date & seal)

N.B.: All the documents shall be submitted in Hard Copies.

"ANNEXURE – A1"

TABLE A: DETAILS OF ALL WORKS OF CLASS/ NATURE COMPLETED DURING THE LAST SEVEN YEARS

S. No.	Name of work/ project and location (Give brief of nature of work)	Name of the Owner/organization and designation Name of officer signing agreement	Cost of works in crores of rupees Estimated cost put to tender Tendered Cost	Stipulated date of start as per agreement Actual date of start	Stipulated date of completion Actual date of completion	Litigation/ Arbitration Pending / inprogress withdetails*	Name and Address and Phone no. of officer to whom reference may be made	Give brief reason for delayin execution, if any	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)

* Indicates gross amount claimed and amount awarded by arbitrator

Signature of applicant(s)

''ANNEXURE – A2''

TABLE-B: PARTICULARS OF CURRENT PROJECTS IN PROGRESS/AWARDED

PARTICULARS OF PROJECTS UNDER EXECUTION OR AWARDED

S. No.	Name of work/ project and location (Give brief of nature of work) Role in project (as main contractor or Sub Contractor, State name of maincontractor)	Name of client Owner or organization	Cost of Works in crores of rupees Estimated cost put to tender Tendered Cost	Stipulated date of start as per agreement Actual dateof start	Stipulated date of completion	Up to date percentage progress of work	Slow progress if any and reasons thereof	Name and Address/ Phone no.of officer to whom reference may be made	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)

Certified that the above list of works is complete and no work has been left over and that the information given is correct.

Signature of applicant(s)

TABLE-C: PARTICULARS OF SIMILAR PROJECTS COMPLETED IN THE LAST SEVEN YEARS

DETAILS OF ALL WORKS OF SIMILAR CLASS COMPLETED DURING THE LAST SEVEN YEARS ENDINGLAST DAY OF THE MONTH AS ON 31/03/2023

S. No.	Name of work/ project and location (Give brief of nature ofwork)	Owner or organization name and designation Of officer signing agreement	Cost of Works in crores of rupees Estimated cost put to tender Tendered Cost	Stipulated date of start as per agreement Actual dateof start	Stipulated date of completion Actual date of completion	Litigation/ Arbitration Pending in progress with details*	Name and Address and Phone no. of Officer to whom reference may be made	Give brief reason for delay in execution	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)

Signature of applicant(s)

''ANNEXURE – A3''

TABLE-D: LIST/DETAILS OF PLANT & EQUIPMENT LIKELY TO BE DEPLOYED/ USED ON THE PROJECT/ WORKSHOP

S. No.	Name of equipment	Capacity / specification	Age	Condition	Quantity	Ownership Status			Current Location	Remarks
						Personally owned	Leased	To be purchased		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)

Signature of applicant(s)

11. **Earnest Money**:

a) The Earnest Money amounting to **Rs. 8,26,684/- (Rupees Eight Lakh Twenty Six Thousand Six Hundred Eighty Four Only)** being approx.2.5% of the estimated value of the work (rounded off to the nearest hundred), only in the form of **Bank Guarantee/ Pay Order/ Demand Draft/ Banker's Cheque/ NEFT** from any Nationalized Bank/Scheduled Bank. For NEFT, the details of our Banker is furnished as below:

Details of Bankers:			
Bank Name:	1. STATE BANK OF INDIA		2. INDIAN OVERSEAS BANK
Beneficiary Name:	CREATIVE MUSEUM DESIGNERS		CREATIVE MUSEUM DESIGNERS
Bank Address:	State Bank of India, Swasthya Bhawan, Institute of Family & Health Welfare, 29, GN Block, Sector V, Bidhan Nagar, 700091	or	Indian Overseas Bank, GN 34/2, Sector - V, II Studio, Saltlake, Kolkata - 700091, West Bengal, India
A/c No.:	35354841157		164201000001214
IFSC Code:	SBIN0010043		IOBA0001642

Bank Guarantee/ Pay order/ Demand Draft/ Banker's Cheque / NEFT to be drawn in favour of **Creative Museum Designers payable at Kolkata**. Demand Draft/ Banker's Cheque/ Documents confirming NEFT(amount must be credited to CMD's account as mentioned above on or before the last date of submission i.e. **27.05.2023 up to 11.00 AM**) for the Earnest Money Deposit must accompany the part I of tender as indicated in Clause 20 below. All the tenderers must submit their complete document within the last date of submission i.e. **27.05.2023 up to 11.00 AM**. Tenders received after the due date and/ or without Earnest Money Deposit (EMD) will be summarily rejected. No deviation from the mode of depositing Earnest Money stipulated above will be permissible and any deviation will render the tenders liable for rejection.

The validity period of Bank Guarantee (EMD) shall be minimum 120 (One hundred twenty) days from the due date of opening of tender with claim period up to 12(Twelve) months. This validity period of B.G may be extended with mutual consent, if required by CMD for any unavoidable reason(s).

b) **Demand Draft / Pay Order/ Banker's Cheque/ NEFT** must be drawn only on Nationalized Bank/Scheduled Bank at the place mentioned in Clause 11 above, failing which the Earnest Money deposited shall be deemed as inadequate, and the tender shall be liable for rejection.

c) EMD of unsuccessful bidders/ tenderers shall be returned upon finalisation of the Tender, without any interest.

11.1 **Tender Fees** : Tenderers / Bidders to submit **Rs. 5,900/- (Rupees Five Thousand Nine Hundred Only) including GST,** towards the cost of Tender Document By **Demand Draft / Banker's Cheque/ Pay order/ NEFT** and to be drawn in favour of Creative Museum Designers , payable at Kolkata as per details given in Clause 11 above.

Tender Fees is NON- REFUNDABLE.

12. **Security Deposit (SD):**

The successful bidder shall deposit **10%** of total contract value as **Security Deposit/Retention Money in the form of Demand Draft or Bank Guarantee**. The EMD submitted by the

successful bidder will be returned after receiving total 10% of contract value as security deposit in the form of Demand Draft/ Bank guarantee. The security deposit so submitted in the form of Demand Draft will be retained till completion of Defect Liability Period without any interest. The security deposit so submitted in the form of Bank Guarantee shall have validity period up to completion of Defect Liability Period (DLP) plus 01 (one) year claim period. Please refer to the Clause 17 of General Conditions of Contract.

13. Tenderers, who do not fulfil any of the above conditions or are incomplete in respect of any document(s) supporting the above qualification criteria are liable for summary rejection.

14. The company does not bind itself to accept the lowest tender and reserves to itself the authority to reject or partially accept any or all the tenders, tendered items or schedules received without assigning any reason whatsoever.

15. Canvassing in connection with tenders is strictly prohibited and the tenders submitted by the tenderers who resort to canvassing will be liable for rejection on that ground alone.

16. Tenders incorporating additional conditions are liable to be rejected.

17. The tenderers must declare in writing that they are no way related to any official(s) in the Creative Museum Designers, Kolkata and National Council of Science Museums (NCSM), Kolkata.

18. All Applicable Statutory Taxes and Duties on equipments, GST on materials & services, freight & transit Insurance F.O.R. site and any other payments to be made to the local authorities for the completion of the job will be inclusive in the rate offered by the successful tenderer & payable by them. Nothing extra will be payable for increase in such taxes or duties even if imposed or levied either before or after the tenders are opened or during currency of contract.

19. Before submitting the tender, the tenderer shall examine all specifications, drawings, conditions of contract and inspect the site. The tender must be balanced in respect of individual items so that the rates quoted shall remain in force even if the quantities deviate before or during the execution of the work.

20. The tender must be submitted [in two separate sealed covers marked Part I (Techno-Commercial bid) and Part II (Financial bid)] and addressed to the Company and each envelope super scribed ‘‘Tender for **Supply, Installation, Testing & Commissioning of DG, Transformer (CSS type), Panel etc. for External Electrical System of 33/11 KV in connection with Proposed K D Malaviya National Oil Museum, Khanapara, Guwahati, Assam** ----Part I (Techno-Commercial bid) Due Date on……’’ and ‘‘Tender for **Supply, Installation, Testing & Commissioning of DG, Transformer (CSS type), Panel etc. for External Electrical System of 33/11 KV in connection with Proposed Construction of K D Malaviya National Oil**

Museum, Khanapara, Guwahati, Assam -------Part II (Financial bid) Due Date on……..'' and finally both PartI & Part II to be sealed in a separate sealed envelope supercribing ''Tender for **Supply, Installation, Testing & Commissioning of DG, Transformer (CSS type), Panel etc. for External Electrical System of 33/11 KV in connection with Proposed Construction of K D Malaviya National Oil Museum, Khanapara, Guwahati, Assam.** ''

The contents of Part I & II will be as follows:

(a) The sealed cover marked Part I shall contain the following documents only:

(i) Earnest Money and Tender Fees in the form as described in Clause 11 of the Notice Inviting Tender (NIT).
(ii) Documents in support of Bidders qualification criteria as per Clause 8 above.
(iii) An up to date and valid Income Tax Clearance Certificate/ Return for last 03 (three) years of the bidder in original or true copy thereof duly attested by a Gazetted Officer/ Chartered Accountant and the Permanent A/C No. Of the bidder.
(iv) Forwarding letter (in duplicate) clearly indicating the documents attached therein. The tenderer has to clearly state in the forwarding letter that he has not quoted any extra condition along with the tender in title Part II sealed envelope.
(v) Each and every pages if the tender document to be duly signed and stamped by the tenderer.
(vi) Necessary Power of Attorney/ Authorization in favour of the person, signing the tender document to be submitted.
(vii) Declaration as per **ANNEXURE – C2**.
(viii) Declaration for No-Deviation of Tender as per **ANNEXURE – C1**

(b) The sealed cover marked Part II shall contain the Offer Form complete with financial bid i.e. Schedule of Quantities & Rates (As per **ANNEXURE – D**) and Summary of Price Sheet (As per **ANNEXURE - E**) duly signed and stamped by the tenderer on each and every pages and should not have any additional condition whatsoever. If any such additional conditions found in this cover it will not be taken into consideration and will not form part of the tender.

21. For the purpose of opening of the tenders as described in Clause 7 of the Notice Inviting Tender (NIT) it is clarified that only the sealed envelope marked Part I will be opened first. Initially the documents contained in Part I will be opened & scrutinized and agencies will be shortlisted for opening the Part II. The shortlisted agencies will be informed about the opening date & time of Part II. In case documents in envelope marked Part II are not opened at all, the same will be returned to the tenderer treating it as invalid and his/their acknowledgements will be obtained in token of receipt of the same.

22. However, after opening Part I, if required, CMD may send communications through email to tenderers seeking necessary documents, clarifications etc. for the purpose of qualification.

23. Earnest Money is liable to be forfeited if the successful tenderer selected for the work fails to submit the acceptance of Letter of Intent (LOI) within 07 (seven) days & sign the formal agreement within 30 (Thirty) days from the date of issue of Letter of Intent (LOI) by the Company.

24. The successful tenderer will be issued a Letter of Intent by the Company and will be given 15 (fifteen) days mobilisation time which shall be counted from the date of issue of the Letter of Intent (LOI). Within the mobilisation time the tenderer must scrutinise all the drawings, CPM/PERT/ BAR CHART, specifications, etc. and obtain clarifications from the authority wherever necessary and submit a revised & detailed BAR CHART. During the mobilisation time, the tenderer shall also mobilise all his resources including men and materials, obtain the supply of water and electricity necessary for construction, erect a temporary office/godown at site and sign an Agreement with the Company in approved format on a non-judicial stamp paper of Rs. 100/- (Rupees One Hundred only). The date of commencement of work shall be the date of issue of Letter of Intent (LOI).

25. The validity period of the tender shall be 120 (One hundred twenty) days from the date of opening of tenders. This period may be extended with mutual consent if required by CMD for any unavoidable reason(s).

APPENDIX TO NOTICE INVITING TENDER

(a) SUMMARY CONDITIONS OF CONTRACT		
Name of Work	:	Supply, Installation, Testing & Commissioning of DG, Transformer (CSS type), Panel etc. for External Electrical System of 33/11 KV in connection with Proposed K. D. Malaviya National Oil Museum, Khanapara, Guwahati, Assam
Architect	:	Kothari & Associates, 14B, Camac Street, Kolkata - 700017
Scope of Work	:	Supply, Installation, Testing & Commissioning of DG, Transformer (CSS type), Panel etc. for External Electrical System.
Defect Liability Period (DLP)	:	**01 (One)** Year from the date of completion as certified by the Company.
Time of Completion	:	**06 (Six)** months from the date of letter of intent as per Clause 5 & 24 of NIT.
Minimum value of work for Interim Payment (Running Account Bill)	:	**75 (Seventy five)** lakhs only and 01 (one) running account bill will be processed in a month.
Cost of Tender (Non Refundable)	:	**Rs. 5,900/- (including GST).**
Earnest Money to be deposited with the tender	:	**Rs. 8,26,684/-** (Rupees Eight Lakh Twenty Six Thousand Six Hundred Eighty Four only).
Liquidated damages for non-completion of work in time [Clause 61d of the General Conditions of Contract (GCC)]	:	0.5 (Zero point Five) percent per week of the contract value subject to a maximum of 10% (ten percent) of the contract value awarded.
Payment terms	:	Electrical & Instrumentation Works for Supply & Installation: ➢ 60% after receipt of materials at site and site inspection clearance. ➢ 30% after erection/ installation on foundation, alignment & grouting (wherever required), Installation / laying of Electrical and Instrument items. ➢ 5% on completion of testing and commissioning etc. on pro rata basis. ➢ 5% on completion of total work in all respects and issuance of completion certificate etc.

(b) RETENTION MONEY FOR INTERIM PAYMENT		
Security Deposite /Retention Money	:	10% of the Contract Value including Earnest Money Deposit (EMD) as follow, i. EMD: 2.5 % of the tender value. ii. Performance Guarantee: 7.5% (including 2.5% EMD) of contract value. iii. Balance amount 2.5% of Contract Value to be deducted from each Running Account Bill & Final Bill and shall be kept as Retention Money. Or Total 10% by Bank Guarantee to be submitted upon award of work.
Performance Guarantee	:	On receipt of the L.O.I from CMD by the successful tenderer shall furnish a Bank Guarantee or Demand Draft (From Nationalized Bank/Scheduled Bank) in favour of Creative Museum Designers, Kolkata of an amount equivalent to 7.5% (including 2.5% EMD) of the contract value towards PERFORMANCE GUARANTEE, valid up to completion time plus additional 12 (twelve) calender months from the date of completion time with claim period of 01 (one) year thereafter. The same shall be submitted within 15 (fifteen) days from the date of issuing Letter of Intent (LOI).
Release of Security Deposit/ Retention Money/ Performance Guarantee	:	Shall be released after completion of Defect Liability Period (DLP) of the contract, without any interest.
Escalation Clause	:	Not applicable for this contract
Period of submitting final bill by the successful bidder	:	Within 03 (three) months from the date of virtual completion of SITC of External Electrical Work

INSTRUCTIONS TO BIDDERS

1.	**SINGLE PERCENTAGE BASED** Bids are invited by CMD in **two part system** from resourceful & capable tenderers fulfilling the Qualifying Criteria furnished in **ANNEXURE – A, ANNEXURE – A1, ANNEXURE – A2 & ANNEXURE – A3** of the NIT by Creative Museum Designers (CMD) for the work : "**Supply, Installation, Testing & Commissioning of DG, Transformer (CSS type), Panel etc. for External Electrical System of 33/11 KV in Connection with K D Malaviya National Oil Museum at Khanapara, Guwahati, Assam.".**
	Procedure for Submission of Bid:
	Tender Fee – The Tenderer must submit **₹ 5,900.00 (Rupees Five thousand nine hundred only) including GST** as cost of Tender Document (TD) (non-refundable) in the form of A/c Payee **Demand Draft (DDs) / Pay Order/ Banker's Cheque/ NEFT** in favour of Creative Museum Designers (CMD) payable at Kolkata as cost of Tender Document (Non-refundable) along with their offer.(No A/c Payee Cheque/ Cash shall be considered).Tax Invoice shall be prepared by CMD, Kolkata Office for cost of tender document. The Offer of the Bidder shall not be considered further if the Cost of Tender Document and EMD are not submitted in the form and manner as stated above and their offer is liable to be rejected.
	In case of non-submission of Tender Fee, EMD and any other documents (Hard-copy) specified in NIT /Tender Document, the offer will be summarily rejected.
	Under no circumstances the Tenderers should incorporate any changes/ modifications etc., in the Tender Document itself to avoid rejection of their Tenders.

	If any tenderer withdraws or make any changes in his offer already submitted before the expiry of the above validity period or any extension thereof without the written consent of the company, the offer may be liable to be cancelled and the amount submitted by the bidder against EMD will be forfeited.	
	Prebid Discussion: Prebid discussions will be held on **19.05.2023** at **11.00 AM** in the office of **Creative Museum Designers, Saltlake, Kolkata** in presence of Consultants and the intending bidders.	
	Bid shall be submitted **in two part system**:	
	Part I (Techno – Commercial):	Containing one Copy each of following documents :
		(i) Bidder should submit the Tender Fee, Letter of Submission (in Company's letter head); Detail of information to be furnished by

		the bidder and Power of Attorney in favour of the person who has signed the bid, Earnest Money Deposit (EMD).
		(ii) No Deviation Certificate (as per **ANNEXURE – C1**), Format for declaration & undertaking (as per **ANNEXURE – C2, ANNEXURE – C3 & ANNEXURE – C4**) in Bidder's Letter Head to be furnished by the bidder.
		(iii) Documents pertaining to Qualifying Criteria furnished in Clause 10 of the NIT.
		(iv) Signed & Stamped **NIT, ITB, GCC, SCC, Technical Specification, Un-priced SOQR** with the word **" Quoted"** written against each Item, Drawing i.e. complete NIT documents as a token of acceptance along with all other submittals as prescribed in the Bidding document.
	Part-II (Financial bid):	The Financial Bid format is provided in **Offer Form,** the rates offered should be entered on SINGLE PERCENTAGE RATE basis (to be applicable on all items) on the "Summary Sheet" as provided in **ANNEXURE - E**. The Financial Bid / SOQR template must not be modified / replaced by the bidder; else the bid submitted is liable to be rejected for this tender.

		Telegraphic or Fax or Email offers shall not be accepted under any circumstances.
		Due date for submission of tender document is 27.05.2023 upto 11.00 hrs. and shall be addressed to, **Head of Engineering - Civil,** **CREATIVE MUSEUM DESIGNERS** **NCSM Campus, 33, Block-GN, Building-II** **Bidha Nagar, Sector –V, Kolkata – 700091** **Phone No. 033 2357 6041** **Email:cmd.ncsm.civil@gmail.com**

2.	**Tender Validity** Tender submitted by tenderer shall remain valid for acceptance for a period **of 120 days** from the last date set for submission of the tender. The tenderer shall not be entitled within the said period of 120 (one hundred twenty) days to revoke or cancel or vary the tender given or any item thereof, without the consent of CMD. In case tenderer revokes or cancels or varies his tender in any manner without the consent of CMD, within this period, his earnest money/retention money will be forfeited.

3.	This Tender is Percentage based Item rate tender with estimated rates already mentioned in the Bill of Quantities (BOQ)/ Schedule Of Quantities & Rates (SOQR). Bidder has to quote percentage variation from the same (On total amount only) proposed by him either in positive or in negative or at par as the case may be in the Summary Sheet and Offer Form provided separately. Summary sheet & Offer Form and Bill of Quantities (BOQ)/ Schedule Of Quantities & Rates (SOQR) duly stamped & signed by the authorised signatory shall only be included in the PRICE BID
4.	Price Bids of those Bidders who will be Techno-commercially qualified for the subject tender on the basis of evaluation of techno commercial bids, will be opened on specified date. The date & time to opening the Financial bid (Package –II) of tender shall be **intimated to the qualified bidders only through EMAIL**.
5.	The complete Tender Document and all other relevent documents pertaining to this tender shall be submitted by the Tenderers duly signed and stamped as a token of Tenderer's acceptance.
6.	**EVALUATION OF BIDS** Technical Bids submitted by the tenderers will be opened first and evaluated based on documentary evidences submitted along with the offer for qualification. After qualification of Bidders, Price Part of the Tender will be considered for opening in respect of the qualified tenderers only for Evaluation of Price.
7.	**AUTHORISATION AND ATTESTATION** Tenders shall be signed by a person duly authorized/empowered to do so. An attested copy of the Power of Attorney, in case the tender is signed by an individual other than Director/ Proprietor / Partner etc. shall be submitted along with the tenders.
8.	**LANGUAGE** The tenderer shall quote the rates **in English language.**
9.	The successful Tenderer shall accept Letter of Intent (LOI) & sign the formal agreement within 30(Thirty) days from the date of issue of Letter of Intent (LOI) by the Company, failing which the award of work may be liable to be cancelled alongwith encashment of Bank Gaurantee / Demand Draft etc. as submitted towards EMD by the bidder..
10.	**Tenderers are advised to inspect and examine the site and its surroundings and satisfy themselves before submitting their tenders** about the nature of the work and site situation,

	environments, facilities available, position of material and labour, means of transport and access to Site (so far as is practicable), the form and nature of the site, the accommodation they may require and in general shall themselves obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their tender. No claim will be entertained later on the grounds of lack of knowledge of any of these conditions. A tenderer shall be deemed to have full knowledge of the site whether he inspects it or not and no extra charges consequent on any misunderstanding or otherwise shall be allowed. The tenderer shall be responsible for arranging and maintaining at his own cost all materials, tools & plants, water, electricity, access, facilities for workers and all other services required for executing the work unless otherwise specifically provided for in the contract document. Submission of a tender by tenderer implies that he has read these instructions and all other contract documents and has made himself aware of the scope and specifications of the work to be done and local conditions and other factors having a bearing on the execution of the work.

11	**REJECTION OF TENDER AND OTHER CONDITIONS**
11.1	CMD does not bind itself to **accept the lowest** or any other tender and reserves to itself the authority to reject any or all the tenders received without assigning any reason thereof. Tenders in which any of the prescribed condition is not fulfilled or any condition including that of conditional rebate is put forth by the tenderer shall be liable for rejection.
11.2	Conditional tenders, unsolicited tenders, tenders which are incomplete or not in the form specified or defective or have been materially altered or not in accordance with the tender conditions, specifications etc., are liable to be rejected.
11.3	Tenders are liable to be rejected in case of unsatisfactory performance of the tenderer with CMD/ NCSM, or tenderer under suspension (hold / banning / delisted) by CMD/ NCSM. CMD reserves the right to reject a bidder in case it is observed that they are overloaded and may not be in a position to execute this job as per the required schedule. The decision of CMD will be final in this regard.
11.4	If a tenderer who is a proprietor expires after the submission of his tender or after the acceptance of his tender, CMD may at their discretion, cancel such tender. If a partner of a firm expires after the submission of tender or after the acceptance of the tender, CMD may then cancel such tender at their discretion, unless the firm retains its character.
11.5	If the tenderer deliberately gives **wrong information** in his tender, CMD reserves the right to reject such tender at any stage or to cancel the contract if awarded and forfeit the Earnest Money / Security Deposit / any other money due.
11.6	Canvassing in any form in connection with the tenders submitted by the Tenderer shall make his offer liable to rejection.

11.7	Tenderer must submit the declaration as per ANNEXURE – C2 stating the non relationship with any Employee of CMD/ NCSM.
11.8	The successful tenderer should not sub-contract part or complete work detailed in the tender specification undertaken by him without written permission of CMD. The tenderer is solely responsible to CMD for the work awarded to him.
11.9	The Tender submitted by a techno commercially qualified tenderer shall become the property of CMD, which under no circumstances shall be returned to the bidder.
11.10	Unsolicited discount received after the due date and time of Bid Submission shall not be considered for evaluation.
11.11	CMD shall not be liable for any expenses incurred by the bidder for site visit and preparation of the tender etc. irrespective of whether the tender is accepted or not.
11.12	The Bidder must provide any further details required for the review upon request from CMD. Failure to comply with any request by CMD for such information will result in rejection of their Offer. CMD may, in its absolute discretion suspend or disqualify a Bidder / Bidders who, at any time, is considered to have breached any of the qualification conditions or has performed in an unsatisfactory manner without assigning any reason whatsoever.

12.	**Tender Documents to be submitted to**
	Head of Enginnering - Civil, **CREATIVE MUSEUM DESIGNERS** **NCSM Campus, 33, Block-GN, Building-II** **Bidha Nagar, Sector –V, Kolkata – 700091** **Phone No. 033 2357 6041** **Email:cmd.ncsm.civil@gmail.com**
13.	**Bidder should submit the documents only in Hard Copy** to the address as mentioned above.
(a)	Power of Attorney in favor of the person who has signed the bid.
(b)	Letter of Submission in Bidder's Letter Head as per **ANNEXURE - B**
(c)	No Deviation Certificate in Bidders letter head as per prescribed format (**ANEXURE - C1**).

(d)	Declaration & Undertaking in Bidders letter head as per prescribed format (**ANNEXURE – C2, ANNEXURE - C3 & ANNEXURE – C4**)
(e)	Documents pertaining to Qualifying Criteria furnished in Clause 10 of the NIT (as per **ANNEXURE – A, ANNEXURE – A1, ANNEXURE – A2 & ANNEXURE – A3**).
(f)	**Tender Fee: ₹ 5,900.00 (Rupees Five thousand nine hundred only) including GST** in the form of **Demand Draft (DDs) / Pay Order / Banker's Cheque / NEFT** in favour of Creative Museum Designers payable at Kolkata as cost of Tender Document (Non-refundable) (**in original**). Tax Invoice shall be prepare by CMD, Kolkata Office for cost of tender document.
(g)	**Earnest Money Deposit (EMD) :** The Earnest Money Deposit will be of **₹ 8,26,684.00 (Rupees Eight Lakh Twenty Six Thousand Six Hundred Eighty Four only).** EMD shall be submitted along with the Bid in the form of **Bank Guarantee/ Pay Order/ Demand Draft/ Banker's Cheque/ NEFT** valid for the period of 120 days. **(No A/c Payee Cheque / Cash shall be considered).**

''ANNEXURE – B''

FORMAT FOR LETTER OF SUBMISSION

UNIT RATE Tender for **SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF DG, TRANSFORMER (CSS TYPE), PANEL ETC. FOR EXTERNAL ELECTRICAL SYSTEM OF 33/11 KV IN CONNECTION WITH PROPOSED K. D. MALAVIYA NATIONAL OIL MUSEUM AT KHANAPARA, GUWAHATI, ASSAM.**

T E N D E R

I / We have read and examined the Instructions to Bidders, General Conditions of Contract (GCC), Special Condition of Contract (SCC), Technical Specification, Schedule of Quantities & other documents and Rules referred to in the conditions of contract and all other contents in the tender document for the work.

I/We hereby tender for the execution of the work specified for the CMD within the time specified in tender viz., schedule of quantities and in accordance in all respects with the specifications and the Conditions of contract (GCC & SCC) and with such materials as are provided for, by, and in respects in accordance with, such conditions so far as applicable.

We agree to keep the tender open for **120 days** from the due date of submission of tender thereof and not to make any modifications in its terms and conditions.

The cost of tender document of value **₹ 5,900.00 (Including GST)** has been deposited in the shape of Demand Draft (DDs) / Pay Order/ Banker's Cheque / NEFT of a Nationalised / Scheduled Bank issued in favour of Creative Museum Designers. if I/we agree that Creative Museum Designers or his successors in office shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the said earnest money absolutely, otherwise the said earnest money shall be retained by him towards retention money to execute all the works referred to in the tender documents upon the terms and conditions of contract.

We accept that we will automatically be kept under Black Listing/Holiday List from being eligible for bidding in any contract with Creative Museum Designers during the period of bid validity from the date of occurrence, if we are in breach of our obligation(s) under the bid conditions because we:

(a) Have withdrawn our Bid during the period of bid validity specified in the letter of Bid, or

(b) Having being notified of the acceptance of our Bid by CMD during the period of Bid validity, (i) have failed or refused to execute the Contract, if required, or

(ii) have failed or refused to furnish the Performance Guarantee within prescribed period in accordance with the clause of Tender.

Further if I/we fail to commence work as specified, I/we agree that Creative Museum Designers or his successors in office shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the performance guarantee absolutely,

I/we hereby declare that I/we shall treat the tender documents, Technical Specification and other records connected with the work as secret/ confidential documents and shall not communicate information derived there from to any person other than a person to whom I/we am/are authorized to communicate the same or use the information in any manner prejudicial to the safety of the State.

Date :_____ Signature of Contractor

Postal Address

Witness:

Address :

Occupation :

''ANNEXURE – C1''

Creative Museum Designers

(Section 8 Company guaranteed by National Council of Science Museums)
Govt. of India, Block- GN, Sector-V, Bidhan Nagar, Kolkata-700 091

NO DEVIATION CERTIFICATE

[To be submitted in Bidder's Letter Head]

To, **Date:…….**
Head of Engineering - Civil,
CREATIVE MUSEUM DESIGNERS
NCSM Campus, 33, Block-GN, Building-II
Bidha Nagar, Sector –V
Kolkata – 700091

Subject : **No Deviation Certificate for "Supply, Installation, Testing & Commissioning of DG, Transformer (CSS type), Panel etc. for External Electrical System of 33/11 KV in connection with Proposed K D Malaviya National Oil Museum, Guwahati, Assam"**

NIT/ Tender No. : CMD 007.12.35(WORKS)/23-24/02, Dated 02.05.2023

We hereby agree to fully comply with, abide by and accept without variation, deviation or reservation all technical, commercial and other conditions whatsoever of the Biding Documents and Amendment(s)/Addendum(s) to the biding documents, if any, for subject work issued by Creative Museum Designers.

We hereby further confirm that any terms and conditions if mentioned in our Bid (un-priced) as well as price part) shall be recognised and shall be treated as null and void.

SIGNATURE OF THE BIDDER

NAME OF BIDDER

COMPANY SEAL

''ANNEXURE – C2''

Creative Museum Designers

(Section 8 Company guaranteed by National Council of Science Museums)
Govt. of India, Block- GN, Sector-V, Bidhan Nagar, Kolkata-700 091

[To be submitted in Bidder's Letter Head]

Tender No.: CMD 007.12.35(WORKS)/23-24/02, Dated 02.05.2023

DECLARATION - 1

This is to certify that neither I / We / Any of us is in anyway related to any employee in CREATIVE MUSEUM DESIGNERS, KOLKATA , or any of its constituent units.

Date: (Signature of the tenderer)

Place: with company seal/rubber stamp

''ANNEXURE – C3''

Creative Museum Designers

(Section 8 Company guaranteed by National Council of Science Museums)
Govt. of India, Block- GN, Sector-V, Bidhan Nagar, Kolkata-700 091

[To be submitted in Bidder's Letter Head]

Tender No.: CMD 007.12.35(WORKS)/23-24/02, Dated 02.05.2023

DECLARATION - 2

We, do hereby accept the General Terms and Conditions, Special Conditions of Contract, Technical Specifications etc. as provided by the CREATIVE MUSEUM DESIGNERS, KOLKATA along with tender documents for **"Supply, Installation, Testing & Commissioning of DG, Transformer (CSS type), Panel etc. for External Electrical System of 33/11 KV in connection with Proposed K D Malaviya National Oil Museum, Guwahati, Assam"** and also undertake to execute the job strictly as per the specifications & drawings as provided along with the tender documents in the event of placement of any work order on us.

Signature of the tenderer / Constituted Attorney.

(With date and Official Seal)

Date:……..

Place:…….

''ANNEXURE – C4''

Creative Museum Designers

(Section 8 Company guaranteed by National Council of Science Museums)
Govt. of India, Block- GN, Sector-V, Bidhan Nagar, Kolkata-700 091

[To be submitted in Bidder's Letter Head]

Tender No.: CMD 007.12.35(WORKS)/23-24/02, Dated 02.05.2023

UNDERTAKING

This is to certify that I/we have carefully gone through the drawings/specifications, etc. given in the tender document & have clearly understood the site working conditions, time schedule given and have accordingly quoted my balanced rates after going through all details.

I/we hereby give an undertaking that I/we shall carryout the work strictly as per the given specifications, and shall complete the same within the stipulated time frame.

Date: (Signature of the tenderer)

Place: with company seal/rubber stamp

FORMAT FOR BANK GUARANTEE BOND

(For EMD only)

1. In consideration of the (Name and address of the Company) hereinafter called the Company having stipulated under Clause 11 of the Notice Inviting tender No. …….. for the work of (mention name of work as in NIT) at the aforesaid site agreed to accept payment of Earnest Money for due fulfillment of the terms and conditions contained in the said NIT (including appendix) for participation in the tender from (Name and address of the prospective tenderer) (hereinafter called the prospective tenderer) by production of a bank guarantee of (Mention amount of EMD in figure & words) only, we (Name and address of Bank furnishing guarantee (Br. Code ……..) (hereinafter referred to as "The Bank") do hereby undertake to pay to the Company an amount not exceeding (mention EMD amount in figure & Words) only against any loss or damage caused to or suffered or would be caused to or suffered by the Company by reasons of any breach by the said prospective tenderer of any of the terms or conditions contained in the said NIT (including appendix) relating to participation in the tender.
2. We, (Name of Bank), do hereby undertake to pay the amounts due and payable under this guarantee without any demur, merely on a demand from the Company stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the Company under National Council of Science Museums by reasons of any breach by the said prospective tenderer of any of the terms or conditions contained in the said NIT (including appendix) or by reason of the prospective tenderer's failure to comply with conditions contained in the said NIT relating to participation in the tender. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding (mention amount of EMD in figures and words) only.
3. We, (Name of Bank) further agree that the guarantee herein contained shall remain in full force and effect during the period as mentioned in Clauses 23 and 24 of the said NIT (including appendix) or the period stipulated under Clause 25 for deciding the tender and that it shall continue to be enforceable till the dues of the Company under or by virtue of the said NIT (including appendix) have been fully paid and its claims satisfied or discharged or the Company certified that the terms and conditions of the said NIT (including appendix) have been fully and properly honoured and carried out by the said prospective tenderer for participation in the tender and accordingly discharges the guarantee. Unless a demand or claim under this guarantee is made on us in writing on or before the periods stipulated above, we shall be discharged from all liability under this guarantee thereafter.
4. We, (Name of the Bank) further agree with the Company that they shall have the fullest liberty without our consent and without affecting in any manner our obligation hereunder to extend time of deciding the tender as may be expedient and to forbear or enforce any of the terms and conditions relating to the NIT (including appendix) and we shall not be relieved from our liability by reason of any such extension being granted to the said proposed tenderer for any forbearance, or act of omission on the part of the Company or any indulgence by the Company to the said proposed tenderer or by any such matter or thing whatsoever which under the law relating to surety.
5. We, (Name of the Bank) lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Company in writing.

Dated, the …….. day of ……..…….

For ……..

(Authorised signatory of the Bank with Seal)

FORMAT FOR BANK GUARANTEE BOND

(For Security Deposit/ Performance Bank Guarantee only)

1. In consideration of the…….....…….. (Hereinafter called "The Company") having agreed to exempt .....…….... (Hereinafter called the "successful tenderer' from the demand, under Clause 12 of the Notice inviting tender No. …… dated …… and/or the terms and conditions of an Agreement dated …… Made between the Company and successful tenderer(s) …… for …….(hereinafter called "the said agreement") of Earnest Money/Retention Money for the due fulfilment by the said Contract(s) of the terms and conditions contained in the said NIT or the conditions of (execution of work) or the agreement on production of a bank guarantee of Rs……(Rupees…… ……only),

2. We ……..…….(hereinafter referred to as "The Bank") do hereby undertake to pay to the Company an amount not exceeding Rs……..…….. against any loss or damage caused to or suffered or would be caused to or suffered by the Company by reasons of any breach by the said successful tenderer of any of the terms or conditions contained in the said NIT, the conditions of Contract or the Agreement.

3. We, ……. do hereby undertake to pay the amounts due and payable under this guarantee without any demur, merely on a demand from the Company stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the Company under National Council of Science Museums by reasons of any breach by the said successful tenderer of any of the terms or conditions contained in the said NIT or the conditions of contract or the Agreement or by reason of the successful tenderer's failure to perform as per conditions contained the said NIT or the condition of contract or the Agreement. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However our liability under this guarantee shall be restricted to an amount not exceeding Rs……

   Note:**(Bank guarantee bond towards Retention Money/Security deposit as defined under Clause 17 of the General Conditions of Contract at the time of signing of agreement on award of work acceptable only if furnished by any of the Nationalised Banks/Scheduled Banks.)**

4. We, ……..further agree that the guarantee herein contained shall remain in full force and effect during the period as mentioned in Clause 5 of the said NIT read with Clause 20 of the General Conditions of Contract, or the period that would be taken for the performance of the said Agreement and that it shall continue to be enforceable till the dues of the Company under or by virtue of the said NIT or the conditions of contract or the Agreement have been fully paid and its claims satisfied or discharged or the Company certified that the terms and conditions of the said NIT or the conditions of contract or the Agreement have been fully and properly honoured and carried out by said successful tenderer and accordingly discharges the guarantee.

   Unless a demand or claim under this guarantee is made on us in writing on or before the ……..

   We shall be discharged from all liability under this guarantee thereafter.

   1. We,..... lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Company in writing.

Dated, the …….. day of ……

For ……

(Authorised signatory of the Bank with seal)

Creative Museum Designers

(Section 8 Company guaranteed by National Council of Science Museums)
Govt. of India, Block- GN, Sector-V, Bidhan Nagar, Kolkata-700 091

OFFER FORM

Tender No.: CMD 007.12.35(WORKS)/23-24/02, Dated 02.05.2023

I/We have read, understood and accepted all the General Terms and Conditions etc. for **"K. D. Malaviya National Oil Museum at Guwahati"** as per enclosed specification by Creative Museum Designers, Kolkata. I/We hereby offer my/our rates for the said tender:-

1. Name of the Tenderer :

2. Permanent address (in case of Firm/: Company, address of the registered office including jurisdiction of the police station should be given)

3. Telephone Nos. a) Office :
   b) Workshop/Factory:
   c) Mobile :
4. Name of the Bankers and their address:
5. Price offer

Cost ofK. D. Malaviya National Oil Museum at Guwahati, Assam as per enclosed specification by Creative Museum Designers, Kolkata:

I/We agree to carry out the work mentioned in the schedule at……% (…….....percent) **above** the rates shown in the priced schedule of probable items with approximate quantities.

OR

I/We agree to carry out the work mentioned in the schedule at……% (…….....percent) **below** the rates shown in the priced schedule of probable items with approximate quantities.

OR

I/we agree to carry out the work mentioned in the schedule at **par** rates shown in the priced schedule of probable items with approximate quantities

6. GST No**:** **…….**

   SAC/HSN code no: …….

   GST charged separately (%) **……..**

   Total Amount (Including GST) (Rs) …….

Total amount quoted by us for (in figures) Rs**.....** are strictly in accordance with the Creative Museum Designers, Kolkata.

Total amount including GST(In words)……

Date: Signature of the Tenderer/Authorised Official Seal

FORMAT FOR LETTER OF INTENT

…… Date……
(Mention fil number)

Sub: Letter of intent for the work of ……..

Dear Sir/Madam,

With reference to your tender dated …….. (and further clarification vide letter number …….. dated ……) # it is intended to award the aforesaid work at the tendered amount of ₹……..

You are, therefore, requested to sign an agreement as per standard format already printed in the tender documents purchased by you while tendering for this job. For this purpose, you are requested to send us a non-judicial stamp paper of appropriate value for preparing contract Agreement within a week from the date of this letter.

You are also requested to deposit Bank Guarantee (from Nationalized Bank/ Scheduled Bank) duly issued / assigned in favour of Creative Museum Designers, Kolkata of an amount of Rs……. as Security cum Performance Guarantee, which shall be submitted within 15 (fifteen) days from the date of issuing of LOI. The validity of Performance Guarantee shall be up to completion time and additional 12 (twelve) calender months from the date of completion time.

You may avail of 15(fifteen) days mobilisation time from the date of issue of this letter of intent for mobilisation your men, materials and other necessary resources for the construction. During mobilisation period, you are requested to study all the drawings and designs annexed hereto and the Bar-Chart and obtain clarifications from the architect or this office immediately.

Please note that the work has to be completed within ……. Weeks/months in which mobilisation time period of 15(fifteen) days is also included. The date of commencement of work would be reckoned as the date of issue of this letter (as per Clause 24 of NIT).

Thanking you,

Yours faithfully,

Sd/-

Administrative Officer

Letter of intent is to be issued in the letter head of the of the company and a photocopy is to be maintained as office copy on which signature of the authorised representative of the successful tender is to be obtained with date at the time of issue of original letter of intent. # Delete words within brackets if not applicable in specific case.

FORMAT FOR ARTICLES OF AGREEMENT

INSTRUCTIONS (not to be typed in Agreement)

(Articles of Agreement have to be typed on non-judicial stamp paper. The value of the stamp paper varies from state to state and is to be known form the particular place. The stamp paper will be purchased by the successful tenderer and the agreement may be typed by the Company according to the format.)

ARTICLES OF AGREEMENT made at ……..

…….
(Place)

This…….. day of ……
(Date) (Month & Year)

Between the …….

……..

Hereinafter referred to as the CMD which expression shall be include its successors and assigns on the one part and……

……
(name of the successful tenderer)

Trading in the name and style of……
……..
……
…….
(Name and complete address of the successful tenderer)
Hereinafter referred to as the successful tenderer which expression shall be include his/their respective heirs, executors, administrators and assigns on the other part.

WHEREAS the CMD is desirous of getting the work of

…….
…… therein done and has caused
(Name of the work)

Notice Inviting Tender (Including appendix), drawings, schedule of quantities and specifications describing the work and conditions of contract to be prepared by……
……
……

…….
(Name and address of the company)

AND WHEREAS the said NIT (including appendix) drawings as per list attached, specifications and the priced schedule of quantities and conditions of contract have been signed by or on behalf of the parties hereto.
AND whereas the Successful tenderer has deposited in Cash or Bank Draft a sum of ₹…….....
(exact amount in words)

The amount being 2.5% of the estimated value of the tender rounded off to the nearest hundred with the Company as Initial Security for the die performance of this Agreement as provided in the said conditions.

NOW IT IS HEREBY AGREED AND DECLARED BY AND BETWEEN THE PARTIES HERETO AS FOLLOWS:

1. In consideration of the payments to be made to him as hereinafter provided the successful tender shall upon and subject to the conditions herein contained execute and complete the work within **06 (Six)** months form the date of issue of letter of intent (as defined under Appendix of NIT) and as per the said drawings and such further detailed drawings as may be furnished to him from time to time and described in the said specifications and the said priced schedule of quantities along with the progress of the building work.

2. The Company shall pay to the successful tenderer such sum as shall become payable hereunder at the time and in the manner specified in the said conditions.

3. Time is the essence of this agreement and the successful tenderer shall proceed with the work, throughout the stipulated period of his contract, strictly according to the CPM/PERT/BAR CHART for reasons directly attributable to the successful tenderer, he shall pay or allow the CMD to deduct from any money due to him a liquidated damage as per Clause 61 of the General Conditions of Contract.

4. This agreement comprises the work above and all subsidiary works connected therewith, even though such work may not be shown on the drawings, or described in the said specifications or the priced Schedule of Quantities.

5. The Company through the Engineer (As defined under Clause 3 of General Conditions of Contract) reserves to itself the right of altering the drawings and of adding to or omitting any item of work or of having portions of the same carried out departmentally or otherwise and such alterations or variations shall not vitiate this agreement.

6. In the case of any disputes or differences arising out of or in connection with, or concerning this Agreement, it shall be settled by arbitration. The arbitration shall be conducted by an expert as Arbitrator in the field acceptable to both the parties. In case of disagreement, it shall be through three experts in the field, one to be appointed by each party and the third presiding expert to be jointly appointed by the expert referred to. The arbitration shall be as per the provision of the Arbitration and Conciliation (amendment) Act, 2015 and the decision of the panel so appointed shall be final and binding on both the parties to this Agreement. The place of arbitration shall be normally Kolkata or any other suitable place mutually agreed.
   The provisions of the Arbitration and Conciliation Act 2015 or any statutory modification or re-enactment thereof and of the rules made there under for the time being in force shall apply to arbitration proceedings under this clause.

   In witness whereof the parties have set their respective hands the day and the year and the place hereinabove written.

   Signed by for and on behalf of the company

   ……..

   In the presence of

   1)……..

Seal

2)……

Signed by the said Successful tenderer…….

In the presence of

1)……..

Seal

2)……

GENERAL CONDITIONS OF CONTRACT

1. DEFINITION OF TERMS:

The various terms appearing in the Tender Document shall have the following meaning unless they are repugnant to the context otherwise:

(a)	**COMPANY**	**:**	**CREATIVE MUSEUM DESIGNERS – A section 8 company guaranteed by National Council of Science Museums, NCSM Campus, 33, Block-GN, Building – II,6th Floor, Bidhannagar, Sector – V, Kolkata - 700091**
(b.1)	**OWNER/CLIENT**	**:**	**M/S. K D MALAVIYA NATIONAL OIL MUSEUM TRUST (KDMNOMT)**
(b.2)	**CONSULTANT**	**:**	**M/S. KOTHARI & ASSOCIATES, 14-B, CAMAC STREET, KOLKATA - 700017**
(c)	**BIDDER/TENDERER**	**:**	**The firm/party who shall tender quotation to the company.**
(d)	**CONTRACTOR**	**:**	**The Bidder who's quoted offer will be accepted, either in full or in part, by the Company.**
(e)	**WORK(s)**	**:**	**Jobs awarded to the contractor by the Company.**
(f)	**LOI/WORK ORDER/ CONTRACT**	**:**	**The Formal letter/notification issued to the Contractor awarding the work(s) in full or in part by the Company together with the applicable terms and conditions etc. as are finally and mutually agreed to between the Company and the Contractor.**
(g)	**SITE/WORK SITE**	**:**	**The premises where the work will be executed by the Contractor and shall include the lands, buildings, structures etc. erected thereupon.**
(h)	**ENGINEER-IN-CHARGE**	**:**	**The officer/Engineer nominated and authorized by the company for the time being for the purpose of operating the contract or any work covered thereunder.**
(i)	**ACCEPTING AUTHORITY**	**:**	**MANAGING DIRECTOR of the company.**

2. INTERPRETATION:

The terms as used in the tender documents and agreement and named hereunder shall have the meanings herein assigned to them except where the subject or context otherwise requires: -

"This agreement" shall compromise of the Articles of Agreement along with the Appendix, General Conditions of Contract, Special Condition of Contract, Priced Schedule of Quantities, Technical Specifications and Drawings and CPM/PERT/BAR CHART attached hereto and including those to which only a reference is made herein.

"Work" or "Works" shall mean all work or works defined by bills of quantities, Drawings Specifications and such other work or works as the successful tenderer may be entrusted with for carrying out under this agreement as per Clause 5 of the Articles of Agreement.

Company shall mean Creative Museum Designers (CMD) which shall include the persons for the time being in management of the Company and its assigns.

"Engineer" shall mean the representative of CMD or authorized as such by the Company or in the event of his ceasing to be Engineer for the work such other firm or persons as may be appointed by the Company as Engineer for this work. (Further elaboration given in Clause 3 below):

"Successful tenderer" shall mean **Accepted Lowest Bidder** and shall include his/their respective heirs, executors, administrators and assigns.

''Site'' shall mean the site of the construction works as shown on the site plan attached hereto including any buidings and erection thereon and any other land adjoining these to (inclusive) as aforesaid allotted by the Company for the use of successful tenderer.

"Act of Insolvency" shall mean any act of insolvency as defined by the Presidency Towns Insolvency Act, or the Provincial Insolvency Act or any "Amending Statue.

"Notice in Writing" or "Written Notice" shall mean a notice or communication in written, typed or printed or printed characters sent (unless delivered personally or otherwise proved to have been received) by registered post to the last known private or business address or the registered office of the addressee and shall be deemed to have received when in the ordinary course of post it would have been delivered. "Virtual Completion" shall mean that the works carried out are fit for occupation in every respect including removal of scaffolding, plant, surplus material and rubbish and cleaning of dirt from work and site.

Words imputing persons include firms and corporations words imputing the singular only also include the plural and vice versa where the context so requires.

Short headlines are given to each Clause for convenience only and they will not limit the meaning or scope of the Clause in any way.

3. ENGINEER:

The plans, agreement and documents above mentioned shall form the basis of this agreement and the decision of the said Engineer for the time being as mentioned in the said conditions, in reference to all matters or dispute as to material and workmanship shall be final and binding on both the parties.

The term "Engineer" shall mean the firm or person(s) appointed by the Company to superintend the work. He/They will receive his/their instruction for the work from the Company.

The successful tenderer shall afford the said Engineer(s) every facility and assistance for examining the work and materials and for checking and measuring works and materials.

The Engineer or any Authorised Assistant of the Engineer shall have the power to give notice to the successful tenderer or to his Supervisor of non-approval of any work, or materials, and such work shall be suspended or the use of such materials shall be discontinued. The work from time to time be examined by the Engineer or the Engineers Assistant but such examination shall not in any way exonerate the successful tenderer from the obligation to remedy any defects due to materials or workmanship not in accordance with the contract which may be found to exist at any stage of the work or may appear within the defects liability period mentioned in Clause 37 of General Conditions of Contract (GCC).

4. SCOPE OF THE CONTRACT:

The successful tenderer shall carry out and complete the works in every respect in accordance with this contract and in accordance with the directions of the Engineer and to the satisfaction of the Engineer/ Consultant/ Owner. The engineer may from time to time issue further drawings and/or written instructions, detailed directions and explanations in regard to:

a. The variation or modification of the design, quality or quantity of works for the addition or omissions or substitution of any work.
b. Any discrepancy in the drawings or between the schedule of quantities and/or drawing and/or specification.
c. The removal from the site of any material brought therein by the successful tenderer and the substitution of any other materials there from.
d. The removal and/or re-execution of any works executed by the successful tenderer.
e. The dismissal from the works of any persons employed thereupon.
f. The opening up for inspection of any wok covered up.
g. The amending and making good of any defects under Clause 37.
h. The rectification and making good of any defects under clauses herein after mentioned and those arising during the maintenance period/defect liability period.
i. Obtaining all necessary approval from statutory authority / APDCL and abide by aii rules & regulations there of.

The successful tenderer shall comply with and duly execute any work comprised in such instructions, detailed directions and explanations, provided always that if the engineer's instructions involved variation from the priced Schedule of Quantities, such instruction shall be issued by the Company and the successful tenderer shall take the action stipulated in Clause 60.

If the work shown on any such further drawings or detailed drawings or that may be necessary to comply with any such instructions, directions, or explanations be in the opinion of the successful tenderer, extra to

that comprised in or reasonably to be inferred from the contract he shall before proceeding with such work, give notice in writing to this effect to the Engineer, and in the event of his not doing so three days before the commencement of such work the successful tenderer shall not be entitled to any allowance in respect of any such extra work. But if such notice has been duly given and the Engineer and the "successful tenderer, fail to agree as to whether or not there is any extra, then if the engineer decides that the successful tenderer is to carry out the said work, the successful tenderer shall do so accordingly, and the question whether or not there is any extra and if so, the amount thereof shall failing agreement be settled by the Arbitration as provided in Clause 52 on a reference being made by the successful tenderer.

5. SCOPE OF WORK:

The work consists of **"Supply, Installation, Testing & Commissioning of DG, Transformer (CSS type), Panel etc. for External Electrical System of 33/11 KV in connection with Proposed K. D. Malaviya National Oil Museum at Guwahati, Assam"** to be carried out in accordance with the technical specification, job procedure, drawings and Schedule of Quantities & Rates. It includes furnishing all materials, labour, tools and equipment and management necessary for the incidental to the construction and completion of the work. All work, during its progress and upon completion, shall conform to the code, standard, specification, approved drawings etc. Contractor will have to abide by all rules and regulations of Assam State Electricity Regulatory Authorities / APDCL as may be required for successful completion of work.

The Contractor shall forthwith comply with and duly execute any work comprised in such CMD's instructions, provided always that verbal instructions, directions and explanations given to the Contractor's or his representative upon the works by CMD shall if involving a variation be confirmed in writing to the Contractor/s within seven days.

- The Client / Employer / PMC reserves the right to get the work executed in the best and most economical manner, and may add or may not operate any item(s) of work(s) as CMD may consider fit.
- The Client / Employer / PMC reserve the right to increase or decrease the scope of work and/or not to operate any one or more of the item(s) of work(s) of the Schedule of Quantities & Rates. It is the responsibility of the Contractor to ascertain from the Engineer–in–charge, the items to be operated with their actual quantities before making any arrangement (s) for taking up work under the item (s). No claim, whatsoever, from the Contractor will be entertained for non-operation of any of the item(s) or for variation in quantity of any of the item(s).
- The payment shall be made on the basis of actual quantities executed under various item (s) and the accepted rates thereof, and not on the quantities mentioned in the Schedule of Quantities & Rates.
- The work in general consists Percentage Based Item Rate as per "Schedule of Quantities & Rates".
- Any other related civil works i.e. foundation of DG Sets, CSS or any other equipments etc. required for successful execution of the work as per manufacturers/ vendors approved drawings will have to be executed by the Successful bidders, as per instruction of Engineer-in-Charge (CMD)/ Consultant.
- Dismantling of existing Brickwork/R.C.C/P.C.C. etc. if required for successful execution of the work, is to be done by successful bidder as per instruction of CMD/ Consultant including rendering of the same.
- All electrical road crossings, manholes, earth pits etc. as required as per approved drawings will be within the scope of successful bidder.
- The Scope of Work may also include such other related works as covered in 'Schedule of Quantities & Rates' although they may not be specifically mentioned in the above paragraphs and all such incidental items not specified but reasonably implied and necessary for the completion of the work as a whole, shall be deemed to be directed by the Employer
- CMD also reserves the right to accept tender either for full quantity of work or part thereof or divide the works amongst more than 1 (One) Contractor without assigning any reason for any such action.

- CMD also reserves the right to take away part of initially awarded work from Contractor in case of his unsatisfactory work progress and award the same to other Agencies, in order to meet the time schedule of owner/client or for any other reason or contingency. In this regard Employer's decision will final & binding on the Contractor.
- The Contractor shall provide a detailed schedule of work along with material and labour deployment on monthly basis.
- The Contractor shall, after completion of work, clear the site of all debris and left over materials, at his own expense to the entire satisfaction of Engineer-In-Charge or his authorized representative. In case of any failure by the Contractor, the employer will get set at risk and cost of the Contractor.
- If required, Contractor shall submit to CMD / KDMNOMT the entry challan of incoming materials for verification of Stores and record.
- It should be clearly understood that it is entirely the Contractor's responsibility and liability to find, procure and use the required tools and plants and accessories at his own cost for efficient and methodical execution of the work. CMD / KDMNOMT shall have the right to check the sufficiency or quality of the Contractor's tools from time to time and the Contractor shall carry out all reasonable instructions of KDMNOMT in this respect.

6. SUCCESSFUL TENDERER TO PROVIDE EVERYTHING NECESSARY:

The successful tenderer shall provide everything necessary for the proper execution of the works according to the true intent and meaning of the drawings and specification and bill of quantities taken together, whether the same may or may not be particular shown on the drawings or described in the specification or included in the bill of quantities, provided that the same is to be reasonably inferred there from and if he finds any discrepancy in the drawings or between the drawings and specification and bill of quantities, he shall immediately refer the same to the Engineer who shall decide which shall be followed. Figured dimensions shall be followed in reference to scale.

The successful tenderer shall supply, fix and maintain at his cost during the execution of any works, all the necessary centering, scaffolding, staging, planking, timbering, shuttering, shoring, pumping, fencing, boarding, watching and lighting by night as well as by day required for the proper execution and protection of the public and the safety of any adjacent roads, streets, cellars, vaults, eves, pavement, walls, houses, buildings and all erections, matters or thing, and they shall take down and remove any or all such centering, scaffolding etc. as occasion shall require or when ordered to do so and shall fully reinstate and make good all matters and all things disturbed during the executing of the works to the satisfaction of the Engineer before a Virtual Completion Certificate is issued.

The successful tenderer shall make his own arrangements for laying temporary water and electrical power lines including excavation if necessary so as not to cause any obstruction along locations approved by the Engineer. The water supply lines, hose pipes, electrical lines, underground or overhead etc. belonging to them should not cause damage to the property of the company including gardens, plants, flowers, hedges, flower pots in the campus etc. Any expenditure incurred by the company due to damage so caused shall be debited to the successful tenderer's account. It is their complete responsibility to ensure that the garden area and its approaches and other areas not allocated to them are not encroached upon by their men and materials. They have to provide a fence at their cost to confine the activities of construction, labour and materials, to the construction area as approved by the Engineer or his representative. The bitumen carpet road in front of company's office, Science and Exhibits Laboratory, Stores and Workshop or garden paths and defined areas will not be allowed to be used by their labour, materials, trucks and other modes of transport system. Their labour is allowed to use Campus grounds for baths, calls of nature etc.

The company shall on no account be responsible for the expense incurred by the successful tenderer for hired ground or electric power or water obtained from elsewhere.

7. DRAWINGS, DESIGNS ETC.

Tender drawings are diagrammatic but shall be followed as closely as actual construction permits. Any deviations made shall be in conformity with the architectural and other service drawings.

The successful tenderer shall verify all dimensions at the site and bring to the notice of the Engineer all discrepancies or deviations noticed.The Engineer's decision shall be final and binding.

All drawings issued by the Company are its own property and shall not be lent, reproduced or used on any other works than intended without the written permission of the Company.

Largescalesize details and manufacturer's dimension for materials to be incorporated shall take precedence over small scale drawings.

One complete set of drawing, specifications and schedule of quantities shall be furnished by the Engineer to the successful tenderer and the Engineer shall furnish, within such time as he may consider reasonable, one copy of any additional drawing which in his opinion may be necessary for the execution or any part of work. Such copies shall be kept on the works, and the Engineer and his representatives shall at all reasonable time have access to the same and they shall be returned to the Engineer by the successful tenderer before the issue of the certificate for the balance of this account under the contract.

Company will make all efforts to give all drawings, designs, decision etc. from time to time and the successful tenderer shall make timely requests for the same. No claim whatsoever shall however be entertained for compensation for the delay in supply of drawings, designs, decisions, running payments etc. from the successful tenderer. Drawings shown at the time of issue of tenders and forming part of the contract shall indicate the scope of work and drawings issued subsequently during the execution of work shall be deemed to be drawings elaborating the basic scheme. If any detailed drawings show an item for execution, which in the opinion of the successful tenderer is not covered under the items of the contract, he shall immediately refer it to the Engineer, for final decision. The decision of the Engineer as to whether it is an extra item or not or whether it is covered by contracts and if not what extra rate should be paid shall be final and binding on both the parties to the contract i.e. Company and the Successful tenderer.

8. REFERENCE DRAWINGS & SHOP DRAWINGS:

Reference Drawings

The Successful tenderer shall maintain one set of all drawings issued to him as reference drawing. These shall not be used at the site.

All corrections, deviations and changes made at the site shall be shown on these reference drawings for incorporation in the completion drawings. All changes to be made shall be initiated by the Engineer.

Shop Drawings

The Successful tenderer at his own cost shall submit to the Engineer /Consultant six copies of all shop drawings related to the external electrical work etc. with foundation drawings for CSS & DG Electrical panels, Detailed electrical panel drawings, control wiring diagrams etc. for approval. The successful agency shall prepare & submit all shop drawings and take the approval from Consultant/CMD before starting the work and also submit as-built drawings of all the works executed by the successful agency after completion of work.

9. SCHEDULE OF QUANTITIES & RATES (SOQR):

The quantities for various items of works as shown in the Schedule of Quantities & Rates of probable items of works are based on the basic design drawing prepared and issued by CMD/ Consultant. However, if quantity variations become necessary due to Design consideration / Site conditions etc. those have to be done by the Contractor at the time of execution of work as per their finally accepted rates(s). No conditional rate will be allowed in any case.

10. ERROR IN SCHEDULE OF QUANTITIES, IF ANY:

If any error appears in the schedule of quantities, other than the Tenderer's prices and calculation, it shall be rectified by the engineer after informing the Company. Such variation shall constitute a deviation of the item(s)/contract and shall be dealt with as hereinafter provided.

11. NOMENCLATURE OF ITEM:

Nomenclatures of the items of works mentioned in the priced schedule are only a brief description of the work. The work shall have to execute in accordance with the specifications/ drawings for the work to the satisfaction of the Engineer of the work. Any omission in the description will not absolve the successful tenderer from his responsibilities to complete the work in a satisfactory manner.

12. METRIC UNITS:

The schedule of quantity indicate the unit of Metric system. The mode of measurement of different items of work shall be as per details contained in the specification and special conditions with the equivalent of the units mentioned therein in Metric system.

13. CPWD/PWD SPECIFICATIONS AND I S CODES:

CPWD/PWD specifications & relevant I.S Code of practice shall be applicable, for all items of work.

14. ORDER OF PRECEDENCE:

If any discrepancy is noticed between the conditions and specifications, drawing etc. the following would be the order of precedence:

a. Schedule of Quantities.
b. Notice Inviting Tender (NIT).
c. General Conditions of Contract (GCC) & Special Conditions of Contract (SCC)
d. Drawings and notes thereon.
e. Technical Specification as provided with this document for External Electrical Installation.

15. SITE INSPECTION:

The work site is at Khanapara, Guwahati, K D Malaviya National Oil Museum Project, Assam. Tenderers are advised to inspect and examine the site and its surroundings and satisfy themselves before submission of their offer as to the nature of the site and Sub-Soil, the quantities and nature of work and materials necessary for completion of the works and the means and access to the site, accommodation they may require and all other necessary information as to the risk contingencies and other circumstances which may influence or affect their offers and work. A tenderer shall be deemed to have full knowledge of the Site whether he inspects it or not and no extra charge consequent to any misunderstanding or otherwise shall be allowed.

16. SUFFICIENCY OF QUOTATION:

The Bidder shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his quotation for the works and of the rates and prices quoted in the Schedule of Quantities & Rates in which rates and prices shall, except as otherwise provided, cover all his obligations and liabilities under the Contract and all matters and things necessary for the proper completion and maintenance of the Works.

17. SECURITY DEPOSIT/ PERFORMANCE BANK GUARANTEE:

This shall mean and be 10% of the contract value awarded including the initial security deposit and shall be recovered from the running bills. In case of termination of contract, this retention money shall be forfeited and amount necessary to make up this amount shall be recovered from the money due to the successful tenderer under this contract, or any other contract. The successful tenderer can give retention money in the form of a Bank Guarantee from a Nationalised Bank/Scheduled Bank in approved format to the extent of 10% of the total cost of work awarded valid for a period equal to completion period plus one year (which will have to be suitably extended to cover defect liability period and extended period of contract whichever is later). Tenderers who have deposited earnest money deposited in Bank Guarantee along with the tender could get refund of earnest money in bank guarantee after the bank guarantee for the 10% of thecontract value is received and accepted by the Company. The retention money in the form of Bank Guarantee will not be accepted in parts.

The successful tenderer shall have to extend the Bank Guarantee period, from time to time at least one month before the expiry of a Bank Guarantee to cover the defects liability period, reckoned from the date of virtual completion. In case they failed to extend the Bank Guarantee at least one month before its expiry, it shall be considered a breach of contract on the part of the successful tenderer and hence, the Company shall be free to demand the Guarantee money from the Bank.

18. DEVIATIONS:

The successful tenderer may when authorized and when directed, in writing by the Engineer with the approval of the company add or omit or vary the works shown upon the drawings, or described in the specifications, or included the bill of quantities but they shall make no addition, omission or variation without such authorization or direction. A verbal authority direction by the Engineer shall, if confirmed by him, in writing within 7 days , be deemed to have been given in writing.

No claim for an extra shall be allowed unless it shall have been executed under the provision of Clause 19 or by the authority of the Engineer with concurrence of the company as ther in mentioned. Any such extra if wherein refered to, as an authorize extra shall be goverened by Clause 43. No variation i.e. additions or substitutions shall be vitiate the contract.

19. PRICE FOR DEVIATIONS:

Deviation shall be valued at the net rates contained in the Tenderers original tender or where the same may not apply direct at rates analogous to the prices therein contained. If the altered, additional or substituted work included any class of work for which no rate is specified in the contract, Then the successful tenderer shall within seven days of the date of receipt of the order to carry out the work, inform the engineer with the copy to the Company the rate which the intents to charge for such class of work with proper analysis. In the event of his not doing so, within a reasonable time before the commencement of such work, he shall not be entitled to any allowance or payment in respect of any such extra work. When such notice has been duly given, the Engineer with the consent of the Company may agree to such rate but if the engineer does not agree to this rate, the Engineer may cancel his order to carry out such class of work and arrange for it to be carried out departmentally or through any other agency or in such a manner as he may consider advisable or he may decide that the Successful tenderer shall carry out such items of work and in such case he shall only be entitled to be paid in respect of the work carried out or expenditure incurred by him according to such rate or rates as shall be fixed by the Engineer as full and final and shall be binding on successful bidder.

However, in respect of the rates for extra/new items, if there are any, the opinion of the Engineer as to whether it is an extra item or not, and if so, what rate should be paid shall be final and binding on the successful tenderer and shall be derived from contract items so far as applicable and the rates of which cannot be derived from contract items will be fixed as per (i) relevant DSR items as applicable or (ii) on the basis

of actual cost of materials and labour, plus 15% as successful tenderers overheads and profits on all trades except on the cost of materials supplied departmentally.

Successful tenderer shall not claim any idle and remobilization charge for interim due to late decision by the Company. Such legitimate interim delays shall however be considered for extension of time if any.

Furthermore, they shall submit analysis of rates with justifications for claiming extra on any deviation item prior to the probable date of execution of the referred item.

20. COMPLETION TIME:

Time of completion of work will be 06 (Six) months from the date of issuance of Letter of Intent (LOI).

21. TOOLS, PLANTS & EQUIPMENTS:

- The Contractor shall arrange at his own expense all necessary Tools, Plants & Equipments (hereinafter referred to as T&P) such as DG Set, Welding machine, Crane of required capacity, Water Tanker etc. along with all accessories, Operator(s) & Labourers required for execution of the work, will be provided by Contractor at his own cost.
  Lighting DG for area lighting if required (including operator and fuel) will also be provided by Contractor within the finally accepted rate / price.

22. MATERIALS:

The Contractor shall at his own expense, provide all materials required for the work in this Tender Documents.

- All materials to be provided by the Contractor shall be in conformity with the specifications laid down in the contract and the Contractor shall, if requested by the Engineer-in-Charge, furnish proof to the satisfaction of him that the materials so comply.
- The Contractor shall, at his own expense and without delay, supply to the Engineer-in-Charge samples of materials proposed to be used in the works. The Engineer-in-Charge shall within seven days of supply of samples or within such further period as he may require intimate to the Contractor in writing/inform the Contractor whether samples are approved by him or not. If samples are not approved, the Contractor shall forthwith arrange to supply to the Engineer-in-Charge for his approval fresh samples complying with the specification laid down in the Contract.
- The Engineer-in-Charge shall have full powers for removal of any or all the materials brought to site by the Contractor which are not in accordance with the Contract specifications or do not confirm in character or quality to samples approved by him. In case of default on the part of the Contractor in removing rejected materials the Engineer-in-Charge shall be at liberty to have them removed by other means.
- All charges on account of transportation, octroi, GST, Excise and other duties on materials obtained for the works from any source shall be borne by the Contractor.

23. FAULTY MATERIALS AND WORK:

a. The Engineer shall during the progress of the work has power to order in writing from time to time the removal from the work, within such reasonable time or times as may be specified in the order, to any materials and/or workmanship which in the opinion of the Engineer are not in accordance with the specifications or the instructions of the Engineer. The substitution of proper materials or any workmanship and the removal and proper re-execution of any work executed with materials or workmanship not in accordance with the drawings and specifications or instructions shall have to be forthwith carried out by the Successful tenderer at his own cost upon receiving such order. In case of default on the part of the Successful tenderer to carry out such order the CMD shall have the power to

employ any other persons to carry out the same and all the expenses consequent thereon or incidental thereto shall be borne by the Successful tenderer and shall be recovered from them by the Company from any money due to or that may become due to the Successful tenderer or from the amount of retention money.

b. Nothing in this clause shall relieve the Successful tenderer from his liability to execute the works in all respect in accordance with those terms and upon and subject to the conditions of this contract or from his liability to make good all defects.

24. ACCESS:

The Company or its representatives shall at all reasonable time have free access to the works and/or to the workshops factories or other places where materials are being prepared or constructed for the contract and also to any place where materials are lying or from which they are being obtained and the Successful tenderer shall give every facility to them for inspection, examination and testing of the materials and workmanship. Expect the representative of Public Authorities and those mentioned above, no person shall be allowed on the works at any time without the prior written permission of the Engineering of the Company.

If any work is to be done at a place other than the site of works the Successful tenderer shall obtain the prior written permission of the Engineer for doing so.

25. LABOUR:

The Contractor shall employ labour in sufficient numbers to maintain the required rate of progress and quality to ensure workmanship of the degree specified in the Contract and to the satisfaction of the Engineer–in–Charge. The Contractor shall not employ in connection with the Works any person who has not completed his eighteen years of age.

The Contractor shall furnish to the Engineer-in-Charge at regular intervals as decided by Engineer-in-charge of CMD, a distribution return of the number & description by trades of the work people employed on the Works. The Contractor shall also submit on the 4th and 19th of every month to the Engineer–in–Charge a true statement showing in respect of the second half of the current month (i) the accidents that occurred during the said fortnight showing the circumstances under which they happened and the extent of damage and injury caused by them.

The Contractor shall pay to labour employed by him wages not less than Minimum Wages as defined in the Contract Labour Regulations.

The Contractor shall in respect of labour employed by him comply with or cause to be complied with the Contract Labour Regulations in regard to all matters provided therein.

The Contractor shall comply with the provisions of the payment of Wages Act, 1936, Minimum Wages Act, 1948, Workmen's Compensation Act, 1923, Industrial Disputes Act, 1947, or any modifications thereof or any other law relating thereto and rules made thereunder from time to time.

The Contractor shall be liable to pay his contribution and the employee's contribution to the State Insurance Scheme in respect of all labour employed by him for the execution of the contract, in accordance with the provision of "The Employee's State Insurance Act, 1948" as amended from time to time.

The Engineer–in–Charge shall on a report having been made by an Inspecting Officer as defined in the Contract Labour Regulation have the power to deduct from the money due to the Contractor any sum required or estimated to be required for making good the loss suffered by a worker or workers by reasons of non-fulfilment of the Conditions of the Contract for the benefit of workers, non-payment of wages or of deduction made from his or their wages which are not justified by the terms of the Contract or non-observance of the said Contract Labour Regulations and Acts and Rules framed there under.

In the event of the Contractor committing a default or breach of any of the provisions of the aforesaid Contract Labour Regulations, as amended from time or furnishing any information of submitting or filling

any Form / Register / Slip under the provisions of these Regulations which is materially incorrect then on the report of the Inspecting Office as defined in the Contract Labour Regulation, the Contractor shall without prejudice to any other liability pay to the Company a sum as applicable as per prevailing Rules as liquidated damages for every default, breach or furnishing, making, submitting, filling materially incorrect statement as may be fixed by the Engineer–in–Charge & in the event of the Contractor's default continuing in this respect, the liquidated damages may be enhanced for each day of default subject to a maximum percent of the estimated cost of the Works put to tender. The Engineer–in–Charge shall deduct such amount from bills or security deposit of the Contractor and credit the same to the Welfare Fund constituted under Regulations. The decision of the Engineer–in–Charge in this respect shall be final and binding.

The Contractor shall at his own expense comply with or cause to complied with Model Rules for Labour Welfare framed by Government from time to time for the protection of health and for making sanitary arrangements for workers employed directly or indirectly on the Works. In case the Contractor fails to make arrangement as aforesaid, the Engineer–in–Charge shall be entitled to do so and recover the cost thereof from the Contractor.

The Contractor shall at his own expense arrange for the safety provisions as required by the Engineer-in-Charge, in respect of all labour directly or indirectly employed for performance of the Works and shall provide all facilities in connection therewith. In case the Contractor fails to make arrangements and provide necessary facilities as aforesaid, the Engineer–in–Charge shall be entitled to do so and recover the cost thereof from the Contractor.

Failure to comply with Model Rules for Labour Welfare, Safety Code or the provisions relating to report on accidents shall make the Contractor liable to pay to the Company as liquidated damages as applicable as per prevailing Rules for each default or materially incorrect statement. The decision of the Engineer–in–Charge in such matters based on reports from the Inspecting Officers as defined in the Contractor Labour Regulation as appended to these conditions shall be final and binding and deductions for recovery of such liquidated damages may be made from any amount payable to the Contractor.

26. POSSESSION OF SITE BY CONTRACTOR:

- The Contractor shall not be permitted to enter on (other than for inspection purposes) or take possession of the site until instructed to do so by the Engineer – In – Charge in writing. The portion of the site to be occupied by the Contractor shall be defined and / or marked on the site plan, failing which these shall be indicated by the Engineer – in – Charge at Site and the Contractor shall on no account be allowed to extend his operation beyond these areas. In respect of any land allotted to the Contractor for purposes of or in connection with the contract the Contractor shall be licensee subject to the following and such other terms and conditions as may be imposed by the licenser.

  (i) That such use or occupation shall not confer any right or tenancy of the land to the Contractor.

  (ii) That the Contractor shall be liable to vacate the land on demand by the Engineer – in – Charge.

  (iii) That the Contractor shall have no right to any construction over this land without the written permission of the Engineer–in–Charge. In case, he is allowed to construct any structure he shall have to demolish and clear the same before handing over the completed work unless agreed to the contrary.

- The Contractor shall provide if necessary, or if required, on the site, all temporary access there to and shall alter, adopt and maintain the same as required from time to time and shall take up and clear them away as and when no longer required and as and when ordered by the Engineer–in–Charge and make good all damage done to the site at his cost.

27. SETTING OUT WORKS:

The successful tenderer at his own expense shall set out the works and shall be responsible for the true and perfect setting out of the same and for the correctness of the positions, levels, dimensions and alignment of all parts thereof. If at any time any error shall appear during the progress of any part of the work, the Successful tenderer shall at his own expense rectify such error if called upon to the satisfaction of the Engineer.

28. MATERIALS OBTAINED FROM EXCAVATION:

Materials of any kind obtained from excavation on the site shall remain the property of the Company and shall be disposed of as the Engineer-in-Charge may direct.

All fossils, coins, articles of value of antiquity and structures and other remains or things of geological or archaeological interest discovered on the site shall be the absolute property of the company and the Contractor shall take reasonable precautions to prevent his workmen or any other person from removing or damaging any such article or thing shall immediately upon discovery thereof and before removal acquaint the Engineer-in-Charge with such discovery and carry out the Engineer-in-Charge's directions as to the disposal of the same at the expense of the Company.

29. WATCHING & LIGHTING:

The Contractor shall provide and maintain at his own expense all lights, guards fencing and watching when and where necessary or required by the Engineer–in–Charge for the protection of the Works or for the safety and convenience of these employed on the Works or the public.

30. WORK SUPERVISOR AND FOREMAN:

The Successful tenderer shall keep a qualified and experienced Engineer for supervision of works to ensure best quality work. He shall also give all necessary personal superintendence during the execution of the works and as long thereafter as the Engineer may consider necessary until the expiration of the "Defect Liability Period" stated in Clause 37 above. The Successful tenderer shall also during the whole time, the works are in progress, employ competent Foreman approved by the Engineer whose qualification must conform to the requirements specified by the Engineer. In special cases, he shall be constantly in attendance of the building while the men are at work". Any directions, explanations, instruction or notices given by the Engineer to such Foreman shall be held to be given to the successful tenderer.

31. INSPECTION AND APPROVAL:

All works embracing more than one process shall be subject to examination and approval at each stage thereof and the Contractor shall give due notice to the Engineer – in – Charge of his authorized representative when each stage is ready. In default of such notice, the Engineer-in-Charge shall be entitled to appraise the quality and extent thereof.

Employer's/ Client's representatives concerned with the Contract shall have powers at any time to inspect and examine any part of the works and the Contractor shall give such facilities as may be required for such inspection and examination.

Company's/Owner's representatives concerned with the Contract shall have powers at any time to inspect and examine any part of the works and the Contractor shall give such facilities as may be required for such inspection and examination.

32. POWERS OF ENGINEER-IN-CHARGE'S REPRESENTATIVE:

The duties of the representatives of the Engineer–in–Charge, are to watch and supervise the works and to test and examine any materials to be used or workmanship employed in connection with the works. He shall

have no authority to order any work involving any extra payment by the Employer nor to make any variation in the works.

- The Engineer–in–Charge may from time to time delegate to his representative any of the powers and authorities vested in the Engineer–in–Charge and shall furnish to the Contractor a copy of all such written delegation of Powers and authorities. Any written instruction or written approval given by the representative of the Engineer–in–Charge to the Contractor within the terms of such delegation shall bind the Contractor and the Employer as through it had been given by the Engineer–in–Charge.
- Failure of the Representative of the Engineer–in–Charge to disapprove any work or materials shall not prejudice the power of the Engineer–in–Charge thereafter to disapprove such work or materials and to order the pulling down, removal or breaking up thereof.
- If the Contractor is dissatisfied with any decision of the Representative of the Engineer–in–Charge he shall be entitled to refer the matter to the Engineer–in–Charge who shall thereupon confirm, reverse or vary such decision.

33. REMOVAL OF WORKMEN:

The Contractor shall employ in and about the execution of the works only such persons as are skilled and experienced in their several trades and the Engineer-in-Charge shall be at liberty to object to and require the Contractor to remove from the works any persons employed by the Contractor in or about the execution of the works who in the opinion of the Engineer-in-Charge misconducts himself or is incompetent or negligent in the proper performance of his duties and such person shall not be again employed upon the works without written permission of the Engineer-in-Charge.

34. WORK DURING NIGHT OR ON SUNDAYS & HOLIDAYS:

Subject to any provisions to the contrary contained in the Contract, none of the permanent works shall be carried out during night or on Sundays or on authorized Holidays without the permission in writing of the Engineer-in-Charge except when the work is unavoidable or absolutely necessary for the safety of life, property of works in which case the Contractor shall immediately advise the Engineer-in-Charge accordingly.

The Contractor would be required to carry out the work even on Sunday or any other holidays, without conferring any right on the Contractor for claiming for extra payment for introducing this holidays working. The decision of the Engineer-in-charge in this regard will be final and binding on the Contractor. Nothing extra will be paid for doing works on Sunday or any other holidays.

35. COMPLETION CERTIFICATE:

As soon as the work is completed, the Contractor shall give notice of such completion to the Engineer-in-Charge and within a reasonable period of receipt of such notice the Engineer-in- Charge shall inspect the work and shall furnish the Contractor with a certificate of completion indicating (a) the date of completion (b) defects to be rectified by the Contractor and/or (c) items for which payment shall be made at reduced rates. When separate periods of completion have been specified for items or groups of items, the Engineer-in-Charge shall issue separate completion certificates for such item or groups of items.

No certificate of completion shall be issued, nor shall the work be considered to be complete till the Contractor shall have removed from the premises on which the work has been executed all scaffolding, sheds and surplus materials, except such as are required for rectification of defects, rubbish and all huts and sanitary arrangements required for his workmen in the site in connection with the execution of the work, as shall have been erected by the Contractor the workmen and cleaned all dirt from the parts of building(s) in upon or about which the work has been executed or of which he may had possession for the purpose of the execution thereof and cleaned floors, gutters and drains, eased doors and sashes, oiled locks fastening labelled keys

clearly and handed them over to the Engineer-in-Charge or his Representative and made the whole premises fit for immediate occupation or use to the satisfaction of the Engineer-in-Charge.

If the Contractor shall fail to comply with any of the requirements of this conditions as aforesaid, on or before the date of completion of the works, the Engineer-in-Charge may at the expense of the Contractor fulfil such requirements and dispose of the scaffoldings, surplus materials and rubbish etc. as he thinks fit and the Contractor shall have no claim in respect of any such scaffolding or surplus materials except for any sum actually realized by the sale thereof less the cost of fulfilling the requirements and any other amount that may be due from the Contractor. If the expense of fulfilling such requirements is more than the amount realized on such disposal as aforesaid, the Contractor shall forthwith on demand pay such excess to the Company.

- If at any time before completion of the entire work, items or groups of items for which periods of completion have been specified, have been completed, the Engineer-in-Charge with the consent of the Contractor takes possession of any part or parts of the same then notwithstanding anything expressed or implied elsewhere in this Contract :

  (a) Within ten/thirty days of the date of completion of such items or groups of items or possession of the relevant part the Engineer-in-Charge shall issue completion certificate for the relevant part as in condition above provided the Contractor fulfils his obligations under that condition for the relevant part.

  (b) The Defects Liability Period in respect of such items and the relevant part shall be deemed to have commenced from the certified date of completion of such items or the relevant part as the case may be.

36. PRICE ESCALATION:

The quoted rate of the Contractor shall remain firm throughout the entire Contract period including extended Contract period if any and No Price Escalation shall be paid due to any reasons whatsoever.

37. DEFECT LIABILITY PERIOD AND DEFECTS AFTER COMPLETION:

Defect liability period shall be one year from the date of virtual completion of work, as certified by the Company. Any defect, shrinkage or other faults, which may appear within the defect liability period, in the opinion of the Engineer, arising from materials or workmanship not in accordance with the contract or from failure to take due precautions, shall upon the directions in writing of the engineer and within such reasonable time as shall be specified therein be amended and made good by the Successful tenderer at his own cost. In case of default, the Company may employ and pay any other person/persons to amend and make good such defect, shrinkage or other faults and all damage, loss and expenses consequent thereon or incidental thereto shall be made good and borne by the Successful tenderer.

Such damage, loss and expense shall be recoverable from the Successful tenderer by the Company or may be deducted by them from any money due or that may become due to the successful tenderer. The Company may also in lieu of such amendments deduct from any money due to the Successful tenderer, a sum to be determined by the Engineer equivalent to the cost of amending such works, and in the event of the amount retained under Clause 17 (the amount held as retention money) being insufficient, recover the balance from the Successful tenderer, together with expenses the Company may have incurred in connection therewith. The Successful tenderer shall remain liable under the provisions of this clause notwithstanding the signing by the Engineer of any certificate or the passing of any bills.

38. FACILITIES TO OTHER CONTRACTOR:

The Contractor shall, in accordance with the requirements of the Engineer-in-Charge, afford all reasonable facilities to other Contractor engaged contemporaneously on separate contracts in connection with the works.

39. NOTICES TO LOCAL BODIES:

(i) The Contractor shall comply with and give all notice required under any Governmental authority, instrument, rule or order made under any Act of parliament, State laws or any regulation of bye laws of any local authority relating to the works. He shall before making any variation from the Contract drawing necessitated by such compliance give to the Engineer-in-Charge a written notice giving reasons for the proposed variation and obtain the Engineer-in-Charge's instruction therein.

(ii) The Contractor shall pay and indemnify the Company against any liability in respect of any fees or charges payable under any Act of Parliament, State laws or any Government instrument, rule or order and any regulations or bye-laws of any local authority in respect of works.

40. SUB-CONTRACT:

The Contractor shall not sublet any portion of the contract without the prior written approval of the Accepting Authority.

41. LIABILITY FOR DAMAGE, DEFECTS OF IMPERFECTION AND RECTIFICATION THEREOF:

If the Contractor or his workmen or employees shall injure or destroy any part of the building in which they may be working or any building, road, fence etc. contiguous to the premises on which the work or any part of it is being executed, or if any damage shall happen to the work while in progress the Contractor shall upon receipt of a notice in writing in that behalf make the same good at his own expenses. If it shall appear to the Engineer – in – Charge or his Representative at any time during construction or reconstruction or prior to the expiration of the Defects Liability Period, that any work has been executed with unsound, imperfect, or unskilled workmanship or that any materials or articles provided by the Contractor for execution of the work are unsound or of a quality inferior to that contract for, or otherwise not in accordance with the Contract, or that any defect, shrinkage or other faults have appeared in the work arising out of defective or improper materials or workmanship, the Contractor shall, upon receipt of a notice in writing in that behalf from the Engineer – in – Charge forthwith rectify or remove and reconstruct the work so specified in whole or part as the case may be and / or remove the materials or article so specified and provide other proper and suitable materials or articles at his own expense, notwithstanding that the same may have been inadvertently passed, certified and paid for and in the event of his failing to do so within the period to be specified by the Engineer – In – Charge in his notice aforesaid, the Engineer – In – Charge may rectify or remove and re-execute the work and / or remove and replace with other materials or articles / complained of, as the case may be, by other means at the risk of the Contractor.

42. MEASUREMENTS:

In case of dispute between the successful tenderer and the Company as to under which item a particular work is to be measured the decision of the Engineer shall be final and binding on both the parties to the contract. If for any items, the mode of measurements is not specified the decision of the Engineer about the mode of measurement shall be final and binding on both the parties to the contract.

43. PREPARATION OF RUNNING AND FINAL BILLS:

The Engineer or his representative shall take measurements in presence of Successful tenderers representative and record them in the Measurement Book from time to time and shall prepare abstract for running and final bill, including recovery statements. The bill abstract shall be prepared on standard CPWD form on the basis of abstract of quantities prepared by the Engineer in triplicate. The Successful tenderer

should sign the bill and Measurement Book with the remark "Measurement and bill accepted", However, in the final bill, the successful tenderer shall have to certify "The bill is accepted in full and final settlement of all claims and demands against this work."

In case a large amount is blocked in the final bill pending technical/audit check, advance up to the extent of 75% of net final bill amount may be paid to the successful tenderer, with the approval of the Engineer at his direction even after the completion date is over.

The recovery from Running Account Bills for the materials issued by the Company shall be made on the basis of the quantity consumed in the work as assessed by the Engineer, giving a due allowance for wastage. The Successful tenderer shall submit once a month a statement showing the materials received, consumed and the balanced carried over the subsequent month so that a watch could be maintained on the material.

Final payment will be made within 03 (three) month on virtual completion of the entire work under the scope of work mentioned in the tender document and on submission of pre-receipted invoice along with all documents pertaining to warranty, test certificate etc. The payment for measurable items will be made on actual measurement basis (measurement will be taken physically by the Engineer of the Company and the authorised representative of the successful tenderer).

44. TERMS OF PAYMENT:

Electrical & Instrumentation Works for Supply & Installation :

- 60% after receipt of approver materials at site and on inspection & clearance etc.
- 30% after erection/ installation on foundation, alignment & grouting (wherever required), Installation / laying of Electrical and Instrument items etc.
- 5% on completion of testing and commissioning etc. on pro rata basis
- 5% on completion of total works in all respects and issuance of completion certificate

45. MODE OF PAYMENT:

All payment shall be made through RTGS/NEFT from Creative Museum Designers, Kolkata office only and the Contractor shall submit the following details to the company :

Name of the company :

Name of Bank :

Name of Bank Branch :

City :

Account Number :

Account Type :

IFSC Code of the Bank Branch :

MICR Code of the Bank Branch :

46. RATES AND TAXES/DUTIES:

Quoted price in the bid shall include all taxes & duties, GST, freight F.O.R. site and transit insurance and related incidentals, labour cess etc. in respect of this contract and no additional claim beyond what has been

quoted in the Financial Bid shall be accepted. Accepted tender rates shall not be changed due to changes in wages of labour. **Bidder must submit challan copy of GST as a proof of GST payment.**

The rates quoted by the successful tenderer shall be paid at net rates. He should include in his rates allowance for increase or decrease in the price due to market fluctuation.

The aforesaid rates would be subject to the following deductions as and if applicable at the rates in force at the time the bill is raised:

a. TDS under Income Tax Act.
b. Any other state taxes as applicable, Labour cess etc.
c. The raised bill should clearly and separately mention the following tax(es)
   GST

Nota bene: Tenderer should have obtained registration under the GST Act.

47. LABOUR CESS:

Labour Cess as applicable shall be deducted from each and every bill .

48. ROYALTY:

Payment of Royalty will be the responsibility of the Contractor within his quoted price every month the Contractor shall submit Royalty challan issued by the Competent Authority for Stone chips and Sand purchased by the Contractor and used in the job. It is mandatory for the Contractor to submit to the Company Royalty Certificate from the Mining Department before release of final bill payment due to him.

49. INSURANCE FOR DAMAGE TO PERSONS AND PROPERTY:

a. To execute the work, the successful tenderer shall obtain a **Contractors All Risk Policy** on contract value awarded to them.

b. The Successful tenderer shall be responsible for all injury to persons, animals or things and for all damages to property, structural and decorative, whether such injury or damage arise from carelessness or accident or in any way connected wherewith. This clause shall be held to include, interalia any damage due to causes as aforesaid to buildings (whether immediately adjacent or otherwise) and to roads, streets, footpaths, bridges or ways as well as all damage caused to the buildings and works forming the subject of this contract by the inclemency of weather. The Successful tenderer indemnifies the Company and holds him harmless in respect of all expenses arising from such injury or damage to persons or property aforesaid and also in respect of any claim made in respect of Injury or damages consequent upon such claim.

c. The successful tenderer shall reinstate all damage of every sort mentioned in this clause, so as to deliver up the whole of the contract works complete and perfect in every respect and so as to make good and otherwise satisfy all claims for damage as aforesaid to the property or third parties.

d. The Successful tenderer also indemnifies the Company against all claim which may be made upon the Company during the currency of this contract by any employee or representative of an Employee of the agency or any sub-agency, employed by him, for any injury to or loss of life or such employees, or for compensation payable under any law for the time being in force to any workman or to the representative of any deceased or incapacitated workmen.

e. The Successful tenderer also indemnifies the Company in respect of any costs, charges and/or expenses, including legal costs as between Solicitor and client, occurring out of any award of compensation and/or damages consequent upon such claims.

f. The Company shall be at liberty and is hereby empowered to deduct the amount of any damages, compensation cost, charges and/or expenses arising or ascertaining from or in respect of any such claim and/or damages as aforesaid from any sum, or sums due to, or become due to the Successful tenderer.

50. WATER & ELECTRICITY:

Service water shall be provided by CMD without any cost implication. The drinking water is to be arranged by the tenderer themselves. Power cannot be provided by CMD for construction purpose. However, commissioning power shall be arranged by CMD. Contractor shall arrange for construction power from available resources/ alternate arrangement at site at their own cost.

51. LAND FOR SITE OFFICE, WORKSHOP & LABOUR COLONY:

CMD will provide land/ space for contractor's temporary office/ godown/ store within project premises only, subject to availability. But no land for labour/ worker hutment shall be provided by CMD.

52. ARBITRATION:

In the case of any disputes or differences arising out of or in connection with, or concerning this Agreement, it shall be settled by arbitration. The arbitration shall be conducted by an expert as Arbitrator in the field acceptable to both the parties. In case of disagreement, it shall be through three experts in the field, one to be appointed by each party and the third presiding expert to be jointly appointed by the expert referred to. The arbitration shall be as per the provision of the Arbitration and Conciliation (amendment) Act, 2015 and the decision of the penal so appointed shall be final and binding on both the parties to this Agreement. The place of arbitration shall be normally Kolkata or any other suitable place mutually agreed.

The provisions of the Arbitration and Conciliation Act 2015 or any statutory modification or re- enactment thereof and of the rules made there under for the time being in force shall apply to arbitration proceedings under this clause.

53. JURISDICTION:

In regard to all disputes or claims arising out of the contract of whatever nature, the place of jurisdiction shall be at Kolkata only.

54. OPENING OF WORK:

a. All works under or in course of execution or executed in pursuance of the contract shall at all times be open to the supervision of the Company, Engineer or their representatives.

b. The successful tenderer shall notify the Engineer in writing immediately after the trenches or excavations, as shown in the drawings, are executed or as soon as any ground is cut into which from the unexpected cause, appears to need immediate attention. After notifying the Engineer he shall await instructions which shall be given within seven days of receipt of such notice. If the successful tenderer puts in, any part of the foundations before he has notified the Engineer and received instruction, he shall be liable to reinstate all work that may subsequently at any time, be damaged on account of any defect or insufficient foundations. The Successful tenderer shall at the request of the Engineer, within such time as indicated by the Engineer, shall open up for inspection any other work and should the successful tenderer refuse or neglect to comply with such request, the Company through the Engineer may employ other workmen to open up the same. If the work has been covered up in contravention of Engineer's instruction, or if on being opened up, be found not in accordance with the drawings and specifications

or the instructions of the Engineer, the expenses of opening up and covering it up again, whether done by the Successful tenderer or such other workmen shall be borne by or which may become due to the Successful tenderer or from the amount held as retention money. If the work has not been covered up in contravention of such instructions, and be found in accordance with said drawings and specifications or instructions, the expenses aforesaid shall be borne by the Company and shall be added to the contract sum provided always that in the case of foundations or of any other urgent work so opened up and requiring an immediate attention, the Engineer shall within seven days after receipt of written notice from the Successful tenderer that the work has been so opened, make or cause to make the inspection thereof and at the expiration of such time if such inspection shall not so have been made, the Successful tenderer may cover the same and shall not be required to open it up again, except at the expense of the Company.

55. HEIGHTS:

Successful tenderer's rates shall include lifts up to all heights given in drawings or as required during execution.

56. SCAFFOLDING:

The successful tenderer shall use external scaffolding to ensure true line in vertical and horizontal planes. Scaffolding required for execution of this work may vary from single floor height to multi floor heights, which may require multiple staging, scaffolding, centering and shuttering. Since the payments will be made to the successful tenderer at net quoted rates, irrespective of the heights involved the tenders must see and study the drawings carefully before tendering their rates.Contractor's quoted rates for concreting item shall deemed to be inclusive of all cost for RCC, Reinforcement steel, scaffolding, centering& shuttering, labour, supervision etc. as may be required for successful completion of the work.

57. SITE CLEARANCE AND CLEAN UP:

The Successful tenderer shall, from time to time clear away all debris and excess materials accumulated at the site.

After all fixtures, equipment and appliances have been installed and commissioned, they shall clean up the same and remove all plaster, paints, stains, stickers and other foreign matter of discolouration leaving the construction in ready to use condition.

On completion of all works, they shall demolish all temporary storages put up by them, remove all surplus materials and leave the site in a broom clean condition.

58. QUANTITY VARIATION:

All the quantities given in schedule of quantities are tentative only.

The tenderers shall be deemed to have given balanced Rate for each items, irrespective of the quantities given. Also irrespective of variation in quantities to any extent either positive or negative, the tenderer shall be paid at acceptable contract rates only till completion of work. The Company reserves the right to increase or decrease quantities of any or all items to any extent either positive or negative , for successful completion of work.

59. AUTHORITIES, NOTICES AND PATENTS:

The successful tenderer shall confirm to the provision of any Act of the Legislature relating to the works, the Regulations and Bye-Laws of any corporation and of any electric and other Companies and/or authorities

with whose systems the structure is proposed to be connected, and shall, before making any variation from the drawings or specifications that may be necessitated by so confirming, give to the engineer written notice, specifying the variation proposed to be made and the reason for making it and apply for instruction thereon. If compliance with this clause involves any extra work not included in this contract, he shall specify these items of work and the allowance or extra payment required on their account. In case he shall not, within seven days, received such instructions, shall proceed with the work, conforming to the provision and/or regulations of bye-laws in question.

The amount claimed as an extra or whether there is an extra or not shall be decided by the Engineer and will be subject to arbitration clause is so required.

The successful tenderer give all notices required by the said regulations or bye-laws to be given to any authority and pay to such authority or to any public office all fees that may be properly chargeable in respect of the works and lodge the receipts with the bill.

The successful tenderer shall indemnify the Company against all claims in respect of patent rights, and shall defend all action arising from such claims and shall himself pay all royalties, license fees, damages, cost and charges of all and every short that may be legally incurred in respect thereof.

60. CERTIFICATES AND PAYMENTS:

a. The Engineer may from time to time intimate in writing to the Successful tenderer that he requires the works to be measured and they shall attend or send qualified agent to assist the Engineer or the Engineer's representative in taking such measurements, and calculations and to furnish all particulars or to give all assistance required by the Engineer. Should they not attend or neglect or omit to send such agent then the measurement taken by the Engineer or approved by him shall be taken to be correct measurements of the work unless objected to within one month of their being recorded in the measurement book or books. Such measurements shall be taken in accordance with the mode of measurements mentioned in the specifications.

b. The Successful tenderer or his agents may at the time of measurement take such notes of measurements as they may require.

c. The Engineer or his authorised representative will issue on the basis of necessary measurement interim valuation certificates to the Successful tenderer in respect of items of work, rates for which exist in the priced schedule of quantities or have been subsequently agreed upon between the parties, and shall send the measurement books and the valuation certificates to the Company, The Successful tenderer shall be entitled under these certificates of the Engineer to payments, within 15 days from the date of each certificate. unless objected as provided in sub-clauses (a) &(b) at the rate of maximum 90% (ninety percent) of the value of work so executed and the balance being retained towards retention money. The engineer shall issue such certificates within fifteen days of notice from the Successful tenderer provided measurements have been taken and the value of the work done since last payment exceeds the amount stated in the appendix and not more than one certificate is required in a fortnight, provided always that the issue by the Engineer of any certificate during the progress of the work or after their completion shall not have any effect as a certificate of satisfaction or relieve the Successful tenderer from his liability under Clauses 37 and 54. Provided all defects are removed and the retention money is not forfeited or has not become liable to beforfeited under this contract, entire amount under retention money shall be refunded without interest after the completion of defect liability period or the final bill is passed for payment whichever is later.

d. All intermediate payments shall be recorded as payments by way of advance against the final payment only and not as payment for work actually done and completed. The final bill shall be submitted by the

Successful tenderer within 3 months of the date fixed for completion of the work. The measurement of the work taken by the Engineer or his representatives after one week's notice to the Successful tenderer shall be final and binding on him unless objected to within one month of their being recorded in the measurement books.

e. The Company may in consultation with the Engineer, but absolutely at his discretion, make an advance payment on account, which will be merged in the next intermediate payment, based on measurements.

f. Advance for materials brought to site: The Successful tenderer shall execute a bond in favour of the Company in the prescribed format attached hereto for each advance or intermediate payment received by him. If the Successful tenderer commits any default in the terms of the said bond and he fails to pay the bond amount, the Company shall have the power to.

   i. Seize and utilise the said materials or any part thereof for the completion of the works.

   ii. Remove and sell by public auction the materials seized or any part thereof, and out of the proceeds of the sale, retain all sums repayable to the Company together with interest thereon at the rate prescribed by Govt. of India from time to time for capital outlays.

   iii. Deduct all or any part of moneys owing from out of the retention money or any other sum or sums due to the Successful tenderer under this agreement.

g. The Successful tenderer agrees that before final payment shall be made on the contract, he will sign and deliver to the Company either in the measurement books or otherwise as required, a valid release and discharge certificate from any and all claims and demands whatever from the company for all matters arising out of or connected with the contract.

61. TIME AND DAMAGES FOR NON-COMPLETION OF WORK IN TIME:

a. All the construction works shall progress strictly as per the enclosed CPM/PERT/BAR CHART. If however, the Successful tenderer desires some minor modification time and before execution of the agreement indicating the reasons for which changes are required. The Company may after scrutiny, agree to the modifications suggested if the reasons Cited by the successful tenderer areconsidered valid. The decision of the consideration of the company in this respect will be final and binding. The modifications, if any, are to be incorporated in the CPM/PERT/BAR CHART and this will form a part of the agreement.

b. The starting time specified for carrying out of the work as entered in the CPM/PERT/BAR CHART shall be reckoned from the date of issue of the Letter of Intent. The date of completion or such date as is duly extended under Clause 62 shall be strictly observed by the Successful tenderer. The work shall, throughout the stipulated period of the contract, be proceeded with all diligence (Time being deemed to be the essence of this Contract) by the successful tenderer strictly according to the CPM/PERT/BAR CHART which is a part of this agreement.

c. At any stage during the execution of the work if the work lags behind the target indicated in the CPM/PERT/BAR CHART for reasons directly attributable to the Successful tenderer, he shall be liable to pay as agreed liquidated damages equivalent to half percent of the total cost of work awarded every week for the period the work lags behind the CPM/PERT/BAR CHART subject to a maximum of 10% of thecontract valueawarded or gross value of work done, whichever is greater.

d. In the event of Successful tenderer's inability to complete the SITC of External Electrical System work by the scheduled date of completion, the Company shall have the right to terminate the contract as per Clause 65 or allow the successful tenderer to continue and complete the work within specific date. In the latter case, during the period of continuation, the successful tenderer shall pay as agreed liquidated damage equivalent to one per cent of the total cost of work awarded for every week that the work remains unfinished subject to a maximum of 10% of thecontract value awarded or gross value of work done, whichever is greater.

62. EXTENSION OF TIME:

If the successful tenderer shall desire an extension of time for completion of the work on the grounds of his having been unavoidably hindered in its execution and for reasons not attributable to him on the following grounds:

a. by reason of any exceptionally inclement whether like Cyclone, severe flood etc., normal monsoon shall not be considered a valid reason for extension of time,
b. by reason of proceedings taken or threatened by, or legal disputes with adjoining or neighbouring owners,
c. due to delay in the work of other agencies or tradesman engaged or nominated by the Company: if such delay is directly responsible for delay in execution of this work,
d. by reason of any general strike or lockout affecting the building made, strike or any kind of labour trouble in successful tenderer's own organisation shall not be a valid reason for extension.
e. in the event of delay in execution of work wholly attributable to delay in supply of drawings by Architect or the Company in spite of request from the successful tenderer well in advance, he shall apply in writing to the Engineer within seven days of the date of the hindrance on account of which he desires such extensions as aforesaid and the engineer, with the consent of the Company may if the reasonable ground be shown therefore allow such extension of time, if any, be necessary or proper,
f. in case of the total value of the work exceeds thecontract value owing to deviation in quantities or extra items, the successful tenderer will be entitled to ask for extension of time in proportion to the increased value of work.
g. No extension of time shall be given to the successful tenderer for non-supply or delay in supply of of materials / equipment.The successful tenderer hereby agrees that extension of time requested for by him and granted by the Company shall be treated as an extension of time allowed to them without any claim for compensation or damages for any reasons whatsoever including those for which the extension is granted.

If the works be delayed by:

a. Force majeure or
b. Abnormally bad weather, or
c. Serious loss or damage by fire, or
d. Civil commotion, local combination of workmen, strike or lock out affecting any of the trades employed on the work, or
e. Delay on the part other Sub-Contractors of tradesman engaged by Company in executing work not forming part of the contract, or
f. Non-availability of stores, which are the responsibility of Company to supply, or
g. Non-availability or break-down of tools & plants to be supplied or supplied by company, or
h. Any other cause which in the absolute discretion of Engineer-in-charge is found as beyond the Sub-Contractor’s control, then upon the happening of any such event causing delay, the Sub-Contractor shall immediately give notice thereof in writing to the Engineer-in-charge but shall nevertheless use constantly his best Endeavour’s to prevent or make good the delay and shall do all that may be reasonably required to the satisfaction of the Engineer-in-charge to proceed with the works.

63. SUSPENSION OF WORK BY THE SUCCESSFUL TENDERER:

If the successful tenderer suspends the works without obtaining extension of time or in the opinion of the Engineer neglects or falls to •proceed with due diligence in executing his part of the contract or if he makes default more than once in the manner mentioned in Clause 37 above the Company or the Engineer shall have the power to give notice in writing to the successful tenderer requiring that the work be proceeded with reasonable speed and output must be commensurate with the CPM/PERT/BAR CHART. Such notice shall specify the act of default on the part of the successful tenderer. After such notice has been given the Successful tenderer shall not be at liberty to remove from the site of work or from any ground continuous thereto any plant or materials belonging to him which had been placed thereon for the purpose of the work,

and the Company shall have a lien upon all such plants and materials to subsist from the date of such notice being given, until the notice have been complied with. Provided always that such lien shall not under any circumstances subsist after the expiration of thirty-one days from the date of such notice being given, unless the Company has entered upon and taken possession of the works and site and of all such plants and materials until the works have been completed under the power hereinafter conferred upon it. If the Company exercises the above power it may engage any other agency to complete the works or finish the works departmentally and exclude the successful tenderer, his agents and servants from entry upon or access to the same except that the successful tenderer or any one person appointed in writing by him and accepted by the Company may have access at all reasonable' times during the progress of works to inspect, survey and measure the works. Such written appointments marked with the Company consent or a copy thereof shall be delivered to the Engineer before the person so appointed comes to the works. The Company shall take such steps as. in the opinion of the Engineer may be reasonable and necessary for completing the works without undue delay & expense, using that purpose the plants and materials above mentioned, in so far as they are suitable and adopted to such use. Upon the completion of the work the Engineer shall certify the amount of expenses properly incurred, consequent on the Incidental to the default of the successful tenderer as aforesaid, in completing the works by other persons. Should the amount so certified as the expenses properly incurred, including the Company overhead if the works were carried out departmentally, be less than the amount which would have been due to the Successful tenderer upon the completion of the works by him, the difference shall be paid to the Successful tenderer by the Company. Should the amount of the former exceed the later, the difference shall be paid by the Successful tenderer to the Company. The Company shall not be liable to make any further payment or compensation to the Successful tenderer for or on account of the proper use of the plants for the completion of the works under provisions hereinbefore contained other than such payment as is included in the contract price. After the works have been so completed by persons other than the successful tenderer under the provisions hereinafter contained, the Company shall give notice to the Successful tenderer of such completion and may require him from time to time, before and after such completion, to remove his plants and likewise all such materials as aforesaid as may not have been used in the completion of the works, from the site. If such plants and materials are not removed within such reasonable time, the Company may remove and sell the same, holding the proceeds, less the cost of the removal and sell, to the credit of the successful tenderer. The Company shall not be responsible for any loss sustained by the successful tenderer from the sale of plants in the event of the successful tenderer not removing it after notice, or for any damage thereto or deterioration thereof in any event.

64. DETERMINATION OF CONTRACT BY THE CMD:

If the successful tenderer goes into liquidation, whether voluntary or compulsory or shall make an assignment or a composition for the benefit of the greater part, or shall enter into a Deed of Agreement with its creditors or if the Receiver of the Successful tenderer shall be unable, within fourteen days after notice to him requiring him to do so, to show to the reasonable satisfaction of the Company that he is liable to carry out and fulfil the contract and if so required by the Company to give reasonable security therefore or if the successful tenderer shall suffer execution to be issued or shall suffer any payment under this contract to be attached by or on behalf of any of the creditors or the Successful tenderer or shall assign, charge or encumber this charge or encumber this contract thereunder or shall neglect or shall fail to proceed to perform all or any of the act, matters or things by the contract, to be observed and performed by the successful tenderer for three clear days after written notice shall have been given the successful tenderer in manner, matter hereinafter mentioned, requiring the successful tenderer to observer perform the same or shall use improper material or workmanship in carrying on the works or shall in the opinion of the Engineer not exercised such due progress as stipulated in the enclosed CPM/PERT/BAR CHART forming part of this contract which would enable the works to be completed within the time agreed upon or shall abandon the contract, then, and in any of said case the Company may notwithstanding any previous waiver, determine the contract by a notice In writing in which case the retention money (Including the earnest money and the initial security deposit) and whether paid in one sum or deducted by instalment shall stand forfeited and be absolutely at the disposal of the Company.The Successful tenderer shall have no claim or compensation for any loss sustained by him by reasons of his having purchased or procured any materials or entered into any engagements or made advances

on account of or with a view to the execution of the work or the performance of the contract. The successful tenderer shall not be entitled to recover or be paid any sum for any work actually performed under the contract unless and until the Engineer will have certified in writing the performance of such work and the value of work payable in respect thereof and the successful tenderer shall only be entitled to be paid the value so certified, The certificate of the Engineer shall be based on measurements taken by him or under his supervision and with due notice to the Successful tenderer and on rates in the priced schedule or as subsequently communicated by the Engineer with the approval of the Company, under this agreement except for arithmetical errors, shall be final and conclusive. The Successful tenderer must remove his plant, materials, scaffolding etc. from the site within 10 days (ten days) of the receipt of the notice from the Company after which they will vest in the Company who may dispose them off as per Clause 63 by sale or auction on account of and at the risk of the successful tenderer who will have no claim for loss or compensation on this account.

65. TERMINATION OF CONTRACT BY SUCCESSFUL TENDERER:

If payment of the amount payable by the Company under the certificate of interim payment issued by the Engineer in accordance with Clause 60 shall be in arrears and unpaid for sixty days after notice in writing requiring payment of the amount shall have been given by the Successful tenderer tothe Company in manner hereinafter mentioned or if work be stopped for six months under the order of the Company for any reason not connected with any default on the part of the Successful tenderer or by any injunction or other order of any court of law made for any reasons not connected with any such default on the part of the successful tenderer then and in any of the said cases the successful tenderer shall be at liberty to terminate the contract by notice in writing to the Company and he shall be entitled to recover from the Company payment for all works executed and for useful materials (but not plants) purchased for the purpose of the contract and is brought to the site. In arriving at the amount of such payment, the net rates contained in the successful tenderer's tender shall be followed, or where the same may not apply, rates proportional to the prices therein contained. Rates for materials may be determined by the Engineer on actual vouchers produced by the successful tenderer and/or prevailing market rates at the discretion of the Engineer. The Successful tenderer shall not be entitled to recover or be paid any sum for any work actually performed under the contract, unless and until the Engineer has certified in writing the performance of such work and the value payable in respect thereof and the successful tenderer shall only be entitled, to be paid the value so certified. The certificate of the Engineer shall be based on measurements taken by him or under his supervision after due notice to the successful tenderer and shall be final and conclusive except for arithmetical errors. The successful tenderer must remove his plant, materials, scaffolding etc. from the site within ten days or such time as may be extended by the Company in writing, from the receipt of the notice from the Company after which they will vest in the Company who may dispose them off as per Clause 64 by sale or auction on account of and at the risk of the successful tenderer who will have no claim for loss or compensation on this account.

66. COMPENSATION:

All sums payable by way of compensation or liquidated damage under any of these conditions shall be considered as reasonable compensation to be applied to the use of CMD without reference to the actual loss or damage sustained and whether or not any damage shall have been sustained.

67. DISMISSAL OF WORKMEN ETC.:

The Successful tenderer shall on the request of the Engineer immediately dismiss from the works any person employed thereon who may, in the opinion of the Engineer be unsuitable or incompetent or who may in the opinion of the Company or the Engineer misconduct himself and such person shall not be again employed or allowed on the works without the permission of the Engineer and/or the Company.

68. ASSIGNMENT OR SUBLETTING OR BRIBES:

a. This contract shall not be assigned or sublet without the written approval of the Company. If the Successful tenderer shall assign or sublet this contract, or attempts to do so or become insolvent or commence insolvency proceedings or make any composition with his creditors or attempt to do so, or

if any bribe, gratuity, gift, loan, pre-requisite award, reward or advantage pecuniary or otherwise, shall either directly or indirectly be given, promised or offered by the Successful tenderer any of his servants or agents to any officer of the Company or to persons who shall become in any way directly or indirectly interested in the Contract, the Company may thereupon by notice in writing rescind the contract and the retention money of the Successful tenderer shall thereupon stand forfeited and be absolutely at the disposal of the Company, and the same consequences shall ensure as if the contract had been rescinded under Clause 64 thereof and (in addition) the Successful tenderer shall not be entitled to recover or to be paid for any work therefore actually performed under the contract.

b. The whole of the works including the contract shall be executed by the Successful tenderer and he/they shall not directly or indirectly transfer or assign or underlet the contract or any part, share or interest therein nor shall he take a new partner without the written consent of the Company and no subletting shallrelieve the Successful tenderer from the full and entire responsibility of the contract or from active superintendence of the works during the progress.

69. NOTICE:

Notice for the Company, the Engineer or the Successful tenderer may be served personally or sent by registered post addressed to the office of the Company or the last known place of business of the Engineer and the Successful tenderer or in the case of the successful tenderer also be being left on the works. Any notice sent by registered post shall be deemed to be served at the time when in the ordinary course of post it would be delivered.

70. APPOINTMENT OF APPRENTICES AS PER APPRENTICES ACT:

The Successful tenderer shall during the currency of the contract when called upon by the Engineer engage and also ensure engagement by sub-agencies and other employed by the successful tenderer with the works such number of apprentices in categories mentioned below and for such periods as may be required by the Engineer. The Successful tenderer shall tram them as required under the Apprentices Act 1961 and the Rules made thereunder and shall be responsible for all obligations of the Company under the said act including the liability to make payments to apprentices as required under the said Act.

- <u>In respect of Civil Works</u>

Building Construction : One apprentice for every 7 persons engaged in this category

- <u>In respect of Electrical Works</u>

Wireman : One apprentice for every 7 persons engaged in this category

The Successful tenderer shall comply with the provision of Apprentices Act 1961 and Rules and Orders issued hereunder from time to time.

If the Successful tenderer fails to do so, his failure will be deemed to be a breach of contract and the Company reserves the right to cancel the contract. The Successful tenderer also shall be liable to any pecuniary liability arising on account of any violation by him of the provisions of the Act.

71. QUALITY MANAGEMENT SYSTEM:

The contractor shall prepare and submit draft Project quality plan/quality assurance plan, based on relevant I.S. Codes, contract specifications etc. as applicable for successful completion of the work, for the Engineers review,comments(if any) and approval within 21 days on award of the contract. The Engineer shall review Project quality plan/quality assurance plan and provide any comments to the contractor within 14 days after receipt of such draft. Within 7 days after receipt of Engineer's comments the contractor shall implements such comments and resubmit the Project quality plan/quality assurance plan to the Engineer for approval. These procedures shall repeat till approval of the Engineer.

The contractor shall follow and comply with the approved Project quality plan/quality assurance plan and shall not amend it without prior written consent of the Engineer. The Engineer or his representative at any time during performance of the work, may conduct a compliance audit with respect to the Project quality plan/quality assurance plan. If such audit demonstrates noncompliance with any aspect of the quality assurance plan, the Engineer may notify the contractor of such non compliance and the contractor shall promptly undertake appropriate remedial action, at contractors sole risk, cost and expense.

72. NEGOTIATION:

CMD, Kolkata will not enter into any negotiations even with the Lowest Tenderer.

73. AGREEMENT:

The successful Tenderer has to enter into an Agreement with CMD, Kolkata in Nonjudicial Stamp Paper of Rs. 100/- (Rupees One Hundred Only) before commencement of works.

All documents forming the Contract are to be taken as mutually explanatory of one another. In case the bidder requires any clarifications or further information, may contact

Head of Engineering - Civil,
CREATIVE MUSEUM DESIGNERS
NCSM Campus, 33, Block-GN, Building-II
Bidhan Nagar, Sector –V, Kolkata – 700091
Phone No.: 033 2357 6041
Email: cmd.ncsm.civil@gmail.com

SPECIAL CONDITIONS OF THE CONTRACT

1.0 INTRODUCTION:

1.1 These Special Conditions of Contract shall be read in conjunction with the General Conditions of Contract, specifications of works, drawings and any other document forming part of this contract wherever the context so requires.

1.2 Notwithstanding the sub-division of the document into these separate sections and volumes, every part of each shall be deemed to be supplementary of every other part and shall be read with and into the contract so far as it may be practicable to do so.

1.3 The workmanship shall satisfy the relevant Indian Standards, the Technical Specifications contained herein and codes referred to. Where the job specifications stipulate requirements in addition to those jobs contained in the standard codes and specifications, these additional requirements shall also be satisfied. In absence of any standards/ specifications/ codes of practice for detailed specifications covering any part of the work covered in this tender, the instructions/ directions of Engineer-in-charge will be binding on the Contractor.

1.4 Where any portion of the General Conditions of Contract (GCC) is repugnant to or at variance with any provisions of the Special Conditions of Contract, then unless a different intention appears, the provision(s) of the Special Conditions of Contract shall be deemed to override the provision(s) of General Conditions of Contract (GCC) only to the extent that such repugnancies of variations in the Special Conditions of Contract are not possible of being reconciled with the provisions of General Conditions of Contract (GCC).

1.5 Without prejudice to the provisions of the General Conditions of Contract, whenever in the Bidding documents it is mentioned or stated that the Contractor shall perform certain work or provide certain facilities it is understood that the Contractor shall do so at his own cost and the Contract price shall be deemed to have included cost of such performance and/or provision, as the case may be.

1.6 In the absence of any Specifications covering any work(s), the same shall be performed /executed in accordance with standard Engineering Practice as per the instructions/directions of the Engineer-in-Charge, which will be binding on the Contractor

2.0 LOCATION AND ACCESS OF SITE:

The Project Site is located at K D Malaviya National Oil Museum, Khanapara, Guwahati, Assam. The Site is well connected by Rail and Road from other parts of India. Nearest Airport is at Guwahati.

3.0 These 'Technical Specification and Special Conditions' shall be read in conjunction with other provision including General Conditions of the Contract and are supplementary to & complementary with each other. However, in the event of any provisions of General Conditions are repugnant to or at variance with any provisions of 'Technical Specification and Special Conditions', then unless a different intention appears between the two, the provision given in 'Technical Specification and Special Conditions' shall be deemed to over-ride that provision of General Conditions and shall to the extent of such repugnancy or variation prevail & govern the Contract.

4.0 TIME SCHEDULE:

4.1 The work shall be executed strictly as per Time Schedule as provided in Clause 20 of General Conditions of Contract (GCC).

4.2 CONTRACTOR shall furnish a daily report on category wise labour deployed along with the progress of work done on previous day in the proforma prescribed by the Engineer-in-Charge.

5.0 SEQUENCE OF WORK:

Contractor shall plan the sequence of all works so as to achieve the desired progress keeping in mind overall safety and quality at all points of time.

If due to a particular design or specification or availability of machines or any other reason, a particular sequence of operation is demanded by the engineer due to which some interruptions are inherent to any one or more types of work or items of execution, then no claim for such interruption shall be entertained and contractor shall have to follow the sequence as instructed by the engineer.

6.0 PREPARATION OF BID:

Bidder is advised to visit and examine the site and its surrounding and shall familiarize himself of the existing facilities and environment and shall collect all other information which he may require for preparing and submitting the bid and entering into the contract. Claims and objection due to ignorance of existing conditions or inadequacy of information will not be considered after submission of the bid and during implementation.

7.0 SCOPE OF WORK:

7.1 The scope of work in general includes scope of work specified in various Technical Specifications/ sections provided in Part-I (Technical) and Schedule of Quantity & Rates (SOQR) enclosed in the Bidding Document. Further, it includes any other work not specifically mentioned but required to complete the work as per specifications, drawings and instructions of Engineer-in-Charge.

7.2 Scope of work shall be read in conjunction with item description of Schedule of Rates and Contractor's scope shall include all activities of work specified in the item description of Schedule of Quantity & Rates.

7.3 Rates shall include all cost for the performance of the item considering all parts of the Bidding Document. In case any activity though specifically not covered in description of item under `Schedule of Quantity & Rates' but is required to complete the work which could be reasonably implied/ informed from the content of Bidding Document, the cost for carrying out such activity of work shall be deemed to be included in the item rate.

7.4 The scope of work under fabrication & Erection shall include the following but not limited to these:

a) i) All Transportation including loading unloading of materials

ii) Laying of instrumentation/ signal / control /power cables, cable Tray ,termination of instrumentation/ signal / control cables/ motor cable

iii) Supply,Installation, testing, commissioning of all equipments & panels viz. DG Set, RMU Unit, APFC Panel etc.

iv) Supply, Installation of GI flat, earth electrode, etc

v) Structural support, if any.

vi) Manpower assistance including supply of tools tackles required in pre commissioning & commissioning activity.

vii) House keeping

Note : any other items which are not covered above & separately in the schedule of rates but required to complete the work in all respect as per approved drawing, ITP , procedure, specification, standard are in bidder’s scope. All works required as per drawings, specification and instruction of engineer-in- charge.

b) Carrying out required scaffolding works: wherever required at all level and height for execution of the above works.

c) Returning of all surplus cable, cable tray , structural steel and all piping and structural scraps from the project premises, as per the instructions of Engineer-in-charge.

d) To deploy skilled, semi-skilled and unskilled personnel in required number as per Scheduled Program so as to complete the work as per overall project schedule.

e) To deploy suitably qualified supervisors in required numbers to assure quality of work to the full satisfaction of KDMNOMT/ CMD/ Consultant.

f) To carry out all repairs arising out of defective works done by the contractor.

g) Cleaning of job sites and transporting all surplus material, debris, scrap, construction equipment etc. as per direction of Engineer-in-charge.

h) Contractor shall be responsible for proper coordination with other agencies operating at the site of work so that work may be carried out concurrently, without any hindrance to others. The Engineer-in-Charge shall resolve disputes, if any, in this regard, and his decision shall be final and binding on the Contractor.

i) All works shall be done to the entire satisfaction of the Engineer-in-Charge. Any work not carried out in accordance with the instructions shall be dismantled and made good without any extra cost and time implication to the KDMNOMT .

j) If and when required for the coordination of the works with other agencies involved at site, the Contractor shall within the scope of work, re-route and/or prepare approaches and working areas as may be necessary.

k) The Contractor shall within the scope of work observe in addition to specifications, all national and local laws, ordinances, rules and regulation and requirements pertaining to the work

7.5 The entire work under this specification shall be completed within stipulated period from the date of placement of order. After award of contract, a final program shall be prepared well in advance.

8.0 SITE CLEANING:

1. The Contractor shall clean and keep clean the work site from time to time to the satisfaction of the Engineer- in-Charge for easy access to work site and to ensure safe passage, movement and working.

2. If the work involves dismantling of any existing structure in whole or part, care shall be taken to limit the dismantling up to the exact point and/or lines as directed by the Engineer-in-Charge and any damage caused to the existing structure beyond the said line or point shall be repaired and restored to the original condition at the Contractor's cost and risks to the satisfaction of the Engineer-in-Charge, whose decision shall be final and binding upon the Contractor.

3. Contractor shall be the custodian of the dismantled materials till the Engineer-in-Charge takes charge thereof.

4. Contractor shall dispose off the unserviceable materials, debris etc. out of the project premises.

5. Contractor shall sort out, clear and stack the serviceable materials obtained from the dismantling/ renewal at places as directed by the Engineer-in-Charge.

6. No extra payment shall be paid on this account. The rates quoted in SOQR are deemed to be inclusive of all the costs towards all the above activities as well.

7. The tenderer shall note that no Sub-Contractor shall be engaged by them for the above work.

8.1 If due to a particular design or specification or availability of materials or any other reason, a particular sequence of operation is demanded by the engineer due to which some interruptions are inherent to any one or more types of work or items of execution, then no claim for such interruption shall be entertained and contractor shall have to follow the sequence as instructed by the Engineer-in-Charge.

8.2 Contractor may work beyond normal working hour, and also on Sunday and Holidays (with prior approval from CMD / Consultant) as desired by CMD to maintain progress of work as per schedule without any additional liability to CMD. The Contractor shall give priority or redeploy the work force for a particular work as instructed by CMD.

8.3 All materials shall be stored and stacked properly ensuring that place is properly drained and is free from dirt. It shall be ensured that no damage is caused due to improper stacking.

8.4 CMD / Consultant shall have free access at all times to those parts of Contractor's area of work which are concerned with their works. Also he shall be afforded all reasonable facilities at all stages of preparation, fabrication for satisfying himself that the fabrication is being undertaken in accordance with the provisions of relevant specification.

9.0 SECURITY DEPOSIT/ PERFORMANCE BANK GUARANTEE:

Please refer Clause 17 of General Conditions of Contract (GCC)

10.0 QUOTATION:

10.1 Contractor shall indicate his price as per Scope of Work and SOQR given in Tender Document.

10.2 The enclosed bid documents are deemed to be sufficient for the bidder to assess the nature and quantity of work involved and to quote his prices for the above job. No deviations from the bid documents will be admissible.

11.0 PROGRAMME:

A monthly time bar chart for various activities like supply, fabrication, transportation to site, welding, Installation, Fixing & Laying, Testing & Commissioning etc. giving starting and completion dates of all activities, shall be submitted after awarding of the job for approval of CMD.

12.0 RULES & REGULATIONS OF SAFETY, ELECTRICITY BOARDS ETC.:

The Contractor shall at all times comply with all relevant acts, electricity rules, safety regulations etc. as per statutory regulations of Central / State Government & Plant Authorities/ APDCL.

13.0 EXTRA ITEMS:

Please refer Clause 19 of General Conditions of Contract (GCC).

14.0 Following Points to be considered by the Contractor while quoting his offer

Any additional work, if required, will be undertaken by them after getting instruction in writing from the Engineer-in-Charge. For settlement of their claims on any additional work, the contractor will keep joint record of the measurements of such work duly certified by the Engineer-in-Charge.

15.0 MAINTENANCE & GUARANTEE:

Commencing from the date of issue of final acceptance/completion certificate to the Contractor shall stand guaranted for a period of 12 calendar months, from the date of handing over the total job in all respect to CMD / Consultant. The Contractor shall replace/rectify all parts/components which become defective due to bad fabrication or due to any act of oversight or omission. All such rectification or replacements of defective workmanship shall be done free of cost by the Contractor.

16.0 RESPONSIBILITY OF CONTRACTOR:

16.1 It shall be the responsibility of the Contractor to obtain the approval for any revision and/or modifications decided by the Contractor from CMD / Consultant Engineer-in-Charge before implementation. Also such revisions and/or modifications if accepted/ approved by CMD / Consultant Engineer-in-Charge shall be carried out at no extra cost to CMD / Consultant. Any change required during functional requirements or for efficient running of system, keeping the basic parameters unchanged and which has not been indicated by the Contractor in the data/drawings furnished along with the offer will be carried out by the Contractor at no extra cost to CMD / Consultant.

16.2 All expenses towards mobilization at site and demobilization of work force, Contractor's materials, clearing the site etc. shall be deemed to be included in the prices quoted and no separate payments on account of such expenses shall be entertained.

17.0 SITE ORGANISATION:

The Contractor shall without prejudice to his overall responsibilities and liabilities to provide adequate qualified and skilled personnel on the work. For site organization and augment the same as decided by the Engineer-in-Charge depending on the exigencies of work. In addition to this Contractor shall deploy Safety Supervisors to ensure safe working conditions at site.

18.0 CONSTRUCTION:

18.1 The Contractor shall within the scope of work observe in addition to specifications, all national and local laws, ordinances, rules and regulation and requirements pertaining to the work.

18.2 Various procedures and methods to be adopted by Contractor during the construction as required in the respective specifications shall be submitted to CMD / Consultant in due time and well in advance of the specific work for approval.

18.3 The Contractor shall carry out required supervision as per Quality Assurance Plan and furnish all assistance required by CMD / Consultant in carrying out inspection work. CMD / Consultant will have authorized representatives present who shall have free access to the work at all times. If an CMD / Consultant representative notifies the Contractor's representative of any deficiency in any work or in the supervision thereof, the Contractor shall make every effort to carry out such instructions consistent with best industry practice.

19.0 EMPLOYEES PROVIDENT FUND & EMPLOYEES STATE INSURANCE CORPORATION:

19.1 The Contractor undertakes to discharge his responsibility under the Employees Provident Fund Scheme as an immediate employer, for employees engaged or employed by him for execution of contracted work.

19.2 The Contractor undertakes that all employees, either employed by him, or permitted assigns, would be covered under the above scheme from the date of commencement of work. The Contractor further undertakes to pay employee's contribution as well as employer's contribution at appropriate rate to the office of Regional Provident Fund Commissioner within the stipulated time period for the same.

19.3 The Contractor acknowledges the right of the Company to recover deducts or claims any amount, which the company is required to pay.

19.4 Agency must have individual P.F. & ESIC code, copy of P.F. & ESIC code no allotted to the agency to be furnished by the agency.

19.5 The Contractor shall be liable to pay his contribution and the Employee's contribution to the State Insurance Scheme in respect of all labour employed by him for the execution of the Contract, in accordance with the provision of "The Employee's State Insurance Act, 1948" as amended from time to time. In case the Contractor fails to submit full details of his account of labour employed and the contribution payable, the Engineer-in-Charge shall recover from the running bills of Contractor and amount of contribution as assessed by him. The amount so recovered shall be adjusted against the actual contribution payable for Employees State Insurance.

20.0 MEASUREMENT OF WORK:

Please refer Clause 42 of General Conditions of Contract (GCC).

21.0 BUILDING AND OTHER CONSTRUCTION WORKER'S ACT:

In order to govern welfare and working conditions of labourers engaged in construction activities, the Building and other Construction Workers' (Regulation of Employment and Conditions of Service ''RE & CS'') Act, 1996 came into force. RE & CS Act'1996 is applicable in respect of building and other construction work. The Contractor shall strictly comply with the following provisions pertaining to RE & CS Act'1996.

a. The Contractor must be registered with the concerned authorities under the Building and Other Construction Workers' (RE&CS) Act, 1996 or in case of non-registration; the Contractor should obtain registration within one month of the award of contract.
b. The Contractor shall be responsible to comply with all provisions of the Building and Other Construction Workers' (RE&CS) Act, 1996, the Building and Other construction Workers' Welfare Cess Act, 1996, the Building and other Construction Workers' (RE&CS) Rules, 1998 and the Building and other Construction Workers Welfare Cess Rules, 1998
c. Cess as per the prevailing rate, shall be deducted at source from bills of the Contractor by the Engineer-in-charge of the contract and remitted to the ''Secretary, Building and Other Construction

Workers Welfare Board'' of the concerned state. The Contractor shall be responsible to submit final assessment return of the cess amount to the assessing officer after adjusting the cess deducted at source.

22.0 LABOUR RELATIONS:

22.1 In case of labour unrest/ labour dispute arising out of non-implementations of any law the responsibility shall solely lie with the Contractor and he shall remove/ resolve the same satisfactorily at his cost and risk.

22.2 Contractor shall deploy only duly qualified and competent personnel for carrying out the various jobs as assigned by the Engineer

23.0 EMPLOYMENT OF LOCAL LABOUR:

Contractor shall ensure that local labour, skilled and/or unskilled, to the extent available shall be employed for this work. In case of non-availability of suitable labour in any category out of the above persons, labour from outside may be employed.

24.0 Contractor shall not recruit personnel of any category from among those who are already employed by the other agencies working at site but shall make maximum use of local labour available.

i) Contractor's Labourers to leave site on completion of the work.

ii) The labourers of Contractor must leave the location of the Plant/township/project site after the work is tapered off/ completed.

25.0 TESTS AND INSPECTION OF WORKS:

25.1 The Contractor shall carry out the various tests as enumerated in the bidding document and as per direction of Engineer-in-charge either on field concerning the execution of work. All the expenses shall be borne by the Contractor and shall be considered as included in the quoted price. The inspection shall be done by followings:

I. Representative deputed by Engineer-in-charge.

II. Representative deputed by Statutory Authority.

25.2 Contractor shall give prior notice sufficiently ahead of time to the Engineer-in-charge and also to the authorities to conduct Inspection/ to witness such tests.

25.3 The work is subject to inspection at all times by the Engineer-in-charge. The Contractor shall carry out all instructions given during inspection and shall ensure that the work is being carried out according to the technical specifications of this bidding document, the technical documents that will be furnished to him during performance of work and the relevant codes of practice furnished to him during the performance of the work.

25.4 Any work not conforming to the execution drawings, specifications or codes shall be rejected forthwith and the Contractor shall carry out the rectifications at his own cost.

25.5 All results of inspection and test will be recorded in the inspection reports, proforma of which will be approved by the Engineer-in-charge. These reports shall form part of the Completion Documents.

25.6 Inspection and acceptance of the work shall not relieve the Contractor from any of his responsibilities under this contract.

25.7 Cost towards repeat tests and inspection due to failures, repairs etc. for reasons attributable to the Contractor shall be borne by the Contractor.

26.0 FINAL INSPECTION:

After completion of all tests as per specification the whole work will be subject to a final inspection to ensure that job has been completed as per requirement. If any defects noticed in the work are attributable to Contractor these shall be attended by the Contractor at his own cost.

27.0 TEMPORARY WORKS:

All Temporary and ancillary works including enabling works connected with the work shall be responsibility of the Contractor and the price quoted by them for construction shall be deemed to have included the cost of such works, which shall be removed by the Contractor at his cost, immediately after completion of his work.

28.0 SAFETY:

The Contractor shall ensure that the safety requirements are met in respect of men, materials, adjoining structures, equipment etc. and shall be totally responsible in case any mishap occurs due to negligence or otherwise. In this connection the contractor shall strictly adhere to the rules norms and regulations as applicable.

29.0 HEALTH, SAFETY AND ENVIRONMENT (HSE) MANAGEMENT:

During construction the contractor shall strictly follow the safety procedures, precautions & norms as per the safety code. The contractor shall submit safety procedure prior to start of construction activities. The procedure should include safety measures to be taken during construction work, firefighting etc. All workmen, supervisors engaged at site shall be equipped with PPE's (Helmet, Shoes, Safety belts, Goggles, Handgloves, Apron etc.)

All the staff/ workers engaged by the agency should follow COVID appropriate behaviour as per Govt. directive i.e. Wearing Masks, maintaining physical distance & washing hands frequently.

The contractor shall take all possible measures to avoid accidents to the contractor's labourers and shall adopt all safety measures as will be directed by CMD's Engineer. Contractor shall provide adequate FIRST AID facility at site and also arrange for necessary medical facilities for proper treatment of laborers, if required. Contractor shall ensure & arrange at his own cost fire & safety provisions as per prevailing practice.

30.0 PERSONAL SAFETY:

All necessary personal safety equipments as considered adequate by the Engineer shall be available for use of persons employed at site and maintained in a condition suitable for immediate use and the contractor shall take adequate steps to ensure proper use of PPE's by all the concerned at site.

31.0 TAXES & DUTIES :

Please refer Clause 46 of General Conditions of Contract (GCC).

32.0 MATERIALS AND EQUIPMENT:

All materials and equipment shall conform to the relevant standards and shall be of the approved make and design. The materials and equipment shall conform to relevant Indian Standards. The Contractor shall be responsible for approval of the equipmet, as may be required from supply Authority . The Contractor shall be responsible for the safe custody of all the materials and shall insure them against theft, damage by fire, earthquake etc. A list of items of materials and equipment, together with sample of each shall be submitted to the CMD / Consultant within 10 days of the award of the contract. Any item which is proposed as a substitute, shall be accompanied by all technical detail giving sizes, particulars of materials and the manufacturer's name and shall be submitted along with the tender. At the time of the submission of proposed substitute the Contractor shall state the credit, if any due to the CMD. In the event the substitution is

approved, all changes and substitutions shall be requested in writing and approvals obtained in writing from CMD / Consultant. CMD's decision in the matter shall be final.

All materials of the same kind of service shall be identical and made by the same manufacturers. Any deviation to this rule shall be got approved from CMD/ Consultant. Top priority shall be given to the products that have a permanent agent providing spare parts and maintenance facilities in the same city where the project is situated. The make of electrical equipments, components, accessories, etc. has been mentioned in order of priorities. The tenderer has to quote for the first priority as mentioned above after ascertaining that the first preference materials are available. If at a later stage during executing the work, material of the first preference make are not available, the contractor has to get approval from the CMD/ Consultant to use other make of material prior to procurement. Any rate difference for the first preference make and the one approved will be passed on to the CMD.

33.0 MANUFACTURERS:

Where manufacturers have furnished specific instructions relating to the materials used in this job, covering points not specifically mentioned in these documents, these instructions shall be followed in all cases. Where manufacturer's names and/or catalogue numbers are given, this is an indication of the quality, standards and performance required. When interfacing occurs, equipment shall be mutually compatible in all respects.

34.0 TEST CERTIFICATES:

The contractor shall submit test certificates for all the installed equipments at site including cable etc.

35.0 INSTRUCTION MANUAL:

The contractor shall prepare and produce instruction, Installation, operation and maintenance manuals in English for the use, operation and maintenance of the complete equipment and installations, and submit 3 sets to CMD, at the time of handing over.

36.0 SAMPLES AND CATALOGUES:

Before ordering the material necessary for these installations, the contractor shall submit to CMD for approval, a sample of every kind of material such as cables, conductors, conduits, switches, socket outlets, circuit breakers, lighting fixtures, boxes etc. along with the catalogues.

For big items such as CSS, DG Sets, Panels etc. the submission of catalogues shall be enough. Prior to ordering any electrical equipment/material/system, the contractor shall submit to CMD / Consultant, the catalogues, along with the samples(for small items), at least from three different approved vendors/ manufacturers. After the selection of manufacturer by CMD, the contractor shall arrange inspection and testing at the manufacturer's factory or assembly shop for final approval. No material shall be procured prior to the approval of the CMD.

37.0 CONSULTANT'S DRAWINGS:

The tender drawings indicate only the general scheme of requirement and the extent of work covered in this contract.It is the Contractor's responsibility to ensure that his work co-ordinates with the work of other agencies.

The contractor shall prepare detailed working drawings in co-ordination with other architectural and services drawing and get these working drawings approved by the CMD/ Consultant. The approval of such drawings

by the CMD/ Consultant shall be from the point of view of assisting the contractor in co-ordination of services with other agencies and shall not absolve the contractor from his absolute and indivisible responsibility on performance of his installations.

38.0 VENDOR'S SHOP DRAWINGS:

The contractor shall prepare and submit to CMD/ Consultant, for his approval, six sets of each detail/ shop drawing of electrical work within 30 days on issuance of LOI. Before starting the work the contractor shall submit to CMD/ Consultant for his approval in prescribed manner, the shop/ execution drawing for entire installation. CMD/ Consultant reserve the right to alter/ modify these drawings if they are found to be insufficient or not complying with the established technical standards or if they do not offer most satisfactory performance or accessibility for maintenance.

39.0 AS BUILT DRAWINGS & DOCUMENTATION:

After completion of work and before issuance of certificate of virtual completion the contractor shall submit to CMD, three sets of layout drawing (both in hard & soft drawing) drawn at appropriate scale indicating the complete system "as installed" duly approved by CMD/ Consultant.

40.0 GUARANTEE & FREE SERVICE:

The system shall be guaranteed for performance for **12 months** from the date of satisfactory acceptance and handing over to client in all respects. The guarantee shall be for entire performance of the system and covering intended functionalities desired for intended purpose of the design. The certificate of completion shall be issued after the necessary tests & commissioning in all respects have been carried out to the satisfaction of CMD / Consultant and the required drawings/ manuals / As Built Drawings are submitted. At the close of the work and before issuance of final certificate of **virtual completion** by CMD, the contractor shall furnish written guarantee indemnifying CMD against defective materials and workmanship for a period of **12 (twelve) calendar months after completion and handing over of site**. The contractor shall hold himself fully responsible for reinstallation or replacement, free of cost to CMD, in respect to the following:

- Any defective work or material / equipment supplied by the contractor.
- Any material or equipment damaged or destroyed as a result of defective workmanship by the contractor.
- The contractot shall give 12 (twelve) free services (one at each month) for easy and smooth operation for all equipments and materials supplied & installed by the contractor during the defect liability period. The contractor shall make good at his own cost and to the satisfaction of CMD/ Consulatant, all defects of other faults arising in the opinion of CMD/ Consultant out of bad workmanship or faulty materials not in accordance with the specifications/ drawings.

During guarantee minimum uptime of 95% shall be ensured failing which guarantee period shall deem to be proportionately extended.

41.0 COMPLETION CERTIFICATE:

On completion of the External Electrical SITC (or an extension to an installation) a certificate from a authorised licence holder who is capable to certify the job of above 33KV shall be furnished by the contractor,countersigned by the licensed supervisor, under whose direct supervision the installation was carried out. This certificate shall be in the prescribed form as required by the Local Electricity Authority

/APDCL. The contractor shall be responsible for getting the electrical installation inspected and approved by the local concerned authorities/ APDCL.

42.0 SITE ENGINEER AND TRAINING:

The contractor shall employ a competent fully licensed qualified, full time Electrical engineer to direct the work of Electrical installation in accordance with the drawings and specifications. The engineer shall be available all times at site to receive instructions from CMD / Consultant, in the day to day activities throughout the duration of contract. The engineer shall correlate the progress of the work in conjunction with all the relevant requirements of the supply authority. The engineer coordinates with other services contractor and CMD for any coordination site issues. Contractor shall give training to technical staff of client for Operating, Control and Basic maintenance for easy operation.

43.0 RESTATING & FINISHING OF CIVIL DAMAGES:

For erection/ installation of equipment etc., if any civil structure/ other agency's work is required to be broken, the same shall be done, restated and finished as original by the tenderer without any extra cost.

44.0 COMPLETION PERIOD:

Time allowed for carrying out the work, as mentioned in the GCC, shall be strictly observed by the Contractor. The work shall throughout the stipulated period of the contract be executed with all the diligence and if the contractor fails to complete the work within the specified period, he shall be liable to pay liquidated damages as defined in the contract.

The contractor shall submit a BAR CHART for completion of the work within 15 (fifteen) days on issuance of Letter of Intent (LOI). Such chart shall include all activities like the date of supply of material at site, item wise completion of work etc., and obtain the approval of the client.

CMD may provide storage space within the project premises or in the building if available. However the responsibility and safety of the materials stored will be with the contractor. No accommodation for contractor's staff, worker, labour etc. will be provided by CMD.

45.0 OTHER ISSUES:

The Contractor shall carry out all the work strictly in accordance with the approved drawing, detailed specifications and instructions of the client's engineer. If in the opinion of the client's engineer/consultant, nominal changes have to be made to suit the site condition and with the prior approval in writing of the Employer, the Contractor shall carry out the same without any extracharge.
The tenderer must obtain for himself on his own responsibility and at his own expense, all the information which may be necessary for the purpose of making a tender and for entering into a contract and must examine thedrawings, inspect the site of the work, and acquaint himself with all local conditions, means of access to the work, nature of the work and all matters appertaining thereto. The Employer's decision in such cases shall be final and shall not be open toarbitration.

A Schedule of Probable Quantities in respect of each work and specifications accompany these Special Conditions. The Schedule of Probable Quantities is liable to alteration by omissions, deductions or additions at the discretion of the Employer. Each tender should contain not only the rates but also the value of each item of work entered in a separate column and all the items should be summed up in order to show the aggregate value of the entire tender.

The rates quoted in the tender shall include all charges for scaffoldings, watching and lighting by night as well as day including Sundays and holidays, protection of all other erections, matters or things and the Contractor shall take down and remove any or all such centering, scaffolding etc. as occasion shall require or when ordered so as to do, and fully reinstate and make good all matters and things disturbed during the

execution of work and to the satisfaction of the client.

The contractor shall not be entitled to any compensation for any loss suffered by him on account of delays in commencing or executing the work, whatever the cause of delays may be, including delays arising out of modifications to the work entrusted to him or in any sub-contract connected therewith or delays in awarding contracts for other trades of the project or in commencement or completion of such works. The Employer does not accept liability for any sum besides the tender amount, subject to such variations as are provided forherein.

The successful tenderer shall carry out all items of work necessary for completion of the job even though such items are not included in the quantities and rates. Schedule of instruction in respect of such additional items and their quantities will be issued in writing by the client.
The successful tenderer must co-operate with the other contractors appointed by the client so that the work shall proceed smoothly with the least possible delay.

46.0 FIRM PRICES:

The quoted price shall remain firmed and fixed and valid until completion of the contract and shall not be subjected to escalation for any reason whatsoever.
The quoted prices and unit rates shall include for the following conforming to and meeting the intents of the specifications and drawings.

a. All equipment and accessories and materials which shall be new and of specified maker quality, or if not specified, then of the best quality conforming to IS and ISI stamped unless otherwise permitted by the Employer.
b. Transport from the place or places of manufactures to the places of installation, loadingand unloading, store and safe custody.
c. Any and all taxes and duties applicable at the time of award of contract by way of Letter of Intent / Work order.
d. Comprehensive Insurance against loss of materials during transit, erection and testing till the equipment/installation is commissioned and handed over.
e. Workmen's compensation for personnel deployed by the tenderer during erection and commissioning.
f. Third party liability arising out of action or lack of action of the tenderer or his representatives.
g. Special tools required for erection, operation and maintenance of the equipment,scaffolding and Ladders as required.
h. Erection, testing and commissioning based on the site conditions & facilities specifiedunder "Tenderer Basis".
i. Obtaining approvals from all statutory bodies and authorities wherever applicable beforeand/or after execution of the work.
j. Making 'As-built' drawings and clearance of site as specified.
k. All other items and services as pertinent to and meeting the intents of the tender documents including drawings.

The prices shall be firm till the entire installation is handed over and shall be free from any fluctuation in the cost of raw materials and labour. Rates expressed in words shall prevail over rates expressed in figures.

The quoted rates shall be self sustaining and shall remain valid for any increase or decrease in quantity. Items with quantity given as Rate Only shall also be quoted by the Vendor. Vendor shall supply the item at the quoted rate if required by Client.

47.0 LAND/ SPACE:

CMD will provide land/space subject to availability for contractor's office/go down only within project premises. But no land/space for labour/ worker hutment shall be provided by CMD.

48.0 VARIATIONS TO BE APPROVED BY EMPLOYER:

The Contractor shall submit a statement of variations giving a quantity and rates duly supported by analysis of rates, vouchers etc. The rates on scrutiny and final acceptance by the Employer shall form a supplementary tender. The Employer shall not be liable for payment of such variations until these statements are sanctioned by him.

49.0 CONTRACTOR TO PROVIDE EVERYTHING NECESSARY AT HIS COST:

The Contractor shall provide at his cost, everything necessary for the proper execution of the works according tothe intent and meaning of the Drawings, Bill of quantities and Specifications taken together whether the same may or may not be particularly shown or described therein provided that the same can reasonably be inferred there from, and if the Contractor finds any discrepancy in the Drawings or among the Drawings, Bill of quantities and Specifications, he shall immediately and in writing refer the same to the Employer who shall decide which is to be followed.

50.0 AUTHORITIES, NOTICES AND PATENTS:

The Contractor shall conform to the provisions of any Act of the Legislature relating to the works, and to the regulations and bye-laws of any authority, and of electric supply and other companies and/or authorities with whose systems, the installation is proposed to be connected and shall, before making any variations from the Drawings or Specifications that may be necessitated by so conforming, give to the Employer, written notice, specifying the variation proposed to be made and the reason for making it and apply for instructions thereon. In case the Contractor shall not receive such instructions within ten days, he shall proceed with the work conforming to the provisions, regulations or bye-laws, in question, and any variation so necessitated shall be dealt with the client as required.

The Contractor shall bring to the attention of the Employer, all notices required by the said Acts, regulations or bye-laws to be given to any authority and pay to such authority, or to any public office, all fees that may be properly chargeable in respect of the works, and lodge the receipts with the Employer.

The Contractor shall indemnify the Employer against all claims in respect of rights, and shall defend all actions arising from claims, and shall himself pay all royalties, license fees, damages, cost and charges of all and every sort that may be legally incurred in respect thereof.

51.0 SETTING OUT OF WORKS:

The Contractor shall set out the works and shall be reasonable for the true and perfect setting out of the same and for the correctness of the positions, levels, dimensions, and alignment of all parts thereof. If at any time any error in this respect shall appear during the progress of the works within a period of one year from the completion of the works, the Contractor shall, if so required, at his own expense, rectify such error to the satisfaction of the Employer.

52.0 CONTRACTOR'S SUPERINTENDENCE AND REPRESENTATIVE ON THE WORKS:

The Contractor shall give all necessary personal superintendence during the execution of the works, and as long thereafter as the Employer may consider necessary until the expiration of the "Defects Liability Period" stated in the Appendix hereto. The Contractor shall also during the whole time the works are in progress, employ a competent representative who shall be constantly in attendance at the works while the men are at work. Any directions, explanations, instructions or notices given by the Employer to such representative shall be held to be given to the Contractor.

53.0 BILL OF QUANTITIES:

The Bill of Quantities, unless otherwise stated, shall be deemed to have been prepared in accordance with the Standard Method of Measurement.

Any error in description or in quantity or in omission of items from the Bill of quantities shall not vitiate this contract but shall be rectified and the value thereof shall be ascertained, shall be added to, or deducted from, the Contract Amount (as the case may be) provided that no rectification of errors, if any, shall be allowed in the Contractor's Schedule ofRates.

54.0 SUFFICIENCY OF BILL OF QUANTITIES:

The Contractor shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency ofhis tender for the works and of the prices stated in the Bill of quantities and/or the Schedule of Rates and Prices which rates and prices shall cover all his obligations under the Contract, and all matters and things necessary for the proper completion of theworks.

55.0 QUANTITY VARIATION:

Quantity as shown in SOQR is tentative only and may vary up to any extent either positive (+) or negative (-) and for which bidders quoted rate will remain firm.

56.0 UNFIXED MATERIALS WHEN TAKEN INTO ACCOUNT TO BE THE PROPERTY OF THE EMPLOYER:

Where in any Certificate (of which the Contractor has received payment) the Employer has included the value of any unfixed materials intended for and/or placed on or adjacent to the works, such materials shall become the property of the Employer and they shall not be removed except for use upon the works, without the written authority of the Employer. The Contractor shall be liable for any loss of or damage to such materials.

57.0 REMOVAL OF IMPROPER WORK:

The Employer shall, during the progress of the works, have power to order in writing from time to time the removal from the works within such reasonable time or times, as may be specified in the order, of any materials which in the opinion of the Employer are not in accordance with the Specifications or the instructions of theEmployer, the substitution of proper materials, and the removal and proper re-execution of any work executed with materials or workmanship not in accordance with the Drawings and Specifications or instruction, and the Contractor shall forthwith carry out such order at his own cost. In case of default on the part of the Contractor to carry out such order, the Employer shall have the power to employ and pay the other persons to carry out the same, and all expenses consequent thereon, or incidental thereto shall be borne by the Contractor, or may be deducted by the Employer from any moneys due, or that may become due, to the Contractor.

58.0 LABOUR LICENSE:

Contractor will have to obtain labour license for the laborers engaged / to be engaged for their entrusted job from the appropriate authority. Necessary Form V will be issued from CMD office upon receipt of written request from the contractor. Contractor will have to submit the labour license to CMD.

Contrator will have to maintain all records & registers as per requirement of 'ContarctLabour Act, 1970' and furnish the documents as required by Labour Enforcement Officer (LEO)/ Assistant Labour Commissioner (ALC) during their inspection. Contractor should also furnish the details to CMD's representative periodically.

Further Contractor will have to provide necessary facilities at site as per 'Contract Labour Act, 1970'.

59.0 HANDING OVER REQUIREMENTS:

The System shall be handed over after satisfactory testing along with following documents.

1. Detailed equipment data in the approved proforma
2. Manufacture's maintenance and operating instructions
3. Set of as built drawings, layouts, piping, ducting, cable routing, cable schedules etc
4. Approved test readings of all equipment and installations
5. Inspection certificates
6. Certificates of approval from statutory or Local Authorities for the operation and maintenance of the installations, wherever such approval or certification is required. (This shall include Application filed along with enclosures and receipts of fees paid anddeposits made).
7. List of recommended spares
8. Certificate from the contractor that he has cleared the site of all debris and litter caused by him with out violating the EHS norms during the construction. However, contractor has also to periodically clear the site from all the debris which is generated during execution of work.
9. Undertaking from the contractor that all the materials supplied by him at site are fully tax paid and shall produce all documentation for satisfaction of CMD / Consultant or taxation authorities.
10. **Submission of Final NOC from local electric supply authority/ APDCL for the public usage of the building .**

Submission of the above documentation shall form a precondition for final acceptance of the plant and installation and final payments.

60.0 STATUTORY APPROVALS & INSPECTION:

The contractor shall be fully responsible for meeting all the statutory obligations and local inspectorates wherever applicable to the works carried out by them. The contractor should prepare all working drawings and obtain approval of competent authorities (Elecric & Emergency Service, Guwahati, Assam) and also have the equipment and installation inspected and got approved by them. All the original receipts of official fees paid and deposits made against the demand in writing from the appropriate authority shall be submitted to CMD.

61.0 CARE OF WORKS:

From the commencement to the completion of the works, the Contractor shall take full responsibility for the care thereof and of all Temporary works and in the case any damage, loss or injury shall happen to the works or to any part thereof or to any Temporary works from any cause whatsoever, shall at his own cost, repair and make good the same, so that at completion, the Permanent works shall be in good order and condition and in conformity in every respect with the requirements, of the contract and the Employer's/ Consultant's instructions.

62.0 NUISANCE:

(i) The Contractor shall not at any time, do, cause or permit any nuisance on the site or do anything which shall cause unnecessary disturbance or inconvenience to Employers, tenants, or occupants of other properties near the site of work and to the public generally.

(ii) The Contractor shall indemnify the Employer in respect of all claims, demands, proceedings, damages, costs, charges and expenses whatsoever arising out of or in relation to any such nuisance in so far as the Contractor is responsible thereof.

NOTES ON EXTERNAL ELECTRICAL INSTALLATION WORKS

1. **The works shall be carried out as per the latest relevant CPWD specifications for electrical works, all relevant IE rules & regulations of Assam State Electricity Authority/ APDCL & BIS recommendations**. The quoted rates shall include for carrying out all works as per relevant standards and specifications whether so is specifically mentioned or not.

2. All expenses towards mobilization & demobilization of site including workforce, material, clearing of site, etc. shall be deemed to be included in the quoted rates.

3. **All material to be/used in the work** including their makes apart from those mentioned in the ''List of Approved / Acceptable Makes of Material'' shall be **subject to approval& acceptance of the Engineer-in-charge/Consultant/ APDCL**.

4. The contractor shall be responsible for protection of the underground Electrical, Telephone & other cables, water lines and other services while working at the site. Any damage whatsoever done to such services shall be made good by the contractor at his cost.

5. **Thecontractor shall take all necessary precautions for the safety including in the Electrical safety of all workers while working and their health as special protection & precautions are necessary in such works.**

6. Only the specified /acceptable makes of material shall be used in the work. For any kind of deviation from those mentioned in the tender in respect of makes of material and/or catalogue numbers as in the BOQ, **prior approval of the Engineer-in-charge/Consultant MUST be taken.**

7. Beyond the qouted price no extra payment will be made on any account.

AIR CIRCUIT BREAKER (ACB):

I. There shall be provision of positive earth connection between fixed and moving portion of the ACB either thru connector plug or sliding solid earth mechanism. Earthing bolts shall be provided on the cradle or body of fixed ACB.

II. The incoming panel accommodating ACB shall be provided with indicating lamps for ON-OFF positions, digital voltmeter and ammeter of size not less than 96 mm x 96 mm, selector switches, MCB for protection circuit and measuring instrument circuits.

III. It shall be possible to bolt the draw out frame not only in connected position but also in TEST and DISCONNECTED position to prevent dislocation due to vibration and shocks.

IV. Draw out breakers should not close unless in distinct Service/Test/Isolated Positions.

V. The insulation material used conforms to Glow wire test as per IEC60695.

VI. The ACB provide in built electrical and mechanical anti-pumping.

VII. All EDO ACB's have Ready to Close Contact to ensure that the ACB gets a command only when it is ready to close for applications of Remote Control, AMF, Synchronization and Auto Source Change Over Systems.

MOULDED CASE CIRCUIT BREAKER (MCCB):

The MCCB should be current limiting type with trip time of less than 10 msec under short circuit conditions. The MCCB should be either 3 or 4 poles. MCCB comply with the requirements of the relevant standards

IS13947 - Part 2/IEC 60947-2 and should have test certificates for Breaking capacities from independent test authorities CPRI / ERDA or any accredited international lab.

MCCB comprise of Quick Make -break switching mechanism, arc extinguishing device and the tripping unit shall be contained in a compact, high strength, heat resistant, flame retardant, insulating moulded case with high withstand capability against thermal and mechanicalstresses.

The breaking capacity of MCCB shall be as specified in the Drawings. The rated service breaking capacity (Ics) should be equal to rated ultimate breaking capacities (leu). MCCBs for motor application should be selected in line with Type-2 Co-ordination as per IEC-60947-2, 1989/IS 13947-2. The breaker as supplied to meet IP54 degree of protection.

Current Limiting & Coordination

The MCCB employ maintenance free minimum let-through energies and capable of achieving discrimination up to the full short circuit capacity of the downstream MCCB. The manufacturer shall provide both the discrimination tables and let-through energy curves forall.

Protection Functions

- MCCBs with ratings less than 100 A shall be equipped with Thermal-magnetic (adjustable thermal for overload and fixed magnetic for short-circuit protection) tripunits
- Microprocessor MCCBs with ratings 100A and above shall be equipped with microprocessor based trip units.
- Microprocessor and thermal-magnetic trip units shall be adjustable and it shall be possible to fit lead seals to prevent unauthorized access to thesettings
- Microprocessor trip units comply with appendix F of I EC 60947-2 standard (measurement of RMS current values, electromagnetic compatibility,etc.)
- Protection settings apply to all poles of circuitbreaker.
- All Microprocessor components withstand temperatures up to 125°C

Testing

- Original test certificate of the MCCB as per IEC 60947-1 &2 or IS13947 befurnished.
- Pre-commissioning tests on the switch board panel incorporating the MCCB shall be done as per standardspecifications.

Interlocking

Moulded, case circuit breakers shall be provided with the following interlocking devices for interlocking the door of a switchboard.

a) Handle interlock to prevent unnecessary manipulations of thebreaker.

b) Door interlock to prevent the door being opened when the breaker is in ON position.

c) Defeat-interlocking device to open the door even if the breaker is in ON position.

- The MCCB shall be current limiting type and comprise of quick make - Break switching mechanism. MCCBs shall be capable of defined variable overload adjustment. All MCCBs rated 100 Amps and above have adjustable over load & short circuitpick-up.

- All MCCB with microprocessor based release unit, the protection be adjustable Overload, Short circuit and earth fault protection with time delay. The trip command shall override all other commands.

MOTOR PROTECTION CIRCUIT BREAKER (MPCB):

Motor circuit breakers conform to the general recommendations of standard IEC 947 -1,2 and 4 (VDE 660, 0113 NF EN 60 947-1-2-4, BS 4752) and to standards UL 508 and CSA C22-2 N°14.

The devices shall be in utilization category A, conforming to IEC 947-2 and AC3 conforming to IEC 947-4.MPCB have a rated operational and insulation voltage of 690V AC (50 Hz) and MPCB shall be suitable for isolation conforming to standard IEC 60947-2 and have a rated impulse withstand voltage (Uimp) of 6 kV. The motor circuit breakers shall be designed to be mounted vertically or horizontally without de-rating. Power supply shall be from the top or from the bottom. In order to ensure maximum safety, the contacts shall be isolated from other functions such as the operating mechanism, casing, releases, auxiliaries, etc, by high performance thermoplastic chambers. The operating mechanism of the motor circuit breakers must have snap action opening and closing with free tripping of the control devices. All the poles close, open, and trip simultaneously. The motor circuit breakers accept a padlocking device in the "isolated"position.

The motor circuit breakers shall be equipped with a "PUSH TO TRIP" device on the front enabling the correct operation of the mechanism and poles opening to be checked. The auxiliary contacts shall be front or side mounting, and both arrangements shall be possible. The front-mounting attachments shall not change the breaker surface area. Depending on its mounting direction the single pole contact block could be NO or NC. All the electrical auxiliaries and accessories shall be equipped with terminal blocks and shall be plug-in type. The motor circuit breakers have a combination with the downstream contactor enabling the provision of a perfectly co- ordinated motor-starter. This combination enable type 1 or type 2 co-ordination of the protective devices conforming to IEC 60947-4-1 .Type 2 co-ordination be guaranteed by tables tested and certified by an official laboratory: LOVAG (or other official laboratory).The motor circuit breakers, depending on the type, could be equipped with a door-mounted operator which allow the device setting. The motor circuit breakers shall be equipped with releases comprising a thermal element assuring overload protection and a magnetic element for short-circuit protection. In order to ensure safety and avoid unwanted tripping, the magnetic trip threshold (fixed) shall be factory set to an average value of 12 Ir.

All the elements of the motor circuit breakers shall be designated to enable operation at an ambient temperature of 60°C without derating. Thermal trips shall be adjustable on the front by a rotary selector. The adjustment of the protection shall be simultaneous for all poles. Phase unbalance and phase loss detection shall be available. Temperature compensation (-20°C to+60°C).

MINIATURE CIRCUIT BREAKER (MCB):

Miniature Circuit Breaker shall comply with IS-8828-1996/IEC898-1995. Miniature circuit breakers shall be quick make and break type for 240/415 VAC 50 Hz application with magnetic thermal release for over current and short circuit protection. The breaking capacity shall not be less than 10 KA at 415 VAC. MCBs shall be DIN mounted. The MCB shall be Current Limiting type (Class-3). MCBs shall be classified (B,C,D ref IS standard) as per their Tripping Characteristic curves defined by the manufacturer. The MCB have the minimum power loss (Watts) per pole defined as per the IS/IEC and the manufacturer publish the values.MCB ensure complete electrical isolation & downstream circuit or equipment when the MCB is switchedOFF.

The housing shall be heat resistant and having a high impact strength. The terminals shall be protected against finger contact to IP20 Degree of protection. All DP, TP, TPN and 4 Pole miniature circuit breakers have a common trip bar independent to the external operating handle.

PAINTING:

All sheet steel work undergo a process of degreasing, pickling in acid, cold rinsing, phosphating, passivaiting (seven tank processing) and then painted with electrostatic paint (Powder coating). The shade of colour of panel inside/outside shall be as indicated in datasheets & relevant BIS code.

LABELS:

Engraved PVC labels shall be provided on all incoming and outgoing feeder. Circuit diagram showing the arrangements of the circuit inside the control panel shall be pasted on inside of the panel door and covered

with transparent plastic sheet.

METERS:

i. All voltmeters and indicating lamps shall be throughMCB's.

ii. Meters and indicating instruments shall be plugtype.

iii. All CT's connection for meters shall be through Test Terminal Block(TTB).

iv. CT ratio and burdens shall be as specified on the Single linediagram.

CURRENT TRANSFORMERS:

Current transformers shall be provided for Control panels carrying current in excess of 60 amps. All phase be provided with current transformers of suitable VA burden with 5 amps secondaries for operation of associated metering.

The CTs confirm to relevant Indian Standards. The design and construction shall be dry type, epoxy resin cast, robust to withstand thermal and dynamic stresses during short circuits. Metering CTs, have inbuilt busbar mounting arrangement. Secondary terminals of CTs shall be brought out suitable to a terminal block which be easily accessible for testing and terminal connections. The secondary terminal should be covered with insulation cap/cover so that there should not be any possibility of touching the live terminal. The protection CTs be of accuracy class 5P20 and measurement CTs be of accuracy class I.

SELECTOR SWITCH Where called for, selector switches of rated capacity shall be provided in control panels, to give the choice of operating equipment in selectivemode.

CONTACTOR
Contactor shall be built into a high strength thermoplastic body and shall be provided with an arc shield for quick arc extinguishing. Silver alloy tips shall be provided to ensure a high degree of reliability and endurance under continuous operation. The magnet system consists of laminated yoke and armature to ensure clean operation without hum or chatter.
Starter's contactors have 3 main and 2 Nos. NO / NC auxiliary contacts and shall be air break type suitable for making and breaking contact at minimum power factor of 0.35. For design consideration of contactors the starting current of connected motor shall be assumed to be 6 times the full load current of the motor in case of direct-on-line starters and 3 times the full load current of the motor in case of Star Delta and Reduced Voltage Starters. The insulation for contactor coils shall be of Class"E".
Coil shall be tape wound vacuum impregnated and be housed in a thermostatic bobbin, suitable for tropical conditions and withstand voltage fluctuations. Coil shall be suitable for 220/415±10% volts AC, 50 cycles AC supply.

THERMAL OVERLOAD RELAY:

Thermal over load relay have built in phase failure sensitive tripping mechanism to prevent against single phasing as well as on overloading. The relay operates on the differential system of protection to safeguard against three phase overload, single phasing and unbalanced voltage conditions.

Auto-manual conversion facility shall be provided to convert from auto-reset mode to manual-reset mode and vice-versa at site. Ambient temperature compensation shall be provided for variation in ambient temperature from -5° C to +55°C.

All overload relays shall be of three elements, positive acting ambient temperature compensated time lagged thermal over load relays with adjustable setting. Relays shall be directly connected for motors upto 35 HP capacity. C.T. operated relays be provided for motors above 35 HP capacity. Heater circuit contactors may not be provided with over load relays.

TIME DELAY RELAYS:

Time delay relays shall be adjustable type with time delay adjustment from 0-180 seconds and have one set of auxiliary contacts for indicating lamp connection.

INDICATING LAMP AND METERING:

All meters and indicating lamps be in accordance with relevant IS standard specification. The meters shall be flush mounted type. The indicating lamp shall be of LED type. Each MCC and control panel shall be provided with voltmeter 0-500 volts with three way and off selector switch, CT operated ammeter of suitable range with three nos. CTS of suitable ratio with three way and off selector switch, phase indicating lamps, and other indicating lamps as called for. All indicating lamp be backed up with 5 ampsMCB.

TOGGLE SWITCH:

Toggle switches, where required, shall be in conformity with relevant IS Codes and be of 5 amps rating.

PUSH BUTTON STATIONS:

Push button stations shall be provided for manual starting and stopping of motors / equipment Green and Red colour push buttons shall be provided for 'Starting' and 'Stopping' operations. 'Start or 'Stop' indicating flaps shall be provided for push buttons. Push Buttons shall be suitable for panel mounting and accessible from front without opening door, Lock lever be provided for 'Stop' push buttons. The push button contacts shall be suitable for 6 amps currentcapacity.

CONDUITS:

Conduits and Accessories conform to latest edition of Indian Standards IS-9537 part 1 &2. 16/14 (16 gauge upto 32mm diameter & 14 gauge above 32 mm diameter) gauge screwed Glor MS conduits to be used. Joints between conduits and accessories shall be securely made by standard accessories, as per IS-2667, IS-3837 and IS-5133 to ensure earth continuity. All conduit accessories shall be threaded type only.

Only approved make of conduits and accessories shall be used.

Conduits shall be delivered to the site of construction in original bundles and each length of conduit bear the label of the manufacturer.

Note. : Whatever materials required to be billed by the Contractor should come on site with proper Challan Numbers and quantity mentioned in each such Challan. Maximum permissible numbers of 1100 volt grade PVC insulated wires that may be drawn into metallic Conduits are given below:

Size of wires Nominal Cross section Area	Maximum number of wires within conduit Size (mm)				
	20	25	32	40	50
1.5	5	10	14	—	—
2.5	5	8	12	—	—
4	3	7	10	—	—
Size of wires Nominal Cross section Area	Maximum number of wires within conduit Size (mm)				
	20	25	32	40	50
6	2	5	8	—	—
10	—	3	5	6	—
16	—	2	3	6	6
25	—	—	2	4	6
35	-	-	-	3	5

Maximum permissible number of 1100 volt grade PVC insulated wires that may be drawn into rigid non metallic or PVC Conduits are given below:

Size of wires Nominal Cross section Area	Maximum number of wires within conduit size(mm)				
	20	25	32	40	50
1.5	7	12	16	—	—
2.5	5	10	14	—	--
4	4	8	12	—	—
6	3	6	8	—	—
10	—	4	5	6	—
16	—	3	3	6	6
25	—	—	2	4	6
35	-	-	-	3	5

CABLES:

1100V grade Cables of sizes 6 sq. mm. and above shall be XLPE FRLS insulated aluminium conductor armoured type and PVC insulated Copper conductor armoured cables for sizes 2.5 sq. mm. and below. All cables shall be conforming to IS Codes. Cables shall be cross linked polyethylene (XLPE) insulated PVC inner sheathed and FRLS PVC outer sheath of 1100 volts grade.

Cables shall be suitable for laying in trenches, ducts, and on cable trays as required. Cables shall be termite resistant. Cable glands shall be heavy duty double compression brass glands. Control cables and indicating panel cables shall be multi core PVC insulated copper conductor and armoured cables.

The equipment inside plant room shall be connected to the control panel by means of suitable cables of adequate size. An isolator shall be provided near each motor/equipment (mounted within 10-15 mtr distance on nearest wall or self supported on floor) wherever the motor/equipment is separated from the supply panel through a partition barrier or through ceiling construction. PVC insulated copper conductor wires shall be used inside the control panel for connecting different components and all the wires inside the control panel shall be neatly dressed and plastic beads shall be provided at both the ends for easy identification of control wiring.

Cabling shall be of the following sizes as minimum:

i. From 30 HP to 35 HP motors	2 nos. 3x 16 sq.mm aluminium conductor armoured cable.
ii.From 40 HP to 50 HP motors	2 nos. 3x 25 sq.mm aluminium conductor armoured cable.
iii.From 60 HP to 75HP motors	1 No. 3x 70 sq.mm aluminium conductor armoured cable.
iv.100 HP motors	1 No. 3x 150 sq.mm aluminium conductor armoured cable
v. 150 HP motor	1 No. 3x 240 sq.mm aluminium conductor armoured cable.
vi.250 HP motor	2 Nos. 3x 240 sq.mm aluminium conductor armoured cable.
vii.400 HP motor	3 Nos. 3x 240 sq.mm aluminium conductor armoured cable.
viii.600 HP motor	3 Nos. 3x 400 sq.mm aluminium conductor armoured cable.

CABLE LAYING:

Cables shall be laid by skilled and experienced workmen using adequate rollers to minimize stretching of the cable. The cable drums shall be placed on jacks before unwinding the cable. Great care shall be exercised in laying cables to avoid forming kinks.

Laying of Cables on Cable Trays

The relative position of the cables, laid on the cable tray be preserved and the cables not cross each other. At all changes in direction in horizontal and vertical planes, the cable shall be bent smooth with a radius as recommended by the manufacturer. All cables be laid with minimum one diameter gap and shall be clamped at every metre to the cable tray. Cables be tagged for identification with aluminum tag and clamped properly

at every 20M. Tags shall be provided at both ends and all changes in directions both sides of wall and floor crossings. All cable shall be identified by embossing on the tag the size of the cable, place of origin and termination.

All cables passing through holes in floor or walls shall be sealed with fire retardant Sealant and shall be painted with fire retardant paint upto one meter on all joints, terminations and both sides of the wall crossings by "VIPER CABLERETARD".

Laying of Cables in Ground

The width of trench for laying single cable shall be minimum 350 mm. Where more than one cable is to be laid in horizontal formation, the width of the trench be workout by providing 200 mm gap between the cables, except where otherwise specified. There shall be clearance of 150 mm between the end cable and the side wall of the trench. The minimum depth of the cable trench shall not be less than 750 mm for single layer of cables. When the cables are laid in more than one tier the depth of the trench shall be increased by 300 mm foreach additional tier.
Excavation of trenches: The trenches shall be excavated in reasonably straight lines. Wherever there is a change in direction, suitable curvature shall be provided. Where gradients and changes in depth are unavoidable, these shall be gradual. The excavated soil shall be stacked firmly by the side of the trench such that it may not fall back into the trench. The bottom of the trench shall be levelled and shall be made free from stone, brick bats etc. The trench then shall be provided with a layer of clean, dry sand cushion of not less than 100 mm in depth. Prior to laying of cables, the cores shall be tested for continuity and insulation resistance. The cable drum shall be properly mounted on jacks, at a suitable location, making sure that the spindle, jack etc. are strong enough to carry the weight of the drum and the spindle is horizontal. Cable shall be pulled over rollers in the trench steadily and uniformly without jerks and strains. The entire drum length shall be laid in one stretch. However, where this is not possible the remainder of the cable be removed by 'Flaking' i.e. by making one long loop in the reverse direction. After the cable has been uncoiled and laid into the trench over the rollers, the cable shall be lifted off the rollers beginning from one end by helpers standing about 10 meters apart and laid in a reasonably straight line. Cable laid in trenches in a single tier formation have a cover of clean, dry sand of not less than 150 mm. above the base cushion of sand before the protective cover is laid. In the case of vertical multi-tier formation after the first cable has been laid, a sand cushion of 300 mm shall be provided over the initial bed before the second tier is laid. Finally the cables shall be protected by second class bricks before back filling the trench. The buried depth of upper most layer of cable shall not be less than750mm.

Back Filling : The trenches shall be back filled with excavated earth free from stones or other sharp edged debris and shall be rammed and watered, if necessary, in successive layers not exceeding 300 mm. Unless otherwise specified, a crown of earth not less than 50 mm in the centre and tapering towards the sides of the trench shall be left to allow for subsidence.

WIRE AND WIRESIZES:

1100 volts grade PVC insulted copper conductor wires in conduit shall be used.

For all single phase/ 3 phase wiring, 1100 volts grade PVC insulated copper conductor LSZH wires shall beused. The equipment inside plant room and AHU room shall be connected to the control panel by means of insulated copper conductor wires of adequate size in exposed conduits. Final connections to the equipment shall be through wiring enclosed in galvanized flexible conduits rigidly clamped at both ends and at regular intervals. An isolator shall be provided near each motor/equipment wherever the motor/equipment is separated from the supply panel through a partition barrier or through ceiling construction. PVC insulated copper conductor wires shall be used inside the control panel for connecting different components and all the wires inside the control panel shall be neatly dressed and plastic beads be provided at both the ends for easy identification of control wiring.
The minimum size of control wiring shall be 1.5 sq. mm PVC insulated stranded soft drawn copper conductor wires drawn through conduit to be provided for connecting equipment and control panels.
Power cabling shall be of the minimum following sizes:

i. Upto 5 HP motors/5 KW heaters	3C x 4 sq. mm copper PVC insulated cables.
ii. From 6 HP to 10 HP motors 6 KW to 7.5 KW heaters	3 x 6 sq. mm copper conductor PVC insulated cables
iii. From 12.5 HP to 15 HP motors	2 Nos. 3x6 sq. mm copper conductor PVC insulated cables.
iv. From 20 HP to 25 HP motors	2 Nos. 3x10 sq. mm copper conductor PVC insulated cables.

The above ratings are with copper cabling. Suitable equivalent aluminium armoured cables may also be used.

STARTERS:

Each motor shall be provided with a starter of suitable rating. Starters be in accordance with relevant IS Codes. All Star Delta Starters be fully automatic. Motors up to 7.5 HP shall be provided by Direct On Line (DOL) starter, motors above 7.5 HP and up to 60 HP shall be provided by star/delta starter. The motors of the VRF/VRV units shall be as per manufactures standard.
All starters shall be with Type II coordination for breaker, contactor and over load relay.

All the switches, contactors, push button stations, indicating lamps shall be distinctly marked with a small description of the service installed. The following capacity contactors and overload relays shall be provided for different capacity motors or as per manufacturer's recommendation. Two speed motors when specified, be provided with DOL starter irrespective of itsrating.

CABLE TRAYS:

Ladder and perforated type Cable Trays be of Hot dip Galvanized type and factory fabricated out of CRCA sheet with standard accessories like tee, bends, couplers etc. for different loads and number and size of cables as given below:
Cable trays be galvanized as per Specifications..

a. 1500 mmwide
   Runners 25 x 100 x 25 x 3 mm
   Rungs 2# 20 x 40 x 20 x 3 mm 250 mm C/C
   Suspenders 2 Nos. 40 x 40 x 5 mm Gl angle 1500 mm C/C with base support of 40x 40 x 5mm Gl angle.
b. 1200 mmwide
   Runners 25 x 100 x 25 x 3 mm
   Rungs 2# 20 x 40 x 20 x 3 mm 250 mm C/C
   Suspenders 2 Nos. 40 x 40 x 5 mm Gl angle 1500 mm C/C with base support of 40x 40 x 5mm Gl angle.

c. 1000 mmwide
   Runners 25x100 x 25x3 mm
   Rungs 2# 20 x 40 x 20 x 3 mm 250 mm C/C
   Suspenders 2 Nos. 40 x 40 x 5 mm Gl angle 1500 mm C/C with base support of 40x 40 x 5mm Gl angle.

d. 750 mmwide
   Runners 20 x 75 x 20 x 2.5 mm
   Rungs 20 x 30 x 20 x 2.5 mm 250 mm C/C
   Suspenders 2 Nos. 32 x 32 x 5 mm Gl angle 1800 mm C/C with base support of 40x 40 x 5mm Gl angle.

e. 600 mmwide
   Runners 20 x 75 x 20 x 2.5 mm
   Rungs 20 x 30 x 20 x 2.5 mm 250 mm C/C
   Suspenders 2 Nos. 32 x 32 x 5 mm Gl angle 1800 mm C/C with base support of 40x 40 x

5mm Gl angle.

f. 450 mmwide
Runners 20 x 75 x 20 x 2.5 mm
Rungs 20 x 30 x 20 x 2.5 mm 250 mm C/C
Suspenders 2 Nos. 25 x 25 x 4 mm Gl angle 1800 mm C/C with base support of 40x 40 x 5mm Gl angle.

g. Supply and fixing of perforated type cable trays of the following sizes of pre- galvanizediron.

600x40x40x2mmthick

450x40x 40 x 2 mm thick

300 x 40 x 40 x 2 mmthick

150 x 40 x 40 x 2 mm thick

Note: Suitable length of 10 mm dia Gl rod suspenders at 1800 mm interval shall be included in the item for perforated type cable tray.

SPECIFICATION FOR HOT DIP GALVANIZING PROCESS:

(for Mild Steel Used For Earthing, Cable Trays Or Junction Boxes For Electrical Installation.)

General Requirements

I. Quality of Zinc

Zinc to be used shall conform to minimum Zn 98 grade as per requirement of IS:209-1992.

II. Coating Requirement

Minimum weight of zinc coating for mild steel flats with thickness upto 6 mm in accordance with IS:6745-1972 be 400 g/sqm.

The weight of coating expressed in grams per square metre shall be calculated by dividing the total weight of Zinc by total area (both sides) of the coated surface.

The Zinc coating be uniform, smooth and free from imperfections as flux, ash and dross inclusions, bare patches black spots, pimples, lumpiness, runs, rust stains bulky white deposits, blisters.

Mild steel flats / wires undergo a process of degreasing pickling in acid, cold rinsing and then galvanizing.

FIRE RETARDANT CABLE PAINT & FIRE BARRIER:

The fire retardant paint / barrier be listed by independent test agencies such as UL, FM or OPL and be tested to, and pass the criteria of ASTM E 814 (UL1479) standard test method for fire test through- penetration fire stops and ASTM E 1996 (UL 2079) standard test method for fire resistive joint system.

Fire retardant cable Paint :

The Fire resistant cable coating / painting shall be intumescent / ablative, water based compound, The coating expand up to 10 times, supplied in a manufacturer seal container indicating manufacturing and expiry dates. The coating material shall be non-toxic, asbestos free, & halogen free and have good mechanical strength. The colour of paint shall be white and density of coating be 1.3kg/ltr, coating have a snap time of 30 minutes,

the expansion begin at 230 deg.C and it have a oxygen index of 41%.

Coating shall be applied by ordinary paint brush after cleaning the cables of dust and oil deposition. A minimum textured finish of 3 mm wet film thickness be achieved by applying the material in 2-3 layers leaving intervals of 2 to 8 hours depending upon the moisture and thickness, moisture and temperature hours between each coat.

Fire Barrier sheet for floor and wallsealing :

The framing & fixing part of fire barrier sheet shall be very simple & directly fixed around walls & floors by help of anchored bolts & washer. For 2 hour fire rating the fire barrier sheet shall be minimum 7.62 mm thick and shall be cut as per the profile of penetration and opening. The small gap left around the penetration shall be closed with fire rated soft &mouldableputty. Fire barrier must be design on the intumescent technology to seal larger penetration through the fire rated walls & floors. Fire barrier must be a composite construction with the quality incorporated with organic/ inorganic fire resistive elastomeric sheet with specific gravity of 1.6 gm/ cubic centimeter.

TESTING OF CABLES:

Cables shall be tested at works for all routine tests as per IS including the following tests before being dispatched to site by the project team.

a) Insulation ResistanceTest.
b) Conductor resistance test.
c) Sheathing continuity test.
d) Earth test.(in armoured cables)
e) Hi PotTest.

Test also shall be conducted at site for insulation between phases and between phase and earth for each length of cable, before and after jointing. On completion of cable laying work, the following tests shall be conducted in the presence of the Owner's site representative.

a) Insulation Resistance Test(Sectional and overall)
b) Continuity checks
c) Sheathing continuity test.
d) Earthtest.

All tests shall be carried out in accordance with relevant Standard Code of Practice and Electricity Rules. The Contractor provide necessary instruments, equipment and labour for conducting the above tests and bear all expenses in connection with such tests. All tests be carried out in the presence of the Owner's site representative, results shall be noted and signed by all present and record be maintained.

EARTHING:

Earthing shall be provided in accordance with IS : 3043-1987 and shall be copper strips /wires The main panel shall be connected to main earthing system of the power supply. All single phase metal clad switches and control panels be earthed with minimum 3 mm diameter copper conductor wire. All 3 phase motors and equipment shall be earthed with 2 numbers distinct and independent copper wires / tapes. Following details can be followed in general, However, In case of larger size motors, earthing conductor size to be selected based on fault current calculated

i. Motor upto and including 10 HP HP rating	2 Nos. 3 mm dia copper wires/Equiv.
ii. Motor 12.5 HP to 40 HP capacity	2 Nos. 4 mm dia copper wires/Equiv.
iii. Motor 50 to 75 HP capacity	2 Nos. 6 mm dia copper/Equiv.
iv. Motor above 75 HP	2 Nos. 25 mm x 3 mm copper tapes/ Equiv.

All switches shall be earthed with two numbers distinct and independent copper wires' tapes as

follows:

i. 3 phase switches and control panels Upto 60 amps rating.	2 nos. 3 mm dia copper wires.
ii. 3 phase switches, and control panels 63 amps to 100 amps rating.	2 Nos. 4 mm dia copper wires.
iii. 3 phase switches and control panels 125 amps to 200 amps rating.	2 Nos. 6 mm dia copper wires.
iv. 3 phase switches, control panels, bus ducts, above 200 amps rating.	2 Nos. 3mm x 25 mm copper tapes

The earthing connections shall be tapped off from the main earthing of electrical installation. The overlapping in earthing strips at joints where required shall be minimum 75 mm. These straight joints be riveted with brass rivets & brazed in approved manner. Sweated lugs of adequate capacity and size shall be used for all termination of wires. Lugs shall be bolted to the equipment body to be earthed after the metal body is cleaned of paint and other oily substance, and properly tinned.

DRAWINGS:

Shop drawings for control panels and for wiring of equipment showing the route of conduit & cable be submitted by the contractor for approval of Architect/Consultant before starting the fabrication of panel and starting the work. On completion, four sets of complete "As-installed" drawings incorporating all details like, conduits routes, number of wires in conduit, location of panels, switches, junction/pull boxes and cables route etc. shall be furnished by the Contractor.

TESTING:

Before commissioning of the equipment, the entire electrical installation shall be tested in accordance with relevant BIScodes and test report furnished by a qualified and authorised person. The entire electrical installation shall be gotten approved by Electrical Inspector and a certificate from Electrical Inspector be submitted. All tests shall be carried out in the presence of Owner's site representative. Testing of the panels be as per relevant BIS Codes.

PAINTING:

All sheet steel work unde rgoes a process of degreasing, thorough cleaning, and painting with a high corrosion resistant primer. All panels then shall be baked in an oven. The finishing treatment shall be by application of powder coating of approved shade.

RUBBERMAT:

Rubber mat be provided in front to cover the full length of all panels. Where back space is provided for working from the rear of the panel, rubber mat also be provided at the back of the panel also to cover the full length of panel. Rubber mats provided be as per IS 15652-2006

A. TECHNICAL SPECIFICATION FOR 630KVA, 33KV / 0.433KV COMPACT SUBSTATION WITH 33 KV ICOG PANEL

SCOPE:

This specification covers the technical requirements of design, manufacture, testing at manufacturer's works, packing, forwarding, supply and unloading at store/site and performance of Package type substation comprising an enclosure containing high voltage switchgear, transformer and low voltage switchgear with LT Metering. The transformer shall be of 630 KVA,

The HV compartment shall comprise –1 Way IC OG Panel

The LV compartment shall comprise -1 LT ACB along with Voltmeter, Ammeter & TVM.

APPLICABLE STANDARDS:

The equipment covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with the latest editions of the following Indian/ International standards and shall conform to the regulations of the local statutory authorities.

Sr. No.	Applicable standards	
1	IEC 62271-202-2006	HV switchgear and control gear- HV/LV Pre-fabricated sub-station
2	IEC 62271-200-2003	HV switchgear and control gear-AC Metal Enclosed switchgear andcontrol gear for voltages above 1kV and upto and including 52kV.
3	IEC 60694-1996	Common specifications for high voltage switchgear and controlgear standards
4	IEC 62271-102-2003	HV switchgear and control gear-Alternating current disconnections and earthing switches
5	IEC 60265-1-1998	High voltage switches – Part 1: Switches for ratedvoltages above 1 kV and less than 52 kV
6	IEC 60529-1989	Degrees of protection provided by enclosures (IP Code)
7	IEC 62262-2002	Degrees of protection provided by enclosures for electrical equipment against mechanical impacts (IK Code)
8	IEC 60060-1989	High-voltage test techniques
9	IEC 60947-2007/ IS 13947-1993(Reaffirmed- 2004)	Low voltage switch gear and control gear
10	IEC 60439-1-1999	Low-voltage switch gear and control gear assemblies- Type testedand partially type tested assemblies
11	IEC 60076-1993 / : IS 2026-1997	Power Transformers
12	IEC 60255-3-1989	Electrical relays - Part 3: Single input energizing quantity measuring relays with dependent or independent time.
13	IEC 60044-1-1996 / : IS 2705-1992(Reaffirmed- 2002)	Current Transformers

14	IEC 60044-2-1997 / : IS 3156-1992(Reaffirmed-2002)	Voltage Transformers
15	IEC 60376-2005	High-voltage prefabricated switchgear and control gear assemblies - Voltage presence indicating systems
16	IS 2629-1985 :	Recommended practice for Hot Dip Galvanizing of Iron &Steel. (Reaffirmed-2006)
17	IS 2633-1986 (Reaffirmed-2006)	Tests for uniformity of zinc coating
18		CEA Guidelines dt August 2008 for Energy Efficient Distribution Transformers

CLIMATIC CONDITIONS OF THE INSTALLATIONS:

1	Location	Guwahati, Assam
2	Maximum ambient air temperature	50 deg C
3	Minimum ambient air temperature	5 deg C
4	Average daily maximum ambient temperature	40 deg C
5	Max yearly weighted average ambient temperature	32 deg C
6	Isoceraunic level	45 days/year
7	Maximum altitude above mean sea level	10 meters
8	Minimum relative humidity	26%
9	Max. relative humidity	100%
15	Sesimic Zone	Zone - III

The atmosphere is generally laden with mild acid and dust suspended during dry months andsubjected to fog in cold months.

GENERAL TECHNICAL REQUIREMENTS:

S.No.	Description	Requirement
A.	**FOR ENCLOSURE**	
1	Application	Outdoor
2	Rated voltage	36kV
3	Service voltage	33kV
4	System frequency	50 Hz
5	Rated Impulse withstand voltage	170 kVp
6	Rated power frequency withstandvoltage	70 kVrms
7	Rated LT voltage	433

8	Degree of protection	Transformer Compartment:- IP23 HV Compartment:- IP54
		LV Compartment:-IP54
9	Internal arc test	IAC-AB as per IEC 62271-202
10	Maximum permissible temp. for any accessible part of the enclosure	As per IEC 62271-202:2006
11	Minimum thickness of sheet a) Sides b) Base	2mm 4mm
12	Control wiring a) Type and insulation b) Conductor material and size	PVC and 1.1 KV (max) Copper and 1.5 & 2.5 sq mm
13	Ventilation Aperture	Class K10
14	Locking arrangement	The doors shall be padlocked as well as lock protected
15	Paint	RAL 7032

GENERAL CONSTRUCTION:

Package type substation is designed to comprise the following main components:

a) Enclosure
b) HV compartment consisting of 33kV ICOG.
c) Distribution transformer.
d) LV compartment consisting, LT ACB and Meter.

OUTDOOR ENCLOSURE:

The enclosure shall be made of minimum 2mm thick CRCA Sheet with a base of 4 mm (min.), tropical zed to meet Indian weather conditions. The base of the enclosure shall ensure rigidity for easy transport and installation. The structure of the substation should be provided with additional supporting beams capable of supporting the gross weight of all the equipments. The roof of the sub-station compartments shall be designed to support adequate loads with sufficient clearance for removal/installation of components inside the package sub-station. There shall be provision of proper ventilation through louver apertures so as to allow circulation of hot air inside enclosure naturally. The complete design shall be compartmentalized.

The HV compartment shall comprise of one no. 1 Way, non-extensible indoor type, 33kV ICOG one no. circuit breaker.

The transformer shall be of 33/0.433 kV, 630 kVA, 33KV/433V DYn11 Copper Wounded Cast Resin Dry Type Transformer with Off load tap links of +5% to -5% @2.5% with WTI scanner. Class of Insulation: F, Temperature rise 90 deg.C. Transformer losses @50% Load- 3KW & Transformer Losses @100% Load- 6 KW and Impedance of 4.5 %(Subject to IS Tol.) with WTI scanner. The LV compartment shall comprise of one no. 1000 A ACB with interconnections required for the complete operation of the sub-station. Degree of Protection for the HV compartment, Transformer compartment and LV compartment shall be IP54, IP23 and IP54 in accordance with IEC recommendation. There shall be no bolting arrangement on the doors and sides

(periphery) so as to avoid access of dust and water inside. This would also ensure that the unit is well protected from outside public nuisance owing to its being located in crowded and outdoor areas.

HV and LV compartments shall be accessible on the sides of the substation through double doors equipped with key lock and neoprene rubber seal. The doors shall be Pad locked and/or lock protected to ensure theft prone locking arrangement. Heavy duty hinges shall be provided for each door such that they are not visible from outside and hence not removable. The outgoing of the distribution transformer shall be connected directly to Incomer of LV distribution through bus bars/ Cable. Transformer chamber door can be opened by accessing from the door arrangement from LT compartment. HV, LV and Transformer compartment should be isolated from each other internally. Also, the locking arrangement shall be such that the transformer chamber door cannot be opened when HT is energized. Two No. lifting arrangements shall be provided on both sides of transformer chamber.

There shall be an arrangement for internal lighting activated by associated switch on doors for HV, Transformer andLV compartments separately. Heater with thermostat shall be provided in LV compartment along with Hooter. Suitable arrangement for lifting of Package type substation should be provided.

Ventilation aperture shall be as per Class K10 and the sub-station shall be Type tested for Internal Arc Withstand test as per IEC. Indicator for LT ACB, Transformer WTI and HT Breaker should be provided.

EARTHING:

The connecting point shall be marked with the “Protective earth” symbol as per IEC. Separate link for earthing conductor/strip shall be provided for transformer Neutral and the same shall be insulated from the body earth and suitably brought out from the enclosure for connecting to external system earth. All hinge doors shall be earthed to the enclosure with green color copper flexible wire of size 2.5 sq mm (min).

PAINT:

All paint shall be applied on clean, dry surfaces under suitable atmospheric conditions by seven tank process and powder coating. The paint shall not scale off or crinkle or be removed by abrasion during normal handling. The enclosure for the sub-station shall be painted with shade RAL 7032. Sufficient quantity of touch-up paint shall be furnished for application at site.

GALVANIZING:

The galvanizing shall be carried out by the hot dip process in accordance with IS 2629/ ISO 1460 amended to date. However, high tensile steel nuts, bolts & spring washers shall be electro- galvanized to service condition four. The zinc coating shall be smooth, continuous and uniform. It shall be free from acid spots and shall not scale, blister or removable by handling or packing. There shall be no impurity in the zinc or additives to galvanic bath, which could have a detrimental effect on the durability of the zinc coating.
After galvanizing no drilling or welding shall be performed on the galvanized parts of the equipment except thatnuts may be threaded after galvanizing.

To avoid the formation of white rust, galvanized material shall be stacked during transport and stored in such a manner as to permit adequate ventilation. Sodium dichromate treatment shall be provided to avoid formation of white rust after hot dip galvanization. The galvanized steel shall be subject to tests as per IS 2633/ BS 729 amended to date

33 kV ICOG:

33kV 630Amps 25KA for 1 Sec. SF6 insulated Non-Extinsible Compact switchgear consisting of One No Direct Cable Connection and One No. Fixed Manual Vacuum Circuit Breaker with Microprocessor based Self Powered Numerical Relay (50/51/51N/50N) make (C&S/Ashida/Eq) , mechanical ON/OFF indicator, trip coil , Touch Proof Boots, Manual Close & Trip PB, live cable indicator, mechanical interlocks, pad locking facility,

SF6 gas manometer, 3 nos. CTs with Ratio:30/1A, 5P10 for relay. Relay will be C&S Make: CSPR-V5 without communication port

Interconnection between HT switchgear and transformer shall be using 1Cx3x95 sq.mm Aluminium. unarmouredXLPE Cable.
HT Switchgear : Trf. Feeder Metering Digital Multifunction Meter with A,V,KW,KWH,PF, Cl-0.5 with RS-485 Port (Conzerv-EM 6400) and 3 Nos 33kv Single core Ring type metering CTs with 30/1 A for each transformer feeder One no 3 phase HT PT (33KV/220V) for the complete ICOG with control MCB, 6A, SP.

DISTRIBUTION TRANSFORMER:

630 KVA , 33/0.433KV DYn11 Cast resin dry type transformer with Off circuit tap link having tapping range of +5% to -5% in steps of 2.5%, Z% : 5% (IST) with loss @50% loading- 3kW and Transformer losses @ 100% Load- 6kW, Class F insulation , temp rise : 90 DegC , 3nos. Surge arrestors 9kV 10kA polymeric make Asiatic make/ Eq, 1 no. Digital WTI with Alarm & Trip contacts (Make-Voltamp)

LV COMPARTMENT:

The complete arrangement of ACB shall be provided on a framework of channels with adequate strength to support the weight of the ACB. The Framework shall be covered from the front with CRCA sheet of thickness not less than 2 mm. such that no live part is accessible at any time during the operation or testing period. All mechanism shall be made of such material as to prevent corrosion due to sticking of dust. Cast iron shall not be used for any part of the equipment which may be subjected to mechanical stresses. All connections and contacts shall be of ample section and surfaces for carrying continuously the specified current without undue heating and shall be secured rigidly & locked in position.

All apparatus shall be so designed and constructed as to obviate the risks or short circuits of the live parts by lizards/ rodents. Corresponding parts of similar apparatus shall be mutually interchangeable. All apparatus, connections and cabling shall be designed / arranged to minimize risks of fire and any damage which might cause in the event of fire.

Income: 1000 A, 4P, 415V, 50KA, Fixed manual type ACB with Microprocessor based O/L, S/C, E/F release. Rated Insulation Voltage Ui = 1000V, Utilization category = B Alternate LT Switchgear should be suitable for termination of5run X 3.5 C X 300 Sq.mm aluminum armored Cable.
Make of the ACB - L&T – C Power/ Siemens-3WT / ABB/ Schneider make only.

LV Switchgear Metering (for Incomer) Digital Multifunction Meter with A, V, KW, KWH, PF, Cl-0.5 with Port (Conzerv-EM 6400) – 2 Nos. LT Metering CT's – 3 Nos,1000/1A, Cast Resin Type, Cl - 0.5, R, Y, B, ON, OFF LED Indicating Lamps - 5 Nos. (Make L&T, Technic) Control MCB, 6A, SP - As required (L&T/GE/ABB)

NAME PLATE & MARKING:

All the Components of the Package sub-station shall be provided with durable and legible name plates containing alltechnical parameters. Name plates shall be suitably engraved. Danger Plate of Suitable Size.

ENCLOSURE:

a) Manufacturer's Name
b) Rated Voltage
c) System Frequency
d) Rated Short time withstand current for 1 sec
e) Rated Impulse withstand Voltage
f) Degree of Protection
g) Rated class of enclosure
h) ICOG : As per Standard Practice
i) TRANSORMER: As per Standard Practice

j) LV ACB : As per Standard Practice.

TESTS:

PRE- DESPATCH INSPECTION:

Equipment shall be subject to inspection by a duly authorized representative of the Purchaser. Inspection may be made at any stage of manufacture at the option of the purchaser and the equipment if found unsatisfactory as to workmanship or material, the same is liable to rejection. Bidder shall grant free access to the places of manufacture to the Purchaser's representatives at all times when the work is in progress. Inspection by the Purchaser or its authorized representatives shall not relieve the supplier of his obligation of furnishing equipment in accordance with the specifications. Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) isissued by the Purchaser.

Following documents shall be sent along with material:

a) Test reports
b) MDCC issued by Purchaser
c) Invoice in duplicate
d) Packing list
e) Drawings & catalogue
f) Guarantee / Warrantee card
g) Delivery Challan
h) Other Documents (if applicable)

INSPECTION AFTER RECEIPT AT SITE:

The material received at the Purchaser premisses shall be inspected for acceptance and shall be liable for rejection,if found different from the reports of the pre-dispatch inspection and one copy of the report shall be sent to bidder.

GUARANTEE:

Bidder shall stand guarantee towards design, materials, workmanship & quality of process/ manufacturing of items under the contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by the Purchaser up to a period of 12 months from the date of commissioning or 18 months from the date of shipment of equipment whichever is earlier.

PACKING:

Bidder shall ensure that all the equipment covered under this specification shall be prepared for rail/road transportin a manner so as to protect the equipment from damage in transit. The material used for packing shall be environmentally friendly.

QUALITY CONTROL:

The bidder shall submit with the offer Quality assurance plan indicating the various stages of inspection, the tests and checks which will be carried out on the material of construction, components during manufacture and bought out items and fully assembled component and equipment after finishing. As part of the plan, a schedule for stage andfinal inspection within the parameters of the delivery schedule shall be furnished. The Purchaser's engineer or its nominated representative shall have free access to the manufacturer's/sub-supplier's works to carry out inspections.

MINIMUM TESTING FACILITIES:

Bidder shall have adequate in house testing facilities for carrying out all routine tests, acceptance tests as per

Indian/International standards.

SPARES, ACCESSORIES AND TOOLS:

Bidder shall provide a list of recommended spares with quantity and unit prices for 5 years of operation after Commissioning. The Purchaser may order all or any of the spare parts listed at the time of contract award and the spare parts so ordered shall be supplied as part of the definite works. The Purchaser may order additional spares at any time during the contract period at the rates stated in the Contract Document. The bidder shall provide one no. SF6 gas leak indicator. A list of complete set of special tools and gauges required for erection & maintenance and installation procedure should be submitted.

Bidder shall give an assurance that spare parts and consumable items will continue to be available through the lifeof the equipment which shall be 25 years minimum. However, the Purchaser shall give a minimum of 12 months' notice in the event that the Bidder or any sub-vendor plans to discontinue manufacture of any component used in this equipment.

Any spare apparatus, parts or tools shall be subject to the same specification, tests and conditions as similarmaterial supplied under the Contract. They shall be strictly interchangeable and suitable for use in place of the corresponding parts supplied with the plant and must be suitably marked and numbered for identification.

DRAWING AND DOCUMENTS:

Following drawings and documents shall be prepared based on Purchaser specifications and statutory requirements and shall be submitted with the bid:

a) Completely filled in Technical Particulars
b) General description of the equipment and all components including brochures.
c) General arrangement for CSS with Foundation Details
d) Experience List
e) Type test certificates

After the award of the contract shall submit four (4) copies of following drawings, drawn to scale, describing the equipment in detail shall be forwarded for approval.

Sr. No.	Description	For Approval	For Review Information	Final Submission
1	Technical Parameters	√		√
2	General Arrangement drawings		√	√
3	Power Flow Diagram		√	√
4	HV and LV Compartment layout	√		√
5	Schematic diagrams	√		√
6	Earthing plan	√		√
7	Bill of Material	√		√
8	Foundation Plan & Loading details		√	√

9	Installation Instructions		√	√
10	Instruction for Use & Maintenance		√	√
11	Transport/ Shipping dimension drawing	√		
12	QA & QC Plan		√	
13	Test Certificates		√	√

Bidder shall subsequently provide Four (4) complete sets of final drawings, one of which shall be auto positive suitable for reproduction, before the dispatch of the equipment. Soft copy of all the drawing, GTP, Test certificates shall be submitted after the final approval of the same to purchaser All the documents & drawings shall be in English language.

Instruction Manuals: Bidder shall furnish two softcopies and four (4) hard copies of nicely bound manuals (In English language) covering erection and maintenance instructions and all relevant information and drawings pertaining to the main equipment as well as auxiliary devices.

GUARANTEED TECHNICAL PARTICULARS:

A. ENCLOSURE FOR PSS			
S.No.	**Description**	**Units**	**As furnished by Bidder**
1.	Application		
2.	Rated Voltage	kV	
3.	Service Voltage	kV	
4.	System Frequency – Hz	Hz	
5.	Rated Impulse withstand Voltage	kVP	
6.	Rated Power Frequency withstand voltage	kV rms	
7.	Rated LT voltage	V	
8.	Degree of Protection for Enclosure		
9.	Internal Arc test		
10.	Maximum Permissible Temperature for any accessible part of the enclosure	°C	
11.	Dimensions of Enclosure (LxWxH)	mm x mm x mm	
12.	Thickness of sheet for side and base		
13.	Control wiring		
	a) Insulation type and Voltage grade		
	b) conductor material and size		
	c) wiring identification mark & accessories as per specification		
14.	Ventilation Aperture		
15.	Locking Arrangement		
16.	Earthing to be provided for -PSS -RMU &33kv Metering cubicle -Trf body and neutral -LV ACB & MCCB		

17.	Accessories like Heater, lamps, hooter, door switch ,etc		
18.	Paint		
19.	No. of accessories furnished		
	a) Earthing equipment		
	b) Test plug		
20.	Guarantee- From date of taking over by DHBVN		
21.	Availability of spares		
22.	Dimensions	mm×mm xmm	
23.	Total weight	Kg	

SCHEDULE OF DEVIATION:

The bidders shall set out all deviations from this specification, Clause by Clause in this schedule. Unless specifically mentioned in this schedule, the tender shall be deemed to confirm the purchaser's specifications.

(TO BE ENCLOSED WITH THE BID)

All deviations from this specification shall be set out by the bidders, clause by Clause in this schedule. Unless specifically mentioned in this Schedule, the tender shall be deemed to confirm the purchaser's specifications:

S.No.	Clause No.	Details of deviation with justifications

We confirm that there are no deviations apart from those detailed above.

Seal of the Company:

Signature:

Designation:

B. TECHNICAL SPECIFICATION FOR 630KVA, 33KV / 0.433KV COMPACT SUBSTATION WITH RMU

SCOPE:

This specification covers the technical requirements of design, manufacture, testing at manufacturer's works, packing, forwarding, supply and unloading at store/site and performance of Package type substation comprising an enclosure containing high voltage switchgear, transformer and low voltage switchgear with LT Metering. The transformer shall be of 630 KVA,

The HV compartment shall comprise –3 Way RMU Panel

The LV compartment shall comprise - 1 LT ACB along with Voltmeter, Ammeter & TVM.

APPLICABLE STANDARDS:

The equipment covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with the latest editions of the following Indian/International standards and shall conform to the regulations of the local statutory authorities.

Sr. No.	Applicable standards	
1	IEC 62271-202-2006	HV switchgear and control gear- HV/LV Pre-fabricated sub-station
2	IEC 62271-200-2003	HV switchgear and control gear-AC Metal Enclosed switchgear and control gear for voltages above 1kV and upto and including 52kV.
3	IEC 60694-1996	Common specifications for high voltage switchgear and control gear standards
4	IEC 62271-102-2003	HV switchgear and control gear-Alternating current disconnections and earthing switches
5	IEC 60265-1-1998	High voltage switches – Part 1: Switches for ratedvoltages above 1 kV and less than 52 kV
6	IEC 60529-1989	Degrees of protection provided by enclosures (IP Code)
7	IEC 62262-2002	Degrees of protection provided by enclosures for electricalequipment against mechanical impacts (IK Code)
8	IEC 60060-1989	High-voltage test techniques
9	IEC 60947-2007/ IS 13947-1993(Reaffirmed- 2004)	Low voltage switchgear and control gear
10	IEC 60439-1-1999	Low-voltage switchgear and control gear assemblies- Type tested and partially type tested assemblies
11	IEC 60076-1993 / :IS 2026-1997	Power Transformers
12	IEC 60255-3-1989	Electrical relays - Part 3: Single input energizing quantity measuring relays with dependent or independent time.
13	IEC 60044-1-1996 / : IS 2705-1992(Reaffirmed- 2002)	Current Transformers

14	IEC 60044-2-1997 / : IS 3156-1992(Reaffirmed-2002)	Voltage Transformers
15	IEC 60376-2005	High-voltage prefabricated switchgear and control gearassemblies - Voltage presence indicating systems
16	IS 2629-1985 :	Recommended practice for Hot Dip Galvanizing of Iron & Steel. (Reaffirmed-2006)
17	IS 2633-1986 (Reaffirmed-2006)	Tests for uniformity of zinc coating
18		CEA Guidelines dt August 2008 for Energy Efficient Distribution Transformers

CLIMATIC CONDITIONS OF THE INSTALLATIONS:

1	Location	Guwahati, Assam
2	Maximum ambient air temperature	50 deg C
3	Minimum ambient air temperature	5 deg C
4	Average daily maximum ambient temperature	40 deg C
5	Max yearly weighted average ambient temperature	32 deg C
6	Isoceraunic level	45 days/year
7	Maximum altitude above mean sea level	10 meters
8	Minimum relative humidity	26%
9	Max. relative humidity	100%
10	Sesimic Zone	Zone - III

The atmosphere is generally laden with mild acid and dust suspended during dry months andsubjected to fog in cold months.

GENERAL TECHNICAL REQUIREMENTS:

S.No.	Description	Requirement
A.	**FOR ENCLOSURE**	
1	Application	Outdoor
2	Rated voltage	36kV
3	Service voltage	33kV
4	System frequency	50 Hz
5	Rated Impulse withstand voltage	170 kVp
6	Rated power frequency withstand voltage	70 kVrms
7	Rated LT voltage	433

8	Degree of protection	Transformer Compartment:- IP23 HV Compartment:- IP54
		LV Compartment:-IP54
9	Internal arc test	IAC-AB as per IEC 62271-202
10	Maximum permissible temp. for any accessible part of the enclosure	As per IEC 62271-202:2006
11	Minimum thickness of sheet a) Sides b) Base	2mm 4mm
12	Control wiring a) Type and insulation b) Conductor material and size	PVC and 1.1 KV (max) Copper and 1.5 & 2.5 sq mm
13	Ventilation Aperture	Class K10
14	Locking arrangement	The doors shall be padlocked as well as lock protected
15	Paint	RAL 7032

GENERAL CONSTRUCTION:

Package type substation is designed to comprise the following main components:

a) Enclosure
b) HV compartment consisting of 33kV RMU.
c) Distribution transformer.
d) LV compartment consisting, LT ACB and Meter.

OUTDOOR ENCLOSURE:

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The HV compartment shall comprise of one no. 3 Way, non-extensible indoor type, 33kV RMU with 1 No. Fixed VCB(Manual charging & closing)+ 2 No. Load Break Switch (Manual operated)

The transformer shall be of 33/0.433 kV, 630 kVA, 33KV/433V DYn11 Copper Wounded Cast Resin Dry Type Transformer with Off load tap links of +5% to -5% @2.5% with WTI scanner. Class of Insulation: F, Temperature rise 90 deg.C. Transformer losses @50% Load- 3KW & Transformer Losses @100% Load- 6 KW and Impedance of 4.5 %(Subject to IS Tol.) with WTI scanner. The LV compartment shall comprise of one no. 1000 A ACB with interconnections required for the complete operation of the sub-station.
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33 kV RMU:

RMU (SF6 gas insulated): Sheet steel enclosed, free standing, Indoor mounted, 33kV, 630A, 25kA/1s, 3 WAY Non -extensible RMU, consisting of 1 No. Fixed VCB(Manual charging & closing)+ 2 No. Load Break Switch (Manual operated) , Self Powered Numerical Relay (50/51/51N/50N) make (C&S/Ashida/Eq) , mechanical ON/OFFindicator, trip coil , Touch Proof Boots, Manual Close & Trip PB, live cable indicator, mechanical interlocks, pad locking facility, SF6 gas manometer, 3 nos. CTs with Ratio:30/1A, 5P10, 2.5 VA for protection Relay will be C&SMake: CSPR-V5 without communication port Interconnection between HT switchgear and transformer shall be using 1Cx3x95 sq.mm Aluminium. unarmouredXLPE Cable.
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630 KVA , 33/0.433KV DYn11 Cast resin dry type transformer with Off circuit tap link having tapping range of +5% to -5% in steps of 2.5%, Z% : 5% (IST) with loss @50% loading- 3kW and Transformer losses @ 100% Load- 6kW, Class F insulation , temp rise : 90 DegC , 3nos. Surge arrestors 9kV 10kA polymeric make Asiatic make/ Eq, 1 no. Digital WTI with Alarm & Trip contacts (Make-Voltamp)

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The bidder shall submit with the offer Quality assurance plan indicating the various stages of inspection, the tests and checks which will be carried out on the material of construction, components during manufacture and bought out items and fully assembled component and equipment after finishing. As part of the plan, a schedule for stage andfinal inspection within the parameters of the delivery schedule shall be furnished. The Purchaser's engineer or its nominated representative shall have free access to the manufacturer's/sub-supplier's works to carry out inspections.

MINIMUM TESTING FACILITIES:

Bidder shall have adequate in house testing facilities for carrying out all routine tests, acceptance tests as per Indian/International standards.

SPARES, ACCESSORIES AND TOOLS:

Bidder shall provide a list of recommended spares with quantity and unit prices for 5 years of operation after Commissioning. The Purchaser may order all or any of the spare parts listed at the time of contract award and the spare parts so ordered shall be supplied as part of the definite works. The Purchaser may order additional

spares at any time during the contract period at the rates stated in the Contract Document. The bidder shall provide one no. SF6 gas leak indicator. A list of complete set of special tools and gauges required for erection & maintenance and installation procedure should be submitted.

Bidder shall give an assurance that spare parts and consumable items will continue to be available through the lifeof the equipment which shall be 25 years minimum. However, the Purchaser shall give a minimum of 12 months' notice in the event that the Bidder or any sub-vendor plans to discontinue manufacture of any component used in this equipment.
Any spare apparatus, parts or tools shall be subject to the same specification, tests and conditions as similar material supplied under the Contract. They shall be strictly interchangeable and suitable for use in place of the corresponding parts supplied with the plant and must be suitably marked and numbered for identification.

DRAWING AND DOCUMENTS:

Following drawings and documents shall be prepared based on Purchaser specifications and statutory requirements and shall be submitted with the bid:

a) Completely filled in Technical Particulars
b) General description of the equipment and all components including brochures.
c) General arrangement for CSS with Foundation Details
d) Experience List
e) Type test certificates

After the award of the contract, four (4) copies of following drawings, drawn to scale, describing the equipment in detail shall be forwarded for approval.

Sr. No.	Description	For Approval	For Review Information	Final Submission
1	Technical Parameters	√		√
2	General Arrangement drawings		√	√
3	Power Flow Diagram		√	√
4	HV and LV Compartment layout	√		√
5	Schematic diagrams	√		√
6	Earthing plan	√		√
7	Bill of Material	√		√
8	Foundation Plan & Loading details		√	√
9	Installation Instructions		√	√
10	Instruction for Use & Maintenance		√	√
11	Transport/ Shipping dimension drawing	√		
12	QA & QC Plan		√	

13	Test Certificates		√	√

Bidder shall subsequently provide Four (4) complete sets of final drawings, one of which shall be auto positive suitable for reproduction, before the dispatch of the equipment. Soft copy of all the drawing, GTP, Test certificates shall be submitted after the final approval of the same to purchaser All the documents & drawings shall be in English language.

Instruction Manuals: Bidder shall furnish two softcopies and four (4) hard copies of nicely bound manuals (In English language) covering erection and maintenance instructions and all relevant information and drawings pertaining to the main equipment as well as auxiliary devices.

GUARANTEED TECHNICAL PARTICULARS:

A. ENCLOSURE FOR PSS			
S.No.	**Description**	**Units**	**As furnished by Bidder**
1.	Application		
2.	Rated Voltage	kV	
3.	Service Voltage	kV	
4.	System Frequency – Hz	Hz	
5.	Rated Impulse withstand Voltage	kVP	
6.	Rated Power Frequency withstand voltage	kV rms	
7.	Rated LT voltage	V	
8.	Degree of Protection for Enclosure		
9.	Internal Arc test		
10.	Maximum Permissible Temperature for any accessible part of the enclosure	°C	
11.	Dimensions of Enclosure (LxWxH)	mm x mm x mm	
12.	Thickness of sheet for side and base		
13.	Control wiring		
	a) Insulation type and Voltage grade		
	b) conductor material and size		
	c) wiring identification mark & accessories as per specification		
14.	Ventilation Aperture		
15.	Locking Arrangement		
16.	Earthing to be provided for -PSS -RMU &33kv Metering cubicle -Trf body and neutral -LV ACB & MCCB		
17.	Accessories like Heater, lamps, hooter, door switch ,etc		
18.	Paint		
19.	No. of accessories furnished		
	a) Earthing equipment		
	b) Test plug		
20.	Guarantee- From date of taking over by DHBVN		
21.	Availability of spares		

22.	Dimensions	mm×mm xmm	
23.	Total weight	Kg	

SCHEDULE OF DEVIATION:

The bidders shall set out all deviations from this specification, Clause by Clause in this schedule. Unless specifically mentioned in this schedule, the tender shall be deemed to confirm the purchaser's specifications.

(TO BE ENCLOSED WITH THE BID)

All deviations from this specification shall be set out by the bidders, clause by Clause in this schedule. Unless specifically mentioned in this Schedule, the tender shall be deemed to confirm the purchaser's specifications:

S.No.	**Clause No.**	**Details of deviation with justifications**

We confirm that there are no deviations apart from those detailed above.

Seal of the Company:

Signature:

Designation:

C. TECHNICAL SPECIFICATION FOR 320 KVA, 415V, 50 Hz, 3 PHASE DG SET

SCOPE OF THE WORK:

Supply, installation, testing and commissioning of 1 no. 320kVA, 415V, 50Hz, DG-Set with weather proof acoustic enclosure with AMF panel inside of the enclosure for providing stand-by source of power supply.

DETAILED SPECIFICATION FOR DIESEL ENGINE & GENERATOR SET:

DIESEL ENGINE:

The diesel engine should be vertical cylinder type having 6 cylinders totally enclosed, compression ignition, water cooled (radiator cooled), turbo charged cooled suitable for Power generationapplication having minimum capacity to drive the alternator at 1500 rpm under NTP condition confirming to BS 649, complete with all interconnecting piping and the following standard accessories.

a) Suitable fly wheel.
b) Flexible coupling
c) Air cleaner
d) Radiator – heavy duty type
e) Cooling fan
f) Water circulating pump
g) Corrosion resistor
h) PT fuel pump
i) Electronic governing control (EGC)
j) Fuel filter
k) Fuel shut down solenoid (24Vdc, stop solenoid)
l) Lubricating oil filter
m) Oil cooler
n) By pass filter
o) Silencer (Residential type)
p) Starter
q) Engine instrument panel with following

- Lubricating oil temperature
- Lubricating oil pressure gauge
- Water temperature gauge
- Hour meter and speedometer

r) The engine should have following

- Safety control trip for low lube oil pressure
- Safety control trip for high lube oil temp.
- Safety control trip for high water temp.
- Safety control trip for engine over speed

REQUIREMENT FOR THE DIESEL ENGINE:

The diesel engine shall be vertical cylinder, single acting, mechanical injection type and furnished with all the required equipments as per standard practice. The engine shoulddevelop rated horse power to drive alternator.

The required auxiliaries, guarantee of fuel consumption for rated output, provision forparallel operation, governor performance and torsional vibration shall be in accordance with BS : 649.

The engine shall be provided with an exhaust gas turbo charger and a charged aircooler, integral air intake filter and silencer.

The engine should have throttle control, the engine water cooling should haveradiator. For charged air cooler, the cooling water inlet flow shall be thermostatically controlled.

FUEL SYSTEM:

Fuel (Diesel) system to the engine shall be supplied from a fuel tank. The supplier should provide a fuel tank inside the encloser. The supplier should provide mechanical fuel level indicator with 'Low' and 'High' markings. Also fuel level indication should be provided in the AMF panel with alarm for Fuel level 'low'

LUBE OIL SYSTEM:

The automatic pressure lubrication shall be provided by an engine driven pump. Thissystem should be complete with an oil cooler and 2Nos. of 250% capacity mesh filters. The oil cooler should be water cooled and equipped with necessary bypass arrangement, to bypass cooler during starting until oil temperature reaches the minimum (or the threshold) temperature.

ENGINE STARTING SYSTEM:

Starting of the diesel engine shall be of electric starting . The electric starting systemshould have starter motor, Lead acid starter Batteries, battery charger and necessary instrument and accessories to indicate the condition of the batteries.

BATTERIES:

The batteries shall be sized taking in to account the starting load requirement of the D-G set. 2Nos. of 12V, Lead acid batteries, of suitable capacity to start the engine by 24V DC electrical starting Motor without struggling, and with suitable capacity of battery cable. The batteries must be capable to try 3 unsuccessful starts continuously. The batteries have tobe placed on a suitable well painted steel stand.

AIR INTAKE SYSTEM: Air intake system should have requisite air filters and complete interconnecting piping, supports etc..

EXHAUST SYSTEM:

Engine exhaust system shall consist of exhaust gas driven turbo charger with laggedpiping, interconnecting cylinder head out lets with the turbo charger inlet. Exhaust gas fromthe turbo charger shall be let out through exhaust gas silencer. The exhaust gas silencer, necessary pipes etc., shall be provided by the contractor. Exhaust piping shall be suitably cladded with aluminium sheets, mineral wool etc. The silencer should be of residential type.

Flexible connection (expansion joints) shall be provided in the exhaust piping to avoid transmission of vibration from engine to the structure (acoustic and weather proof enclosure etc.). Also the exhaust line with suitable bends, collars, flanges, angle supports andother accessories should be provided. Provide necessary arrangements to avoid entry of rain water, falling dust etc. at the top of the exhaust pipe. The exhaust piping system should be designed and laid upto a height as directed by the authorities to suit the site and environmental condition as per the Pollution Control BoardSpecification.

ENGINE GOVERNING SYSTEM : The engine governing system shall be of class 'A' hydraulic governor. An over speed trip mechanism shall be provided to automatically shut off the fuelsupply incase of set speed reading about 110% of rated speed.

ALTERNATOR:

The Alternator shall be screen protected, drip proof, separately excited system (with PMG) of brush less, continuously rated to give an out put of 320kVA at 0.8 pf at 415V, 50Hz, 1500rpm,3 phase, 4wire. The alternator should be provided with automatic voltage regulator with voltage regulation of ± 0.5% (MX321) and is designed, tested forconfirming to IS 4772/1992 or IEC 34.

REQUIREMENT OF ALTERNATOR:

a) kVA rating	: 320 Kva
b) kW rating	: 256 kw
c) Terminal voltage	: 415V
d) Power factor	: 0.8 (lag)
e) No. of phases	: 3
f) No. of wires	: 4
g) Type of excitation	: with built in PMG
h) Voltage regulation	: ± 0.5%
i) Frequency	: 50Hz

The insulating material of the alternator shall be non-hygroscopic and fully tropicalisesd. The Alternator shall be suitable for operation with its neutral solidly grounded.The neutral shall be formed at the terminal box.

The alternator terminal box is made out of 16 SWG sheet steel having louvers and removable type bottom gland plate, top inspection cover and 500A capacity tinned Copper Bus-bars for all phases and Neutral. The Bus-bar should be properly supported with porcelain / resin cast epoxy molded bus supports. Provide sufficient clearances between phases and earth as per BS / IS standards.

MOUNTING : Design, fabricate suitable base frame, which is a welded construction using channel iron etc. to mount DG set. The whole set and base frame should be mounted on 12Nos. (min) of heavy duty type Anti vibration mounts of 'DUNLOP' (b – SERIES)or its equivalent make.

AMF CONTROL PANEL:

The automatic mains failure (AMF) panel should be made out of well painted 16SWG sheet steel enclosure with necessary components like control relays, timers, bus- bars, protective relays, metering , battery charger, indication annunciation system etc should be provided.

a) The panel shall be floor mounting, cubical type, indoor, dust and worm inproof, totally enclosed, made out of 14SWG sheet steel, having hinged door with removable type bottom gland plates. Bottom frame for concretefloor mounting

b) Bus-bar should be of 500A capacity tinned copper for all the phases andNeutral with color coded heat shrinkable sleeves. Sufficient capacity ofearth bus should be provided on either side of the panel.

c) The AMF should be operate in Test/ manual / auto mode and 3 attemptstarting facility with necessary control relays.

REQUIREMENTS IN AMF PANEL:

- Four pole MCCB for Alternator of 500A capacity
- Three over current relay for generator protection
- Instantaneous earth fault Relay through Neutral CT (1A-5A)
- Field failure relay
- HRC fuses for short circuit protection on both mains and for alternator.
- Mode selector switch (Auto / Manual / test / off
- Line voltage monitor (3phase) with adjustment for presetting the voltage
- Current transformers 500/5A 5P10 for protection and class1 for measuringAMF relay should be provided in AMF Panel

Built in battery charger with DC voltmeter, DC ammeter selector switch fortrickle and boost charge

Frequency monitor

Apart from the above the panel should have necessary DC/AC aux. relays,control fuses, MCBs, pushbuttons for start, stop, accept, reset, test, emergency, indication lamps for healthy, trip, faulty indication, fuel level low,24Vdc alarm with all indication for various faults. Use minimum of 1.5sq.mm copper wire for control circuit

Note: Generator Control Relay may also be used containing of all the avove mentioned feathers. DG Set should have auto start mechanism, for that only one 3 phase main supply to be provided externally.

Note : The AMF Panel should be mounted inside the DG Encloser.

FOUNDATION:

Provide a suitable reinforced cement concrete Pedestal for both the D-G set and fuel tank with concrete proportion of 1:2:4 and reinforcing steel rods of 12mm dia .. RCC bed shouldrise at least 0.3m above the ground level or as per approved drawing and instruction of the engineer incharge.

TESTS:

Supplier shall perform all standard tests (Shop tests) on Engine and alternator and the test reports pertaining to the engine and alternator should be submitted.

COMMISSIONING:

Supplier shall perform the following tests at site

a) Testing the set in Auto / Manual / Test modes.
b) Testing for all Interlocks
c) Full load test on the set for Eight hours

Note: It is the responsibility of contractor to arrange the Necessary load, fuel, lube oil, tools and test equipment required to carry out the tests at the site without any additionalcost.

ACOUSTIC AND WEATHER PROOF ENCLOSURE

Design, fabricate, supply and install out door type acoustic and weather proof enclosure for the healthy operation of 320 kVA D-G set at site. The enclosure should be well fabricated structure using 14 SWG sheet steel on all sides.

Provide sufficient working clearance around the D-G set inside the enclosure.

a) Special acoustic panels of optimum sound attenuation using specialaluminium sheets (perforated) and acoustic grade high density wool sandwiched with gypsum.

b) Self insulated ventilation louvers for proper air aspiration and temperature control with suitable incorporation of special blower / axial fans ofheavy duty depending on the on-site fresh air needs.

c) Corrugated steel frames and sturdy supporting material for housing thepanels, effective sealing with the right gasket/ neoprene materials.

d) Well fabricated / nylon wheeled smooth sliding doors to be provided foreasy access to the set. Suitable locking arrangement has to be provided on the doors.

e) Aesthetic finish (with intensive painting care) for perfect integrationwith the surroundings.

f) Noise level should be less than 65 ± 3dB at 3 meter distance from theenclosure.

g) Acoustic and weather proof enclosure system should be complete in all respect as per prevailing standards.

h) Adequate and suitable lighting arrangement inside the acoustic enclosure shall be made.

Note : Separate DP MCBS with control box to be provided for Lighting and blower fans.

1.	ENGINE:	MOTEURS BAUDOUIN/Ashok Leyland/ Volvo Eicher/Perkins/Greives/Kirloskar or equivalent
2.	ALTERNATOR:	Kirloskar/Crompton Greaves/ Leroy Somer/Stamford
3.	MCCB:	L&T/SIEMENS/ABB
4.	CURRENT TRANSFORMER:	KALPA/AE
5.	INDICATING METER:	AE/Secure/L&T
6.	AMF RELAYS:	Koamp,Standford, Woodward
7.	INDICATING LAMPS:	Esbee/TEKNIC
8.	SELECTOR SWITCH:	SIEMENS/KAYCEE/L&T
9.	SDF & FUSES:	L&T/ABB/MERLINGERIN
10.	PUSH BUTTONS:	Esbee/TEKNIC
11.	ENERGY METER:	Secure/AE/L&T

D. TECHNICAL SPECIFICATION FOR 100 KVA, 415V, 50 Hz, 3 PHASE DG SET

SCOPE OF THE WORK:

Supply, installation, testing and commissioning of 1 no. 100kVA, 415V, 50Hz, DG-Set with weather proof acoustic enclosure with AMF panel inside of the enclosure for providing stand-by source of power supply.

DETAILED SPECIFICATION FOR DIESEL ENGINE & GENERATOR SET:

DIESEL ENGINE:

The diesel engine should be vertical cylinder type having 6 cylinders totally enclosed, compression ignition, water cooled (radiator cooled), turbo charged cooled suitable for Power generationapplication having minimum capacity to drive the alternator at 1500 rpm under NTP condition confirming to BS 649, complete with all interconnecting piping and the following standard accessories.

a) Suitable fly wheel.
b) Flexible coupling
c) Air cleaner
d) Radiator – heavy duty type
e) Cooling fan
f) Water circulating pump
g) Corrosion resistor
h) PT fuel pump
i) Electronic governing control (EGC)
j) Fuel filter
k) Fuel shut down solenoid (24Vdc, stop solenoid)
l) Lubricating oil filter
m) Oil cooler
n) By pass filter
o) Silencer (Residential type)
p) Starter
q) Engine instrument panel with following

- Lubricating oil temperature
- Lubricating oil pressure gauge
- Water temperature gauge
- Hour meter and speedometer

s) The engine should have following

- Safety control trip for low lube oil pressure
- Safety control trip for high lube oil temp.
- Safety control trip for high water temp.
- Safety control trip for engine over speed

REQUIREMENT FOR THE DIESEL ENGINE:

The diesel engine shall be vertical cylinder, single acting, mechanical injection type and furnished with all the required equipments as per standard practice. The engine shoulddevelop rated horse power to drive alternator.

The required auxiliaries, guarantee of fuel consumption for rated output, provision forparallel operation, governor performance and torsional vibration shall be in accordance with BS : 649.

The engine shall be provided with an exhaust gas turbo charger and a charged aircooler, integral air intake filter and silencer.

The engine should have throttle control, the engine water cooling should haveradiator. For charged air cooler, the cooling water inlet flow shall be thermostatically controlled.

FUEL SYSTEM:

Fuel (Diesel) system to the engine shall be supplied from a fuel tank. The supplier should provide a fuel tank inside the encloser. The supplier should provide mechanical fuel level indicator with 'Low' and 'High' markings. Also fuel level indication should be provided in the AMF panel with alarm for Fuel level 'low'

LUBE OIL SYSTEM:

The automatic pressure lubrication shall be provided by an engine driven pump. Thissystem should be complete with an oil cooler and 2Nos. of 250% capacity mesh filters. The oil cooler should be water cooled and equipped with necessary bypass arrangement, to bypass cooler during starting until oil temperature reaches the minimum (or the threshold) temperature.

ENGINE STARTING SYSTEM:

Starting of the diesel engine shall be of electric starting . The electric starting system should have starter motor, Lead acid starter Batteries, battery charger and necessary instrument and accessories to indicate the condition of the batteries.

BATTERIES:

The batteries shall be sized taking in to account the starting load requirement of the D-G set. 2Nos. of 12V, Lead acid batteries, of suitable capacity to start the engine by 24V DC electrical starting Motor without struggling, and with suitable capacity of battery cable. The batteries must be capable to try 3 unsuccessful starts continuously. The batteries have tobe placed on a suitable well painted steel stand.

AIR INTAKE SYSTEM: Air intake system should have requisite air filters and complete interconnecting piping, supports etc..

EXHAUST SYSTEM:

Engine exhaust system shall consist of exhaust gas driven turbo charger with lagged piping, interconnecting cylinder head out lets with the turbo charger inlet. Exhaust gas from the turbo charger shall be let out through exhaust gas silencer. The exhaust gas silencer, necessary pipes etc., shall be provided by the contractor. Exhaust piping shall be suitably cladded with aluminium sheets, mineral wool etc. The silencer should be of residential type.

Flexible connection (expansion joints) shall be provided in the exhaust piping to avoid transmission of vibration from engine to the structure (acoustic and weather proof enclosure etc.). Also the exhaust line with

suitable bends, collars, flanges, angle supports andother accessories should be provided. Provide necessary arrangements to avoid entry of rain water, falling dust etc. at the top of the exhaust pipe. The exhaust piping system should be designed and laid upto a height as directed by the authorities to suit the site and environmental condition as per the Pollution Control BoardSpecification.

ENGINE GOVERNING SYSTEM : The engine governing system shall be of class 'A' hydraulic governor. An over speed trip mechanism shall be provided to automatically shut off the fuel supply incase of set speed reading about 110% of rated speed.

ALTERNATOR:

The Alternator shall be screen protected, drip proof, separately excited system (with PMG) of brush less, continuously rated to give an out put of 100kVA at 0.8 pf at 415V, 50Hz, 1500rpm,3 phase, 4wire. The alternator should be provided with automatic voltage regulator with voltage regulation of ± 0.5% (MX321) and is designed, tested forconfirming to IS 4772/1992 or IEC 34.

REQUIREMENT OF ALTERNATOR:

a) kVA rating	: 100 Kva
b) kW rating	: 80 kw
c) Terminal voltage	: 415V
d) Power factor	: 0.8 (lag)
e) No. of phases	: 3
f) No. of wires	: 4
g) Type of excitation	: with built in PMG
h) Voltage regulation	: ± 0.5%
i) Frequency	: 50Hz

The insulating material of the alternator shall be non-hygroscopic and fully tropicalisesd. The Alternator shall be suitable for operation with its neutral solidly grounded.The neutral shall be formed at the terminal box.

The alternator terminal box is made out of 16 SWG sheet steel having louvers and removable type bottom gland plate, top inspection cover and 160A capacity tinned Copper Bus-bars for all phases and Neutral. The Bus-bar should be properly supported with porcelain / resin cast epoxy molded bus supports. Provide sufficient clearances between phases and earth as per BS / IS standards.

MOUNTING : Design, fabricate suitable base frame, which is a welded construction using channel iron etc. to mount DG set. The whole set and base frame should be mounted on 12Nos. (min) of heavy duty type Anti vibration mounts of 'DUNLOP' (b – SERIES)or its equivalent make.

AMF CONTROL PANEL:

The automatic mains failure (AMF) panel should be made out of well painted 16SWG sheet steel enclosure with necessary components like control relays, timers, bus- bars, protective relays, metering , battery charger, indication annunciation system etc should be provided.

a) The panel shall be floor mounting, cubical type, indoor, dust and worm inproof, totally enclosed, made out of 14SWG sheet steel, having hinged door with removable type bottom gland plates. Bottom frame for concretefloor mounting

b) Bus-bar should be of 160A capacity tinned copper for all the phases andNeutral with color coded heat shrinkable sleeves. Sufficient capacity ofearth bus should be provided on either side of the panel.

c) The AMF should be operate in Test/ manual / auto mode and 3 attemptstarting facility with necessary control relays.

REQUIREMENTS IN AMF PANEL:

- Four pole MCCB for Alternator of 500A capacity
- Three over current relay for generator protection
- Instantaneous earth fault Relay through Neutral CT (1A-5A)
- Field failure relay
- HRC fuses for short circuit protection on both mains and for alternator.
- Mode selector switch (Auto / Manual / test / off
- Line voltage monitor (3phase) with adjustment for presetting the voltage
- Current transformers 160/5A 5P10 for protection and class1 for measuring AMF relay should be provided in AMF Panel

Built in battery charger with DC voltmeter, DC ammeter selector switch for trickle and boost charge

Frequency monitor

Apart from the above the panel should have necessary DC/AC aux. relays,control fuses, MCBs, pushbuttons for start, stop, accept, reset, test, emergency, indication lamps for healthy, trip, faulty indication, fuel level low,24Vdc alarm with all indication for various faults. Use minimum of 1.5sq.mm copper wire for control circuit

Note: Generator Control Relay may also be used containing of all the above mentioned features. DG Set should have auto start mechanism, for that only one 3 phase main supply to be provided externally.

Note : The AMF Panel should be mounted inside the DG Encloser.

FOUNDATION:

Provide a suitable reinforced cement concrete Pedestal for both the D-G set and fuel tank with concrete proportion of 1:2:4 and reinforcing steel rods of 12mm dia or asper drawing/ specification of manufacturer. RCC bed should be rised at least 0.3m above the ground level.

TESTS:

Supplier shall perform all standard tests (Shop tests) on Engine and alternator and the test reports pertaining to the engine and alternator should be submitted.

COMMISSIONING:

Supplier shall perform the following tests at site

a) Testing the set in Auto / Manual / Test modes.
b) Testing for all Interlocks
c) Full load test on the set for Eight hours

Note: It is the responsibility of contractor to arrange the Necessary load, fuel, lube oil, tools and test equipment required to carry out the tests at the site without any additional cost.

ACOUSTIC AND WEATHER PROOF ENCLOSURE

Design, fabricate, supply and install out door type acoustic and weather proof enclosure for the healthy operation of 100 kVA D-G set at site. The enclosure should be well fabricated structure using 14 SWG sheet steel on all sides.

Provide sufficient working clearance around the D-G set inside the enclosure.

a) Special acoustic panels of optimum sound attenuation using specialaluminium sheets (perforated) and acoustic grade high density wool sand wiched with gypsum.

b) Self insulated ventilation louvers for proper air aspiration and temperature control with suitable incorporation of special blower / axial fans of heavy duty depending on the on-site fresh air needs.

c) Corrugated steel frames and sturdy supporting material for housing the panels, effective sealing with the right gasket/ neoprene materials.

d) Well fabricated / nylon wheeled smooth sliding doors to be provided foreasy access to the set. Suitable locking arrangement has to be provided on the doors.

e) Aesthetic finish (with intensive painting care) for perfect integration with the surroundings.

f) Noise level should be less than 65 ± 3dB at 3 meter distance from the enclosure.

g) Acoustic and weather proof enclosure system should be complete in all respect as per prevailing standards.

h) Adequate and suitable lighting arrangement inside the acoustic enclosure shall be made.

Note : Separate DP MCBS with control box to be provided for Lighting and blower fans.

1.	ENGINE:	MOTEURS BAUDOUIN/Ashok Leyland/ Volvo Eicher/Perkins/Greives/Kirloskar or equivalent
2.	ALTERNATOR:	Kirloskar/Crompton Greaves/ Leroy Somer/Stamford
3.	MCCB:	L&T/SIEMENS/ABB
4.	CURRENT TRANSFORMER:	KALPA/AE
5.	INDICATING METER:	AE/Secure/L&T
6.	AMF RELAYS:	Koamp,Standford, Woodward
7.	INDICATING LAMPS:	Esbee/TEKNIC
8.	SELECTOR SWITCH:	SIEMENS/KAYCEE/L&T
9.	SDF & FUSES:	L&T/ABB/MERLINGERIN
10.	PUSH BUTTONS:	Esbee/TEKNIC
11.	ENERGY METER:	Secure/AE/L&T

E. TECHNICAL SPECIFICATION FOR DG SYNCHRONIZING PANEL

SCOPE:

This specification covers the technical requirements of design, test, supply of 415V DG Synchronizing. Panels complete with all accessories for efficient and trouble free operation.

All the panels shall be manufactured as per the following specification. In case of any deviation from the mentioned, vendor shall bring into notice the same along with it's offer. In absence of such deviation, it will be presumed that equipment offered is exactly similar to the specification.

The following IS Standards shall be referred:-

The equipment covered by this specification shall, unless otherwise stated, be designed, constructed and tested in accordance with the latest revisions of relevant Indian Standards and shall conform to he regulations of local statutory Authorities.

5	Colours for Ready Mixed Paints
375	Specification for Marking &Gen Arrangement of Swgr, Busbars, Main Connection &Aux. Wiring
398	Specification for Hard Drawn Stranded Aluminium &Steel Cored Aluminium Conductors for Overhead Power Transmission Purpose
513	Cold Rolled Low Carbon Steel Sheet &Strips
722	Specificationfor A.C. Electricity Meters.(Integrity Meters)
1248	Specification for Direct Acting Electrical Instruments.
1822	AC Motor Starters of Voltages not exceeding 1000
1841	Specification for EC grade Aluminium RodProduced By Rolling
1897	Specification for copper strips for electrical purposes
1901	Visual Indicator Lamps
2147	Degree of Protection provided by Enclosure for Low Voltage Switchgear
2208	Specification for HRC Fuse Links upto 650Volts
2516	A.C.Circuit Breaker Requirement for Voltages not Exceeding 1000V(Part-I,Sec-I+Part-II,Sec-II)
2705	Specification for current Transformer

2834	Specification for Capacitors for Power System
2959	AC Contactors for voltages not exceeding 1000V
3202	Code of Practice for Climate Proofing of Electrical Equipment
3231	Electrical Relays for Power System Protection.
3247	Switchgear General Requirements
3427	Metal Enclosed Switchgear & Controlgear
4064	Specs for Heavy Duty Air Break Switches Fuses for Voltages not exceeding 1000V.
4237	General Requirement for Switchgears & Controlgear for Voltage not exceeding 1000V
6875	Control Switches/Push Buttons
8623	Factory Built Assemblies of Switchgears &Control Gear.
8828	Miniature Circuit Breaker
13947	LV Switchgear and ControlGear.

INDIAN ELECTRICITY ACTS & RULES:

All codes & standards means the latest, wherever not specified. The manufacturing shall generally follow the Indian Standard codes of practice or the relevant British Standard Codes of Practice in the absence of corresponding Indian Standard.

CONSTRUCTION:

The panel shall be metal-enclosed, free-standing compartmentalized, modular type suitable for indoor installation. The panel shall be dust and vermin proof and the enclosure shall provide a degree of protection of not less than IP-54.The height of all the panels shall not exceed more than 2200mm &depth shall not be more than500mm for Single Front &800mm for Double Front, except for the Circuit Breaker panel, where the depth could be 1000mm.

Control panel shall be fabricated out of 14 SWG CRCA Sheet for Load bearing & Non Load bearing Part, Gland plates to be of 10 SWG CRCA Sheet & properly supported using angles & channels. The Panels shall be divided into convenient continuous line. The whole panel shall be mounted on a base frame made out of suitable structural, preferably ISMC Channels. Joints of any kind in sheet shall be seam welded.

The Panel shall be fully compartmentalized with all doors on the front or back only. When compartment door is opened, busbar and cable alley shall be shrouded by barrier plates.

All panels shall be provided with suitable cable alley and vertical busbar alley. Vendor shall submit Busbar Calculation confirming the suitability of Busbars offered along with the drawing of panel for approval.

Each cable chamber shall have cable entry from bottom and suitable removable gland plates shall be provided for this purpose. The cable chamber shall be provided with suitable supporting arrangement between the gland plate and terminals, in the middle. The cable chamber shall have a minimum width of 300 mm depending upon the outgoing cables.

Each vertical chamber shall be divided into two parts using 14 SWG cold rolled steel plate and shall be of removable type screwed to the lugs projecting from the main body of the panel. Each chamber shall be provided with a hinged type door opening away from the cable alley and shall be provided with black flower type thumb screw which shall ensure tight closing. The edges of the door shall be provided with a neoprene rubber gasket to make the compartment dust proof. All retaining catches, screws and bolts for doors and covers shall be Nikel plated. All nut & bolt for jointing the current carrying materials should be of 10.6 grade with proper tighness.

Compartment door shall be inter-locked with the switch unit in such a way that the door cannot be opened when the feeder switch is ON. The door of the compartment and busbar chamber shall be fully removable type and not hinged.

Equipment to be mounted outside cubicles shall be flush mounted on cubicle door. No externally mounted equipment shall be mounted above 2.0m or below0.4m above floor level.

All similar materials and removable parts of the panel shall be interchangeable. The panel shall be filled with the same family of switches for various ratings with a view to ensure uniformly of design, maintenance and replacements. A horizontal wire way with screwed cover shall be provided at the top/bottom to take inter-connecting control wiring between different vertical sections.Separate and adequate compartments shall be provided for accommodating instruments, indicating lamps, control contractors and control fuses etc.

Earth Busbar shall be provided all around the cubicle at the bottom &it shall be of the same size as neutral busbar.

Painting shall be done by surface coating comprising pre-treatment, Electrostatic Powder Spraying & curing. The surfaces to be coated shall be chemically derusted & degreased, Zinc Phospatised &then Passivated after proper drying subjected to spraying of powder. (All panels shall undergo 7 tank pre-treatment procedures strictly). All the panels shall be coated using Siemens Grey shade(RAL7032).

The panel shall be divided into the following compartments**:-**

BUSBAR CHAMBER :-

The busbar chamber shall be provided at the top of the panel horizontally throughout the length. There

shall be 3 Nos.of phase busbar and1 No neutral busbar and 1No earthing busbar. The busbars shall be air insulated and made up of high conductivity Aluminium.

Busbars shall be of high conductivity Aluminium with current density of 0.8 Amp/sqmm and shall have specified capacity suitable for fault level of 36KA.All busbars shall be fully screened by means of PVC sleeves in their own compartment running throughoutthe length of the panel and also suitable allowance shall be made for bus expansion. Suitable segregation shall be provided in between busbar chamber and adjoining compartments. Busbars shall run throughout the length of the chamber and shall be of extendable type on either side

The busbar shall be properly segregated, suitably braced with insulated supports (DMC/FRP/SMC) placed at appropriate intervals to withstand the electromagnetic stresses during shortcircuit. Minimum electrical clearances shall be maintained between phase, neutral and body as per standards.

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Busbar Sizing calculation to be submitted during the drawing approval as per therelivent standards.

CABLE CHAMBER:

Sufficient size chambers of min 300 mm width shall be provided to house copper connector channels to take out connections for individual feeders. Cables entry shall be as shown on the panel schedules & a min entry depth at Top/ Bottom(as the case may be) shall be provided. 10 swg M.S. sectionalised gland plates shall be provided for cable entries.

AIR CIRCUIT BREAKERS:

GENERAL:

Air circuit breakers shall be 4pole as required. They shall be complete in all respects having the following minimum requirements.

I. Motor wound spring closing mechanism.
II. Full draw-out type with indication for service, test and isolated positions.
III. Trip free mechanism.
IV. Mechanical open,closed and spring charges indicator.
V. Main contacts made up of copper.
VI. Magnetic blow out arc control device.
VII. Facilities for padlocking.
VIII. 3Nos. indicating lamps for ON/OFF and Breaker‘ Auto Trip ’indication.
IX. Relayfor O/C,S/C,E/F protection and others as indicated.
X. Electrical operated mechanism.

CONSTRUCTION:

The breakers shall be designed, manufactured as per IS:13947. The circuit breaker shall be fully draw out type. Suitable guides shall be provided to facilitate easy withdrawal of the trolley. All identical feeder compartments shall be inter-changeable.
The current transformers for the ammeter circuit shall be mounted on the fixed portion of the compartment.
All current carrying contacts of the breaker shall be silver plated. Contacts subjected to arcing shall be tipped with suitable arc resisting material.

The contacts shall be self-aligning, lug-in type, designed to ensure adequate contact pressure on the main busbars and requiring minimum maintenance.

OPERATING MECHANISM:

The breaker mechanism shall be 230VAC motor charged spring operated type. Tripping shall be effected by mean of shunt trip coil.

The operating mechanism shall be trip-free. Failure of spring, vibrations or shocks shall not cause unintended operation of breaker or prevent intended tripping operation. Closing of breakers shall be prevented unless the spring is fully charged.

POWER CONTACTORS :

The Power Contactors shall comply with the requirement of IS 13947.

All Power contactors will be of AC3 Duty.

Power contactors shall be rated as specified in the Schedule of Quantities.

INDICATING LAMPS :

Indicating Lamps shall be cluster LED type suitable to operate on 240VAC.

INDICATING METERS INSTRUMENT TRANSFORMERS :

All measuring instrument shall be square pattern & 96 mm² for all feeders. All the meters shall be of Class-1 accuracy. Ammeters and Voltmeters shall be of digital type. They shall be industrial grade and shall have means of zero adjustment from the front without dismantling them. They shall be capable of carrying the normal full load current (via CTS) and shall not be damaged by effects of rated fault current. The instruments shall have an accuracy class of1.0 as per IS-1248.

INTERNAL WIRING:

- Panel shall be supplied with all internal wiring comprising of PVC insulated1.1KV grade, multistrand flexible copper conductor of 1.5Sq.mm cross section.
- Wiring associated with a particular phase shall be the colour of that phase viz.Red/ Yellow, or Blue. Wiring associated with earthing shall be with green colour insulation and for neutral it shall be with black colour insulation.
- Wiring shall be neatly laid with cable ties and Cable duct where ever required, Bunchof wires not in duct should be tied with pvc spiral tube
- All cables shall have crimped terminations and shall be identified by means of glossy printed ferrules at both ends, showing the wire number as indicated in the schematic diagrams. The ferrules shall be printed on white ferul tubes.
- Wiring to items mounted on hinged doors or wiring that is subject to movement, shall run in helical binding. The binding shall be securely anchored at both ends and sufficient slack provided to prevent any strain being imposed on wiring.

TERMINALBLOCK:

- Terminal blocks shall preferably be grouped according to circuit functions and each terminal block

group shall have atleast 10% spare terminals. Terminal blocks for control circuit shall be of 650V grade with contact ratings not less than10A and stud/clamp type.

- Not more than two wires shall be connected to any terminal block.
- Elmex type Clip-on terminals of 650V grade shall be provided for the cables upto 35 mm². Higher size connection shall be carried out using suitable size Al links.

INTERCONNECTION:

- The interconnection so fall the phases between the busbars and the incoming side of the switch control shall be inaccessible when the doors of the controls are opened for removal of fuses etc.
- For each and every tapping from the busbars, separate connections shall be made.
- No direct tapping from the busbar shall be made for any feeder without control and protection.
- The incoming and outgoing cable shall be properly identified and also the circuit to which it is connected on each outlet.

EARTHING:

All the metal parts of all equipment supplied within the panel (including doors and gland plates) other than those forming part of all electric circuit, shall be connected by means of two independent earth conductors to continuous Aluminium Earth bar of size25x6mm running along the full length of the panel.

LABELS:

- Labels shall be provided to describe the duty of or otherwise identify every Instrument, or other item of equipment mounted internally and externally. Switch positions shall be fully identified. Wording shall be clear, concise and unambiguous.
- Each label shall be permanently secured to the panel surface
- The labels shall be engraved Aluminum (2mm thick) with white letters in black back ground.

OPERATION METHODOLOGY:

- When Main Power will fail 1st the 320 KVA DG Set will start and check the load of thesystem.
  If the Load of the system is less than 100 KVA the 320 KVA DG Set will turn off and100 KVA DG Set will start.
  If the load is greater than 320 KVA both the DG Set will run in parallel condition.

- When the load is catered under DG Set and both the DG Sets are running
  At this condition if load falls up to 300 KVA the 100 KVA DG set will have turned off
  If the load again falls up to 90KVA the 100 KVA DG Set will turn on and 320 KVA DGSet will be turned off.

- In case of fire the arrangement to be provided in such a manner that the 100KVA DGSet will not is operation only 320 KVA DG Set will be functional.

- There should be manual over right option to start the DG Set manually fromSynchronizer panel.

F. TECHNICAL SPECIFICATION FOR ELECTRICAL PANELS

SCOPE:

This specification covers the technical requirements of design, test, supply of 415V L.T. Panels complete with all accessories for efficient and trouble free operation.

All the panels shall be manufactured as per the following specification. In case of any deviation from the mentioned, vendor shall bring into notice the same along with it's offer. In absence of such deviation, it will be presumed that equipment offered is exactly similar to the specification.

The following IS Standards shall be referred:-

The equipment covered by this specification shall, unless otherwise stated, be designed, constructed and tested in accordance with the latest revisions of relevant Indian Standards and shall conform to he regulations of local statutory Authorities.

5	Colours for Ready Mixed Paints
375	Specification for Marking &Gen Arrangement of Swgr, Busbars, Main Connection &Aux. Wiring
398	Specification for Hard Drawn Stranded Aluminium &Steel Cored Aluminium Conductors for Overhead Power Transmission Purpose
513	Cold Rolled Low Carbon Steel Sheet &Strips
722	Specification for A.C. Electricity Meters.(Integrity Meters)
1248	Specification for Direct Acting Electrical Instruments.
1822	AC Motor Starters of Voltages not exceeding 1000
1841	Specification for EC grade Aluminium RodProduced By Rolling
1897	Specification for copper strips for electrical purposes
1901	Visual Indicator Lamps
2147	Degree of Protection provided by Enclosure for Low Voltage Switchgear
2208	Specification for HRC Fuse Links upto 650Volts
2516	A.C.Circuit Breaker Requirement for Voltages not Exceeding 1000V(Part- I,Sec-I+Part-II,Sec-II)
2705	Specification for current Transformer
2834	Specification for Capacitors for Power System
2959	AC Contactors for voltages not exceeding 1000V
3202	Code of Practice for Climate Proofing of Electrical Equipment
3231	Electrical Relays for Power System Protection.

3247	Switchgear General Requirements
3427	Metal Enclosed Switchgear & Controlgear
4064	Specs for Heavy Duty Air Break Switches Fuses for Voltages not exceeding 1000V.
4237	General Requirement for Switchgears & Controlgear for Voltage not exceeding 1000V
6875	Control Switches/Push Buttons
8623	Factory Built Assemblies of Switchgears &Control Gear.
8828	Miniature Circuit Breaker
13947	LV Switchgear and ControlGear.

INDIAN ELECTRICITY ACTS & RULES:

All codes & standards means the latest, wherever not specified. The manufacturing shall generally follow the Indian Standard codes of practice or the relevant British Standard Codes of Practice in the absence of corresponding Indian Standard.

CONSTRUCTION:

The panel shall be metal-enclosed, free-standing compartmentalized, modular type suitable for indoor installation. The panel shall be dust and vermin proof and the enclosure shall provide a degree of protection of not less than IP-54.The height of all the panels shall not exceed more than 2200mm &depth shall not be more than500mm for Single Front &800mm for Double Front, except for the Circuit Breaker panel, where the depth could be 1000mm.

Control panel shall be fabricated out of 14 SWG CRCA Sheet for Load bearing & Non Load bearing Part, Gland plates to be of 10 SWG CRCA Sheet & properly supported using angles & channels. The Panels shall be divided into convenient continuous line. The whole panel shall be mounted on a base frame made out of suitable structural, preferably ISMC Channels. Joints of any kind in sheet shall be seam welded.

The Panel shall be fully compartmentalized with all doors on the front or back only. When compartment door is opened, busbar and cable alley shall be shrouded by barrier plates.

All panels shall be provided with suitable cable alley and vertical busbar alley. Vendor shall submit Busbar Calculation confirming the suitability of Busbars offered along with the drawing of panel for approval.

Each cable chamber shall have cable entry from bottom and suitable removable gland plates shall be provided for this purpose. The cable chamber shall be provided with suitable supporting arrangement between the gland plate and terminals, in the middle. The cable chamber shall have a minimum width of 300 mm depending upon the outgoing cables.

Each vertical chamber shall be divided into two parts using 14 SWG cold rolled steel plate and shall be of removable type screwed to the lugs projecting from the main body of the panel. Each chamber shall be provided with a hinged type door opening away from the cable alley and shall be provided with black flower type thumb screw which shall ensure tight closing. The edges of the door shall be provided with a neoprene rubber gasket to make the compartment dust proof. All retaining catches, screws and bolts for doors and covers shall be Nikel plated. All nut & bolt for jointing the current carrying materials should be of 10.6 grade with proper tighness.

Compartment door shall be inter-locked with the switch unit in such a way that the door cannot be opened when the feeder switch is ON. The door of the compartment and busbar chamber shall be fully removable type and not hinged.

Equipment to be mounted outside cubicles shall be flush mounted on cubicle door. No externally mounted equipment shall be mounted above 2.0m or below0.4m above floor level.

All similar materials and removable parts of the panel shall be interchangeable. The panel shall be filled with the same family of switches for various ratings with a view to ensure uniformly of design, maintenance and replacements. A horizontal wire way with screwed cover shall be provided at the top/bottom to take inter-connecting control wiring between different vertical sections.Separate and adequate compartments shall be provided for accommodating instruments, indicating lamps, control contractors and control fuses etc.

Earth Busbar shall be provided all around the cubicle at the bottom &it shall be of the same size as neutral busbar.

Painting shall be done by surface coating comprising pre-treatment, Electrostatic Powder Spraying & curing. The surfaces to be coated shall be chemically derusted & degreased, Zinc Phospatised &then Passivated after proper drying subjected to spraying of powder. (All panels shall undergo 7 tank pre-treatment procedures strictly). All the panels shall be coated using Siemens Grey shade(RAL7032).

The panel shall be divided into the following compartments**:-**

BUSBAR CHAMBER :

The busbar chamber shall be provided at the top of the panel horizontally throughout the length. There shall be 3 Nos.of phase busbar and1 No neutral busbar and 1No earthing busbar. The busbars shall be air insulated and made up of high conductivity Aluminium.

Busbars shall be of high conductivity Aluminium with current density of 0.8 Amp/sqmm and shall have specified capacity suitable for fault level of 36KA.All busbars shall be fully screened by means of PVC sleeves in their own compartment running through outthe length of the panel and also suitable allowance shall be made for bus expansion. Suitable segregation shall be provided in between busbar chamber and adjoining compartments. Busbars shall run throughout the length of the chamber and shall be of extendable type on either side

The busbar shall be properly segregated, suitably braced with insulated supports (DMC/FRP/SMC) placed at appropriate intervals to withstand the electromagnetic stresses during shortcircuit. Minimum electrical clearances shall be maintained between phase, neutral and body as per standards.

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Busbar Sizing calculation to be submitted during the drawing approval as per there livent standards.

CABLE CHAMBER:

Sufficient size chambers of min 300 mm width shall be provided to house copper connector channels to take out connections for individual feeders. Cables entry shall be as shown on the panel schedules & a min entry depth at Top/ Bottom(as the case may be) shall be provided. 10 swg M.S. sectionalised gland plates shall be provided for cable entries.

AIR CIRCUIT BREAKERS:

GENERAL:

Air circuit breakers shall be 4pole as required. They shall be complete in all respects having the following minimum requirements.

I. Motor wound spring closing mechanism.
II. Full draw-out type with indication for service, test and isolated positions.
III. Trip free mechanism.
IV. Mechanical open,closed and spring charges indicator.
V. Main contacts made up of copper.
VI. Magnetic blow out arc control device.
VII. Facilities for padlocking.
VIII. 3Nos. indicating lamps for ON/OFF and Breaker‘ Auto Trip ’indication.
IX. Relayfor O/C,S/C,E/F protection and others as indicated.
X. Electrical operated mechanism.

CONSTRUCTION:

The breakers shall be designed, manufactured as per IS:13947. The circuit breaker shall be fully draw out type. Suitable guides shall be provided to facilitate easy withdrawal of the trolley. All identical feeder compartments shall be inter-changeable.
The current transformers for the ammeter circuit shall be mounted on the fixed portion of the compartment.
All current carrying contacts of the breaker shall be silver plated. Contacts subjected to arcing shall be tipped with suitable arc resisting material.
The contacts shall be self-aligning, lug-in type, designed to ensure adequate contact pressure on the main

busbars and requiring minimum maintenance.

OPERATING MECHANISM:

The breaker mechanism shall be 230VAC motor charged spring operated type. Tripping shall be effected by mean of shunt trip coil.

The operating mechanism shall be trip-free. Failure of spring, vibrations or shocks shall not cause unintended operation of breaker or prevent intended tripping operation. Closing of breakers shall be prevented unless the spring is fully charged.

MCCB's:

The MCCB shall comply with the requirement of IS13947. MCCB's shall be provided with spring assisted quick make, quick break manually operated Trip free mechanism. MCCB's shall be provided with tripping device with inverse time characteristics for short circuit protection.

MCCB operating handle 'ON' and 'OFF' position shall be displayed and the operating handle shall bemounted on the door of the compartment housing MCCB.

MCCB shall be provided with 1NO+1NC Aux contact rated at 5A. MCCB's shall be rated as specified

in the Schedule of Quantities.

CAPACITOR BANKS:

Each Capacitor Unit shall be 3 phase unit suitable for 415V Delta connection. Each Capacitor Unit shall consist of Capacitor Element connected in parallel. Each Unit shall be protected by internal MCCBs. Each Capacitor Unit shall be housed on a leakproof & explosion proof metallic box.

The Capacitor shall be low wattage Polypropylene film capacitors, self healing type & are vacuum impregnated with non-PCB, non-toxic, bio degradable oil, in nylon container &are provided with Inductor Coil for limiting Inrush Current for individual compensation. The same should be cut-off switching on suitable device. Capacitor Unit shall be provided with Discharge resistor to reduce the Phase voltage to 50V within1minute. Each Unit shall be provided with 2 nos earthing terminals.

INDICATING LAMPS:

Indicating Lamps shall be cluster LED type suitable to operate on 240VAC.

INDICATING METERS INSTRUMENT TRANSFORMERS:

All measuring instrument shall be square pattern &96 mm² for all feeders. All the meters shall be of Class-1 accuracy. Ammeters and Voltmeters shall be of digital type. They shallbe industrial grade and shall have means of zero adjustment from the front without dismantling them. They shall be capable of carrying the normal full load current (via CTS) and shall not be damaged by effects of rated fault current. The instruments shall have an accuracy class of1.0 as per IS-1248.

INTERNAL WIRING:

Panel shall be supplied with all internal wiring comprising of PVC insulated1.1KV grade, multistrand

flexible copper conductor of 1.5Sq.mm cross section.
Wiring associated with a particular phase shall be the colour of that phase viz.Red/ Yellow, or Blue. Wiring associated with earthing shall be with green colour insulation and for neutral it shall be with black colour insulation.
Wiring shall be neatly laid with cable ties and Cable duct where ever required, Bunchof wires not in duct should be tied with pvc spiral tube/
All cables shall have crimped terminations and shall be identified by means of glossy printed ferrules at both ends, showing the wire number as indicated in the schematic diagrams. The ferrules shall be printed on white ferul tubes.
Wiring to items mounted on hinged doors or wiring that is subject to movement, shall run in helical binding. The binding shall be securely anchored at both ends and sufficients lack provided to prevent any strain being imposed on wiring.

TERMINAL BLOCK:

Terminal blocks shall preferably be grouped according to circuit functions and each terminal block group shall have atleast10%spare terminals. Terminal blocks for control circuit shall be of 650V grade with contact ratings not less than10A and stud/clamp type.
Not more than two wires shall be connected to any terminal block.
Elmex type Clip-on terminals of 650V grade shall be provided for the cables upto 35 mm^2.Higher size connection shall be carried out using suitable size Al links.

INTERCONNECTION:

The inter connection so fall the phases between the busbars and the incoming side of the switch control shall be inaccessible when the doors of the controls are opened for removal of fuses etc.
For each and every tapping from the busbars, separate connections shall be made.
No direct tapping from the busbar shall be made for any feeder without control and protection.
The incoming and outgoing cable shall be properly identified and also the circuit to which it is connected on each outlet.

EARTHING:

All the metal parts of all equipment supplied within the panel (including doors and gland plates)other than those forming part of all electric circuit, shall be connected by means of two independent earth conductors to continuous Aluminium Earth bar of size50x6mm running along the full length of the panel.

LABELS:

Labels shall be provided to describe the duty of or otherwise identify every Instrument, or other item of equipment mounted internally and externally. Switch positions shall be fully identified. Wording shall be clear,concise and unambiguous.
Each label shall be permanently secured to the panel surface
The labels shall be engraved Aluminium (2mm thick) with white letters in black background.

G. TECHNICAL SPECIFICATION OF XLPE CABLE SUITABLE FOR USE IN UN EARTHED 33 KV SYSTEM

SCOPE :

The specification covers the design, manufacture, testing, supply and delivery in proper packed condition of different grades of 3 Core Aluminium Conductor, Cross-linked polyethylene (XLPE) insulated, screened, Armoured, PVC sheathed Power Cables.

DEVIATION :

Normally the offer should be as per Technical Specification without any deviation. But any deviation proposed must be mentioned in the 'Deviation Schedule' with reasons and advantage of such deviation. Deviation not mentioned in 'Deviation Schedule' will not be considered after tender opening.

STANDARD :

The cables covered by this specification shall be designed, manufactured and tested in accordance with following Indian Standards as well as relevant IEC's.

Sl. No.	Standards	Title
1.	IS : 5831	PVC Insulation and sheath of electric cables.
2.	IS : 3961 (Part 2)	Recommended current ratings for cables of PVC insulated and PVC sheathed heavy duty cable.
3.	IS : 8130	Conductor for insulated electric cables and flexible cord.
4.	IS : 1885	Electric Cables.
5.	IS : 3975	Mild steel wire, formed wires and tapes for armouring of cables.
6.	IS:7098(PartII)	Specification for cross-linked polyethylene insulated PVC sheathed cables for working voltages from 3.3KV to and including 33KV.
7.	IS : 10418	Cable Drums for Electric Cables.
8.	IS10810:1984	Method of tests for cables.

LOCATION :

a) The Cables may be laid inside the trench of one meter in average,
b) The Cables may also be laid within covered cable trenches, in cable racks or open air ladder trays etc. for certain portions of lengths. Terminate for outdoor connection to a power transformer.

SYSTEM DETAILS :

a) Voltage grade (KV) of cable required: 33KV/33KV
b) Service Voltage :: 33 KV
c) Highest Voltage :: 36 KV
d) EarthingSystem :: Un Earthed
e) B.I.L. For Cable :: 170 KV for 33 KV Grade
f) Fault Level (Maxm.) :: 25KA for 1 sec
g) Frequency :: 50 C/S

WEATHER CONDITION :

a) Monsoon prevails generally from the month of June to October with showers sometimes heavy,acidic, smoky, industrial and foggy.
b) Maximum ambient temperature :: 50 degree C.
c) Minimum ambient temperature :: 4 degree C
d) Thermal resistance of soil :: 150 degree C-Cm/Watt
e) Maximum Daily average ambient temp :: 4 degree C
f) Maximum relatively humidity :: 100.00%
g) Average rainfall per annum :: 1600 cm
h) Maximum height above the Sea level :: 100 Meters

The cable, joints, outdoor termination and their accessories and fittings may conform to other Indian Standards.

ELECTRICAL CHARACTERISTICS & PERFORMANCE:

33/33 KV Grade 1/3 core:

a) Description of Cable : Electrolytic grade aluminum conductor shall be of H4 grade of class 2 or Untinned annealed copper of class 2 as per IS 8130/1984 and any latest amendments to it. The shape of conductor shall be compacted, stranded, and circular, shielded with conductor screen of black extruded semi-conducting XLPE compound , XLPE insulation, shielded with insulation screen of black extruded semi-conducting compound, black semi-conducting tape and metallic screen of copper tape, Inner sheath extruded PVC type

ST2,single layer of strip /round steel or round hard drawn aluminium wire armoured as per IS :7098 part II and black extruded FR PVC (TypeST-2) overall sheathed, conforming generally to IS:7098(PartII).

b) Voltage Grade : 33KV /33KV (For 33 KV System)
c) Size of Cable : As per S.T.P.
d) Service Voltage : 33 KV
e) Maxm.Conductor temp. : 90 degree C at maxm. continuous current.
f) Maxm. Permissible shortcircuit Temperature : 250 degree C for one second
g) Approx. length of Cable in a Drum - 500Mtrs + 5% or as per S.T.P.
h) End Sealing : H.S. Caps (See Clause 8.11) (Heat Shrinkable)

CABLE CONSTRUCTION :

XLPE Underground Cable is to be manufactured in continuous catenary process at controlled elevated temperature and pressure in inert atmosphere with use of suitable materials for XLPE main insulation and XLPE semi-conducting Insulation & XLPE screen. The XLPE Cable in this specification does not have any metal sheath and the short circuit rating of the cable will depend on the conductivity and continuity of the strands of the armour wires which shall be ensured by guarding against corrosion.

a) **ALUMINIUM CONDUCTOR**: Material to IS: 8130/1984, plain Aluminium H4 grade Class 2, stranded compacted circular Or Copper conductor: Untinned annealed copper of class 2 as per IS 8130/1984 and any latest amendments to it.

b) **CONDUCTOR SCREENING**: A semi-conducting cross-linked polyethylene (XLPE) screening shall be extruded over the conductor to act as an electrical shield which together with the elimination of the so called “Strand Effect” prevents to a great extent air ionisation on the surface of the conductor. Thickness as per IS 7098 part II.

c) INSULATION: The main insulation of the Cable shall be extruded unfilled, chemically cross-linked polyethylene (XLPE) inert gas cured satisfying the requirement of IS: 7098(Part-II). **Insulation thickness should not be less than 9.5 mm(Nominal).**

d) INSULATING SCREEN:

Combination of black extruded semi-conducting compound & semi- conducting tape as the non- metallic part and annealed copper tape lapping as metallic part metal screen eliminates tangential stress of rotating electrostatic field surrounding the conductor and uniform electrical stress in the insulation. Metal copper screen should be able to carry a short circuit current of 1KA for 1sec.
The semi-conducting polyethylene (XLPE) screen shall be extruded over the main polyethylene insulating wall to prevent partial discharge at the surface of the insulation. The copper tape shall be wrapped over the semi conducting tape or extrusion as mentioned earlier for 3 core cables. The metal screen so formed around the cores shall be in contact with one another as the cores are laid up at triangular configuration. **For single core cable, Aluminium wire armouring shall constitute the metallic part of insulation screen**. Conductor screening, insulation and insulation

screening shall be extruded in triple extrusion process as to obtain continuously smooth interfaces.

The mechanical and chemical properties of the materials for semi conducting screens are much more important than their electrical properties, but for obtaining the high overall degree of electrical properties of an H.V. cable, the inner and outer semi conducting screens and the main polyethylene insulation between the screens shall be simultaneously extruded during the manufacturing process known as “tripple extrusion”.

e) INNER SHEATH : The cable core shall be supplied with bedding of PVC (inner sheath) in the form of extruded PVC Type ST-2 compound for 33 KV. **For single core cable inner sheath is not required.**

f) **ARMOUR :** Galvanized round steel wires or galvanized formed wires for 3 core cable as per IS 7098 part II. Single layer of round hard drawn aluminium wire for 1 core cable as per IS 7098 part II to ensure an adequate return path for the flow of fault current and also to provide suitable mechanical protection. For 1 core aluminium Wires of required size in requisite number shall be laid closely in the spiral formation to protect the circumference of the cable fully and to provide adequate cross sectional area for flow of maximum fault current within limits of specified temperature rise and duration of fault. The direction of the lay of the armour shall be opposite to that of the cable cores.

g) **OUTER SHEATH :** Black extruded FR PVC Type ST-2 compound to IS:5831 and thickness shall be as per IS 7098 part II.
The cable shall therefore be finished with an extruded PVC over sheath of thickness as per IS 7098 part II.

The quality of PVC over sheath (Jacket) shall be ensured for service reliability against moistureintrusion and shall conform to type ST-2 of IS:5831.
The sheaths shall be protected against white ants, vermin and termites by suitable, reliable and durable measures.
The supplier shall suggest suitable materials for use, in the event of damage to over sheath to prevent passage of moisture along the cable.

h) CABLE IDENTIFICATION :
The following shall be **embossed** on the outer sheath for the identification.
a) Manufacturer’s Name
b) Voltage Grade.
c) Nominal section & Material of conductor and numbers of core.
d) Year of manufacture.
e) Inscription for length of cables at 1.0 meter interval.
f) Type of insulation i.e. XLPE.

g) **SEALING OF CABLE ENDS** : The cable ends of cable in the wooden drum for delivery shall be sealed with heat shrinkable caps.

WOODEN DRUMS :

The Cable shall be packed in non-returnable wooden drums.The following information shall be marked on each drum.

a) Drum identification No.
b) Manufacturer's Name, Trade Name/Trade Mark, if any.
c) Nominal sectional area of the conductor of the cable.
d) No. of Cores.
e) Type of Cable and Voltage Grade with Cable Code.
f) Length of the Cable in Cable Drum.
g) Direction of rotation of Drum (by means of an arrow)
h) Approximate Weight : Tare : Gross
i) Year and Country of Manufacture.
j) Purchase Order No.
k) Date of Delivery.
l) Name of the Purchaser :

Drums shall be proofed against attack by white ants or termite conforming to IS : 10418.
The Drums may also be marked with ISI Certificate Mark, if applicable. Safe Pulling Force : 30 N/mm2 (for Conductor)

TESTS AT MANUFACTURER'S WORKS AND TEST CERTIFICATES:

a) Inspection may carried out in presence of Client ,Consultant and APDCL.
   Cable shall comply with the requirements of routine test as per relevant Indian Standard.
b) All routine and Acceptance tests shall be carried out at the manufacturer's works as per relevant Indian Standards. Three (3) copies of test reports shall be submitted for approval and distribution to site. The contractor shall give at least 15 (fifteen) days advance notice intimating the actual date of inspection and details of all tests that are to be carried out.

TEST REPORTS AND TYPE TESTS:

Only tested type XLPE Cable Power Cables are to be offered conforming to our technical specification, and relevant IS and IEC. XLPE Cables offered should be similar with ones on which type testing has been carried out as per relevant IS and IEC. Three sets of complete type test reports carried out in Govt. recognized Test House or Laboratory /NABL accredited laboratory shall have to be submitted by successful bidder positively along with submission of drawings . Successfulbidder may require producing original copies of type test reports at the time of detail Engineering if asked by APDCL/Client.
Each type test report shall comply the following information with test result

a) Complete identification, date and serial no.
b) Method of application ,Where applied , duration and interpretation of each test

ROUTINE TESTS **:**

The routine test shall be carried out on cable manufactured in accordance with this specification. The following routine tests shall be made on cable length as specified in the IS.

a) Conductor resistance test.
b) Partial discharge test on full drum length.
c) High voltage test

ACCEPTANCE TEST: The following shall constitute Acceptance Tests :

a) Tensile test (for aluminium)
b) Wrapping test (for aluminium)
c) Conductor resistance test.
d) Test for thickness of insulation and sheath.
e) Hot set test for insulation.
f) Tensile strength and elongation at break test for insulation and outer sheath.
g) P.D.test (for screened cables) only on full drum length.
h) High Voltage test, and
i) Insulation resistance (VOLUME RESISTIVITY) TEST
j) Test of cross linking for extruded semi conducting screen.
k) Oxygen Index(Test on FR)
l)Flammability test(Test on FR)

STANDARD TECHNICAL PARTICULARS

(a)	Description of Cable	:	Stranded compacted circular Aluminium shielded with conductor screen of black extruded semi conducting compound, XLPE insulated, shielded with insulation screen of black extruded semi conducting compound, Metallic screen of copper tape, Inner sheath Extruded PVC ST-2 followed galvanized round steel wires or galvanized formed wires for 3 core cable as per IS 7098 part II or single layer of round hard drawn aluminium wire for 1 core cable as per IS 7098 part II and black extruded FR PVC (Type ST 2) overall sheathed conforming generally to IS : 7098 (Part-II)
(b)	Voltage grade	:	33KV (UE) (for 33KV System).
(c)	Size of Cable	:	As per requirement
(d)	Insulation thickness	:	9.5 mm(Nominal thickness).
(e)	Max. Conductor Temp.	:	90ºC at maximum continuous current.
(f)	Short circuit current	:	25KA for 1sec main conductor and 1KA for 1sec for copper screen.
(g)	Maximum permissible emergency overloadtemp. at 25% over load to 100	:	130ºC for one hour.
(h)	Maximum permissible short cut temperature.	:	250ºC for one second.
(i)	Approximate Lengthof cable in a drum	:	500 metres with a tolerance range of + 5%. Or as per requirement.
(j)	End sealing	:	Heat shrinkable Caps.

GUARANTEED TECHNICAL PARTICULARS FOR XLPE CABLES

(To be filled in by the Supplier)

1. Manufacturer's Name &Address ::

2. Voltage Grade.
::33KV/33 KV(For 33 KV
Sys.)
3. Core & Cross Section ::

4. Type &Designation(as per IS) ::

5. List of Standards applicable ::

6. Suitable for system with
(a) Service Voltage ::
(b) Neutral Earthing ::

7. Maximum Conductor temperature ::
(a) Continuous (in Deg. C) ::
(b) Short time (in Deg.C) ::

8. Conductor :
(a) Material to IS-8130(Class/Grade) ::
(b) Size (Sq.mm.) ::
(c) No./Nominal diameter of wires
in ::each Conductor (no./mm.)
(d) Form of Conductor (Circular/shaped) ::

9. Shielding/screening on Conductor ::
(a) Material. ::
(b) Type. ::
(c) Whether thermosetting ? :: (Yes/No.)

10. Insulation ::
(a) Material. ::
(b) Type ::
(c) Nominal Thickness (mm) ::
(d) Minimum Thickness (mm) ::
(e) Whether triple co-extrusion ::
(Yes/No)With radiant curing process ?
11. Shielding /
screenMetallic ::
12. Inner – sheath ::
(a) Material ::

(b) Type ::
(c) Thickness (mm.) ::
(d) Extruded/Wrapped. ::
(e) Approx. outside diameter ::
over sheath (mm.)
13. Armouring ::
(a) Material. ::
(b) Size ::
(c) D.C. resistance at 20
deg.C ::(Ohm/Km.)
(d) A.C. resistance at 20
deg.C ::e)Approx. dia. over
armour

14. Overall Sheath ::
(a) Material ::
(b) Type ::
(c) Thickness (mm.) ::

15. Approx. overall diameter of
the ::Cable (mm.)

16. Standard Drum length
with ::tolerance (Mtr.)

17. Net Weight of Cable(approx.)Kg/Km ::

18. Continuous current rating
for ::standard condition, laid
direct
(a) In ground at temp. 30 deg.C ::
(b) In duct at temp. 30 deg.C ::
(c) In air at temp. 40 deg.C ::

19. Charging current at rated system voltage ::
20. Short Circuit Current (Maxm.) ::
(a) for 1 sec. ::
(b) for 0.5 sec. ::
21. Electrical Parameters ::
a) Maxm. D.C. resistance/km ::
of conductor at 20 deg.C
b) AC resistance/kilometre of max.operating
temp:c)tan-Delta at Uo ::
d) tan-Delta at 1.5 Uo ::
e) tan-Delta at 2 Uo ::
22. Vol. Resistivity at 27 deg.C(ohm/Cm) ::

23. Recommended minimum bending radius ::

24. Derating factor for following
ambient ::temperature in Air/Ground.
(a) at 30 deg. C ::
(b) at 35 deg. C ::
(c) at 45 deg. C ::
(d) at 50 deg. C ::

25. Type test results of the similar Cable to
be ::furnished with Tender (as specified
under Clause-10 of the Spec.)
(a) Tests on Conductor :
(i) Tensile test (for aluminium) ::
(ii) Wrapping test (for aluminium) ::
(iii) Resistance test ::
(b) Test for armouring wires/strips ::
(c) Test for thickness of insulation &steath :
(i) Tensile strength & elongation at break ::
(ii) Ageing in air oven ::
(iii) Hot test ::
(iv) Shrinkage test ::
(v) Water absorption (Gravimetric) ::
(d) Physical :
(i) Tensile strength and elongation at break::
(ii) Ageing in air oven ::
(iii) Shrinkage test ::
(iv) Hot deformation ::
(v) Loss of mass in air oven ::
(vi) Heat shock ::
(vii) Thermal stability ::
(e) Partial discharge test ::
(f) Banding test ::
(Volume
resistivity)*Test

(i) Heating Cycle test ::

(j) Impulse with stand test ::

(k) High Voltage test ::

(l) Flammability test ::

26. Cable Drums :
(a) Length/Drum (Kg) ::
(b) Dimension of Drum ::
(c) Shipping weight (Kg) ::

27. Safe pulling force (Kg.) ::

28. Partial discharge value ::

29. Details of the protective measures ::against attack by white ante, vermins etc. to be XLPE's outer sheath during manufacture.

30. Type of curing of XLPE insulations ::

31. Cut ends of the Cable shall be sealed ::with ……..

32. Cable identification shall be made as per ::per class 8.10 (Yes/No)

33. Cable Drums shall be marked with the ::with the informations of Clauses 9.1 conspicuously (Yes/No)

Signature .....
Name.....

H. TECHNICAL SPECIFICATION FOR 1.1 KV XLPE INSULATED PVC SHEATHED SINGLE & MULTICORE ALUMINIUM CABLE (ARMOURED & UNARMOURED)

SCOPE :

This Specification covers the requirement of XLPE insulated Cables for working voltages upto and including 1100 Volts.

LOCATION :

The Cable shall be laid/buried directly in ground and terminated for outdoor connection.

The Cables may be laid within covered Cable Trenches in Cable Racks/Ladder/open Air etc. for certain portion of length.

STANDARD:

The materials covered under this specification shall comply with the requirements of the latest version of the following standards as amended upto date, except where specified otherwise.

i)	IS : 7098 (Part-I) : 1988 (amended upto date)	:	Specification for Cross linked Polyethylene Insulated PVC sheathed Cables for working Voltage upto & including 1100 Volt.
ii)	IS:8130-1984 (amended upto date)	:	Specification for Conductors for insulated electric cables and flexible cords.
iii)	IS:5831-1984 (amended upto date)	:	PVC insulation & sheath of electric cables.
iv)	IS: 3975-1970 (amended upto date)	:	Specification for Low Carbon Galvanized steel wires, Formed Wires and tapes forarmouring of Cables.
v)	IS:10810-1984 (amended upto date)	:	Methods of test for Cables.
vi)	IS:10418-1982 (amended upto date)	:	Cable Drums for Electric Cables.

RATED VOLTAGE:

The rated voltage of the cables shall be 1100 V.

CABLE SIZE & DATA:

A) 1.1 KV XLPE insulated PVC sheathed armoured Aluminum Cable (multi core)

The standard sizes and technical characteristics for the said Cable of different sizes are shown below:

Cable size	Nominal thickness of Insulation	Minimum thickness of inner sheath	Armour (Galvanized steel Round Wire/Strip)	Nominal dia./ dimensions of Armour (Galvanized steel Round Wire/Strip)	Maximum DC resistance of Armour of Cable at 20^0C (Ohm/KM)	Minimum thickness of outer sheath	Cable Code

1.1 KV XLPE insulated PVC sheathed armoured Aluminum Cable of size							
4C x 10 sq. mm	0.70	0.30	Galvanized steel Round Wire	1.4 mm dia.	3.62	1.40	A2XWY
3.5C x 25 sq. mm	0.90/0.7	0.30	Galvanized steel Strip	4 X 3.4 X0. 8 mm	3.78	1.40	A2XFY
3.5C x 70 sq. mm	1.00	0.30	Galvanized steel Strip	4 X 3.4 X0. 8 mm	3.18	1.56	A2XFY
3.5C x 120 sq. mm	1.20	0.50	Galvanized steel Strip	4 X 3.4 X0. 8 mm	2.11	1.72	A2XFY
3.5C x 240 sq.mm	1.60	0.50	Galvanized steel Strip	4 X 3.4 X0. 8 mm	1.72	2.2	A2XFY
3.5C x 300 sq. mm	1.80	0.70	Galvanized steel Strip	4 X 3.4 X0. 8 mm	1.37	2.36	A2XFY

CONDUCTORS :

For all types of Cable, aluminium conductor shall be H4 grade, stranded in construction with f lexibility class 2, complying with the requirements as specified in IS-8130-1984 with latest amendments**.**

The conductor shall be clean & reasonably uniform in size and shape and its surface shall be free from sharp edges.

INSULATION :

The Conductor shall be provided with XLPE insulation applied by extrusion. The smallest of measured values of thickness of insulation shall not fall below the nominal value (ti) by more than 0.1 mm+ 0.1(ti).

The insulation shall be so applied that it fits closely on the conductor (or barrier, if any) and it shall be possible to remove it without damaging the conductor.

LAYING UP OF CORES:

In multi core cables, the cores shall be laid up together with a suitable lay, the outer most layer shall have right hand lay and the successive layer shall be laid with opposite lay.

INNER SHEATH :

Inner sheath is used for multicore Cables. Single core Cable shall have no inner sheath**.**
For multi core Cables, the laid up cores shall be provided with Inner Sheath applied by extrusion. It shall beensured that it is as circular as possible. Material of inner sheath should be PVC Type ST2 as per IS:5831- 1984.

Inner sheath shall be so applied that it fits closely on the laid up cores and it shall be possible to remove it without damaging the insulation.

ARMOURING:

Armouring is used for single core & multicore armoured cable. The armour wires/strips shall be applied as closely as practicable. A binder tape may be provided on the armour.

The joints in armour wire or strip shall be made by brazing or welding and the surface irregularities shall be removed. A joint in any wire/strip shall be atleast 300 mm from the nearest joint in any other armour wire/flat strip in the completed cable.

Where the calculated dia. below armouring does not exceed 13 mm, the armour shall consist of round wires. Where the calculated dia. below armouring exceeds 13 mm, the armour shall consist of flat strips.

For flat strips armour (for armour material either galvanized steel or non-magnetic), nominal dimensions of armour should be 4 mm. X 3.4 mm. X 0.8 mm.

For Single Core armoured Cable, armouring shall be applied over the insulation with non-magnetic material. For, Multi Core armoured Cable, armouring shall be applied over the inner sheath by galvanized steel.

OUTER SHEATH :

The outer sheath shall be black & applied by extrusion. It shall be applied:

i) Over the insulation in case of unarmoured single core cable.

ii) Over the inner sheath in case of unarmoured multicore Cables.

iii) Over the armouring in case of armoured single core & armoured multicore Cables.

Material of outer sheath should be PVC Type ST2 as per IS:5831-1984.

CLASSIFICATION OF TESTS TYPE:

TEST REPORT:

During bid submission, the bidder shall submit Type Test report for each offered item.

Type Test should be carried out

i) Within 5 years from the due date of opening of tender.

ii) From CPRI or ERDA or NABL accredited LAB bearing NABL Logo. Accreditation of NABL LAB shouldbe displayed in the official website of NABL.

iii) As per IS: 7098-Part I-1988 and it latest amendment and other relevant IS.

All the tests mentioned below are to be made as per details given in IS: 10810-1984.The following shall constitute type Test:

a) Resistance Test on Conductor.

b) Tests for armouring Wires/strips (for Armour Cable).

c) Test for thickness of insulation and sheath.

d) Physical test for insulation.

i) Tensile strength and elongation at break.

ii) Ageing in air oven.

iii) Shrinkage test

iv) Hot set test.

v) Water absorption (Gravimetric).

e) Physical tests for outer sheath.

i) Tensile strength and elongation at break.

ii) Ageing in air oven.

iii) Shrinkage test.

iv) Hot deformation.

v) Loss of mass in air oven.

vi) Heat shock test.

vii) Thermal stability.

f) Insulation resistance (Volume resistivity) Test.

g) High voltage test.

h) Flammability test.

ACCEPTANCE TEST:

The following shall constitute acceptance Test:

a) Resistance Test on Conductor.

b) Test for thickness of insulation and sheath.

c) Tensile strength and elongation at break test for insulation & outer sheath.

d) Hot set test for insulation.

e) Insulation resistance (Volume resistivity) Test.

f) High voltage test.

ROUTINE TEST:

The following shall constitute routine test:

a) Resistance Test on Conductor.

b) High voltage test.

CABLE IDENTIFICATION & SEQUENTIAL LENGTH MARKING**:**

CABLE IDENTIFICATION BY EMBOSSING:

The following shall be embossed on the outer sheath of the cable throughout the length of cableat 1.0 metrespacing for identification:

i)	Manufacturer's Name or Trade Mark.
ii)	Name of the purchaser : (If applicable).
iii)	Voltage Grade of Cable (1100 V).
iv)	Type of insulation, material of conductor (XLPE insulated Aluminium conductor).
v)	Number of cores & nominal cross sectional area of conductor.
vi)	Cable Code.
vii)	Marking "Electric".
viii)	Month & Year of manufacture.

SEQUENTIAL LENGTH MARKING BY PRINTING:

Sequential length shall be marked on the outer sheath of the cable throughout the length by Printing in each meter length interval.

PACKING & DRUM DETAILS:

The Cable shall be supplied in non-returnable wooden drums each containing length of 250/500 Meters of Cable with tolerance of ± 5% per drum subject to overall maximum minus (-) 1% on total quantity will be accepted.

Cable Size	**Drum Length**
A. 1.1 KV XLPE insulated PVC sheathed armoured Aluminum Cable of size	
4C x 10 sq. mm	1000 ± 5%
3.5C x 25 sq. mm	
3.5C x 70 sq. mm	500 ± 5%
3.5C x 120 sq. mm	
3.5C x 240 sq. mm	
3.5C x 300 sq. mm	

The drums shall be proofed against attack by white ant or termite, conforming to IS:10418:1982. The clearance between the outermost layer of the cable & the edge of the flange should be at least 75 mm or equal to the diameter of the Cable whichever is less.

SEALING OF CABLE ENDS:

The ends of the cable shall be sealed with heat shrinkable caps.

MARKING ON EACH DRUM:

The following information shall be stencilled on each drum:

i)	Reference Indian Standard and Lisence Number
ii)	Serial number of the Drum
iii)	Manufacturer's Name or Trade Mark
iv)	Name of the purchaser : (If applicable)
v)	Voltage Grade of Cable
vi)	Type of insulation, material of conductor
vii)	Number of cores & nominal cross sectional area of Conductor.
viii)	Cable Code.
ix)	Purchase Order No. & Date.
x)	Length of Cable on the Drum.
xi)	Direction of rotation of Drum by means of arrow.
xii)	Approximate Weight : Tare : Gross.
xiii)	Number of length on the drum(if more than one).

xiv)	Month & Year of manufacture.
xv)	Country of Manufacture.

GUARANTEED TECHNICAL PARTICULARS FOR 1.1 KV XLPE INSULATED PVC SHEATHED ARMOURED ALUMINIUM CABLE:

Sl. No.	Name of Manufacturer & Country								
	Factory Address								
	Size of Cable	4Cx10 sq. mm	3.5Cx25 sq. mm	3.5Cx70 sq. mm	3.5Cx120 sq. mm	3.5Cx240 sq. mm	3.5Cx300 sq. mm		
1	Make of Cable								
2	Voltage Grade of Cable	635/1100 V							
3	Type of Cable	A2XWY	A2XFY	A2XFY	A2XFY	A2XFY	A2XFY		
4	Applicable Standard	IS: 7098(Part-I)-1988, IS:8130-1984, IS:5831-1984, IS: 3975-1970, IS:10810-1984 & IS:10418-1982							
5	Conductor								
a)	Material	H4 Grade Aluminium wires, Class 2 of IS: 8130							
b)	Form of Conductor	Stranded compacted circular							
c)	Nominal cross sectional area	10 sq. mm	25/16 sq. mm	70/35 sq. mm	120/70 sq.mm	240/120 sq.mm	300/150 sq.mm		
d)	Nos. of wires in each Conductor								
e)	Nominal diameter of wire before stranding								
f)	Maximum DC resistance of conductor at 20^0C	3.08	1.20	0.443	0.253	0.125	0.100		
6	Insulation								
a)	Material	XLPE as per IS: 7098 (Part-I)-1988							
b)	Method of application	By Extrusion							
c)	Nominal thickness of Insulation	0.70	0.90/0.70	1.10/0.90	1.20/1.10	1.70/1.20	1.80/1.40		
7	Inner Sheath								
a)	Material	PVC (type ST2) as per IS: 5831-1984							
b)	Method of application	By Extrusion							
c)	Minimum thickness of inner Sheath	0.30	0.30	0.30	0.50	0.50	0.70		
8	Armouring								
a)	Material	Galvanized Steel Round Wire, single layer	Galvanized Steel Strip, Single layer, applied helically						
b)	Nominal dia./ dimensions of Armour (Galvanized steel Round Wire/Strip)	1.4 mm dia.	4X3.4X0.8 mm						
c)	Maximum DC resistance of Armour of Cable at 20^0C (Ohm/KM)	3.62	3.78	3.18	2.11	1.72	1.37		
9	Outer Sheath								
a)	Material	PVC (type ST2) as per IS: 5831-1984							
b)	Method of application	By Extrusion							
c)	Colour of outer sheath	Black							
d)	Minimum thickness of Outer Sheath	1.40	1.40	1.56	1.72	2.04	2.20		
10	Minimum Bending Radius	15 X O/D of Cable							

11	Maximum operating temperature of Conductor	90^{0}C
12	Maximum temperature of conductor during short circuit	250^{0}C
13	Drum length & tolerance of each drum	500±5%
14	Overall tolerance in total quantity	-1%
15	Cable identification & sequential length marking	Cable identification by Embossing The following shall be embossed on the outer sheath of the cable throughout the length of cable at 1.0 metre spacing foridentification: i) Manufacturer's Name or Trade Mark Sequential length shall be marked on the outer sheath of the cable throughout the length by Printing in each meter length interval.
16	Sealing of cable ends	The ends of the cable shall be sealed with heat shrinkable caps
17	Marking on each drum	The following information shall be stencilled on each drum:

i)	Reference Indian Standard and Lisence Number	
ii)	Serial number of the Drum	
iii)	Manufacturer's Name or Trade Mark	
iv)	Name of the purchaser : (if applicable)	
v)	Voltage Grade of Cable	
vi)	Type of insulation, material of conductor	
vii)	Number of cores & nominal cross sectional areaofConductor	
viii)	Cable Code	
ix)	Purchase Order No. & Date	
x)	Length of Cable on the Drum	
xi)	Direction of rotation of Drum by means of arrow.	
xii)	Approximate Weight : Tare : Gross	
xiii)	Number of length on the drum(if more than one)	
xiv)	Month & Year of manufacture	
xv)	Country of Manufacture	

18	Approximate net weight of Cable	
19	Maximum permissible short circuit current for 1 sec	
20	Continuous current rating of the Cable under standard condition when laid	

i)	Direct in the ground at 30^{0}C
ii)	In duct at 30^{0}C
iii)	In air in 40^{0}C

LIST OF APPROVED MAKES

1. ACB	L&T / Schneider / ABB/ Legrand/ Siemens
2. Compact Substation	Voltamp Baroda / Schneider / ABB/ Siemens
3. MCCB	L&T / Schneider / ABB/ Legrand/ Siemens
4. HT Switchgear Panel	Voltamp Baroda / Schneider / ABB / Siemens
5. Transformer	Voltamp Baroda/ Ames Impex/ABB/Siemens
6. MCB	L&T / Schneider / ABB/ Legrand/ Siemens
7. Metering Instrument	L&T/ Schneider/ Secure
8. Relay	C&S/ Schneider/ Siemens
9. Timers	EAPL / L&T / PLA / BCH
10. Indicating Lamp	L&T/Siemens/ Technic
11. Control Terminals	CONNECTWELL / ELMEX or Equivalent
12. HT Cable	Polycab/ Gloster/ KEI/ Havells/ KEC / Gemscab
13. LT Cable	Polycab/ Gloster/ KEI/ Havells/ KEC / Gemscab
14. CT	Kappa/ AE or Equivalent
15. APFC Relay	L&T / Schneider / SIEMENS
16. Capacitor	L&T/Epcos/Siemens/Enerecon
17. HT Termination KIT	3M / Raycem or Equivalent
18. LT Cable Gland	Dowles / Arun / Commet
19. LT Cable/ Wire Socket	Dowles / Jainson/ Commet
21. NUT BOLT for Panel	10.9 grade of Unbrako / TVS or Equivalent
22. Anchor Fastner	Fischer/ Hilti or Equivalent

The Tenderer shall indicate the specific make of material (any one of the make listed in "list of approved make") proposed to be used by them for the said work against each item failing which the client reserves the right to choose any one make out of the makes of materials. In case the make of any item is not listed in the "List of approved make", the tendered shall propose the make of the said item which they intend to use in the project.

Signature and Seal of the tenderer

Schedule of Quantities & Rates (SOQR)

Item No.	Description of Item	Quantity	Unit	Rate (in Rs)	Amount (in Rs)
1.00	**Supply, Installation, testing & commissioning of 630 KVA COMPACT SUBSTATION (CSS) with HT 3WAY RMU AND 630 KVA TRANSFORMER**	1	Set	₹ 74,53,389.83	₹ 74,53,389.83
	The 33kV Compact Sub-Station shall be consisting of following :-				
	HT SWITCHGEAR				
	RMU (SF6 gas insulated): Sheet steel enclosed, free standing, Indoor mounted, 33kV, 630A, 25kA/1s, 3 WAY Non - extensible RMU, consisting of 1 No. Fixed VCB(Manual charging & closing)+ 2 No. Load Break Switch (Manual operated) , Self Powered Numerical Relay (50/51/51N/50N) make (C&S/Ashida/Eq) , mechanical ON/OFF indicator, trip coil , Touch Proof Boots, Manual Close & Trip PB, live cable indicator, mechanical interlocks, pad locking facility, SF6 gas manometer, 3 nos. CTs with Ratio: 30/1A, 5P10, 2.5 VA for protection Make: ABB/Schneider/Voltamp				
	Relay will be similar to C&S Make CSPR-V5 or Schneider Make DPX V5				
	Protection CT shall be 30/1A 2.5VA 5P10 (Make: Ericon/Kappa)				
	Manometer				
	Cable connection arrangement from outgoing of HT section to primary of Transformer by 33kV XLPE armoured alumminium cable per phase along with heat shrink cable kit.				
	TRANSFORMER				
	630 KVA , 33/0.433KV DYn11 Cast resin dry type transformer with Off circuit tap link having tapping range of +5% to -5% in steps of 2.5%, Z% : 4.5% (IST) with loss @50% loading- 3kW and Transformer losses @ 100%Load- 6kW, Class F insulation , temp rise : 90 DegC , 3nos. Surge arrestors 9kV 10kA polymeric make Cape India, 1 no. Digital WTI with Alarm & Trip contacts Make: Voltamp/Ames Impex				
	1000 AMPS ALUMINIUM BUSBAR (100% FOR PHASES AND 100% FOR NEUTRAL) WITH PVC HEAT SHRINKABLE SLEEVE FROM TRANSFORMER TO ACB				
	INCOMER FROM TRANSFORMER				
	1000Amps 433V 50KA 4P Fixed LT ACB (MF Type) with Microprocessor based releash as incomer. Make L&T, ABB, Schneider				
	R,Y,B,On,Off,Trip Indications (Make: Technik/Essien deinki)				
	MFM of class 1 accuracy (Make: Rishabh/Conserve)				
	OUTDOOR ENCLOSURE				
	Outdoor type enclosure having modular construction of 1.6/2mm GI sheet steel. The enclosure shall have IP54 degree of protection for HT & LT compartment & IP23 degree of protection for Transformer compartment. The enclosure exterior shall be painted with epoxy based powder coated paint (colour RAL 7032). The bottom base frame shall be welded and black painted Channel structure with lifting arrangement for the completely assembled CSS. Each compartment is provided with door and pad locking arrangement. The Compartment illumination lamp with door operated switch shall be provided for each compartment. The Transformer compartment is provided with Limit switch to trip the HT Switchgear, in case the Transformer compartment door is inadvertently opened in LIVE condition				
	INTERCONNECTION AND EARTHING				
	Interconnection Between HT switchgear & Transformer using 1Cx3x95Sq.mm XLPE Single core cable unarmoured Aluminium cable**(Make: KEI/Polycab)** & Interconnection between Transformer & LT switchgear using AL. Busbars. Internal earthing connections including transformer neutral by using 50 x 6mm GI strips.				
1.01	**Supply, Installation, testing & commissioning of 630KVA COMPACT SUBSTATION (CSS) with HT ICOG AND 630 KVA TRANSFORMER**	1	Set	₹ 68,89,830.51	₹ 68,89,830.51
	The 33kV Compact Sub-Station shall be consisting of following :-				

	HT SWITCHGEAR				
	ICOG (SF6 gas insulated): Sheet steel enclosed, free standing, Indoor mounted, 33kV, 630A, 25kA/1s, 1 WAY (ICOG) Non - extensible Panel, consisting of 1 No. Fixed VCB(Manual charging & closing) Self Powered Numerical Relay (50/51/51N/50N) make (C&S/Ashida/Eq) , mechanical ON/OFF indicator, trip coil , Touch Proof Boots, Manual Close & Trip PB, live cable indicator, mechanical interlocks, pad locking facility, SF6 gas manometer, 3 nos. CTs with Ratio:30/1A, 5P10, 2.5 VA for protection Make: ABB, Schneider/Voltamp				
	Relay will be similar to C&S Make CSPR-V5 or Schneider Make DPX V5				
	Protection CT shall be 30/1A 2.5VA 5P10 (Make: Ericon/Kappa)				
	Manometer				
	Cable connection arrangement from outgoing of HT section to primary of Transformer by 33kV XLPE armoured alumminium cable per phase along with heat shrink cable kit.				
	TRANSFORMER				
	630 KVA , 33/0.433KV DYn11 Cast resin dry type transformer with Off circuit tap link having tapping range of +5% to -5% in steps of 2.5%, Z% : 4.5% (IST) with loss @50% loading- 3kW and Transformer losses @ 100%Load- 6kW, Class F insulation , temp rise : 90 DegC , 3nos. Surge arrestors 9kV 10kA polymeric make Cape India, 1 no. Digital WTI with Alarm & Trip contacts Make: Voltamp/Ames Impex				
	1000 AMPS ALUMINIUM BUSBAR (100% FOR PHASES AND 100% FOR NEUTRAL) WITH PVC HEAT SHRINKABLE SLEEVE FROM TRANSFORMER TO ACB				
	INCOMER FROM TRANSFORMER				
	1000Amps 433V 50KA 4P Fixed LT ACB (MF Type) with Microprocessor based releash as incomer. Make L&T, ABB, Schneider				
	R,Y,B,On,Off,Trip Indications (Make: Technik/Essien deinki)				
	MFM of class 1 accuracy (Make: Rishabh/Conserve)				
	OUTDOOR ENCLOSURE				
	Outdoor type enclosure having modular construction of 1.6/2mm GI sheet steel. The enclosure shall have IP54 degree of protection for HT & LT compartment & IP23 degree of protection for Transformer compartment. The enclosure exterior shall be painted with epoxy based powder coated paint (colour RAL 7032). The bottom base frame shall be welded and black painted Channel structure with lifting arrangement for the completely assembled CSS. Each compartment is provided with door and pad locking arrangement. The Compartment illumination lamp with door operated switch shall be provided for each compartment. The Transformer compartment is provided with Limit switch to trip the HT Switchgear, in case the Transformer compartment door is inadvertently opened in LIVE condition				
	INTERCONNECTION AND EARTHING				
	Interconnection Between HT switchgear & Transformer using 1Cx3x95Sq.mm XLPE Single core cable unarmoured Aluminium cable**(Make: KEI/Polycab)** & Interconnection between Transformer & LT switchgear using AL. Busbars. Internal earthing connections including transformer neutral by using 50 x 6mm GI strips.				
1.02	**Main LT Panel**				
	Design, Manufacturing, Supply, Installation, Testing & Commissioning of LT Panel, cubicle type, made out of 2mm thick CRCA sheet,totally enclosed, IP 54,floor mounting, indoor, compartmentalised, suitable for operation on 3 phase and neutral, 415 V, 50Hz AC system with busbars including internal wiring with suitable size wires/cable, interconnection, duly powder coated painting etc. including supply & installation of following switchgears, metering & protection instruments, earthings and following accessories in the LT Panel as per SLD & specifications.(All MCCB will equiped with Extended Rotary Handle & ON, OFF TRIP Indicator) (Switchgear component Make: L&T, Schneider, ABB, Simence)	1	Set	₹ 20,43,220.34	**₹ 20,43,220.34**

	INCOMER				
	1 No.800A A,4P, ACB (50KA) EDO type and 2 No.1000A A,4P, ACB (50KA) EDO typeThermal Magnetic Based with RYB, On, Off, Trip, Spring Charged, Trip Circuit Healthy Indication with interlocking arrangement				
	BUSBARS				
	2 Set of 415V, 1600A,3Ø,4W,50Hz,36KA FOR 1 SEC. busbars of high conductivity electrolytic quality Aluminium Busbar with 1 no 1000A A,4P, ACB (50KA) EDO typeThermal Magnetic Based with RYB, On, Off, Trip, Spring Charged, Trip Circuit Healthy Indication as bus coupler				
	INSTRUMENTS				
	3 No. Multifunction meter of class 1.0 with CT secondary 5 Amp, 96x96 Flush Mounted, 3 nos Digital Ammeter & 3 Nos Digital Voltmeter with LED Display with suitable size CT. Each incoming and Outging feeder will be consisting of Extended Rotary Handle, R,Y,B, On, OFF, Trip indication lamp and 3phase Multifunction meter with suitable size CT				
	OUTGOING BUSBAR-1				
	3 No. 250A Amp 4P MCCB Thermal Magnetic Type. (Ics= 36 KA)				
	1 No. 320-400A Amp 4P MCCB Thermal Magnetic Type. (Ics= 36 KA)				
	2 No. 160A Amp 4P MCCB Thermal Magnetic Type. (Ics= 36 KA)				
	2 No. 100A Amp 4P MCCB Thermal Magnetic Type. (Ics= 36 KA)				
	1 No. 63A Amp 4P MCCB Thermal Magnetic Type. (Ics= 36 KA)				
	2 No. 50A Amp 4P MCCB Thermal Magnetic Type. (Ics= 36 KA)				
	1 No. 40A Amp 4P MCCB Thermal Magnetic Type. (Ics= 36 KA)				
	1 No. 25A Amp 4P MCCB Thermal Magnetic Type. (Ics= 36 KA)				
	2 No. 20A Amp 4P MCCB Thermal Magnetic Type. (Ics= 36 KA)				
	OUTGOING BUSBAR-2				
	2 No. 500A Amp 4P MCCB Thermal Magnetic Type. (Ics= 36 KA)				
	2 No. 400A Amp 4P MCCB Thermal Magnetic Type. (Ics= 36 KA)				
	2 No. 100A Amp 4P MCCB Thermal Magnetic Type. (Ics= 36 KA)				
	1 No. 80A Amp 4P MCCB Thermal Magnetic Type. (Ics= 36 KA)				
	1 No. 50A Amp 4P MCCB Thermal Magnetic Type. (Ics= 36 KA)				
	1 No. 40A Amp 4P MCCB Thermal Magnetic Type. (Ics= 36 KA)				
	2 No. 32A Amp 4P MCCB Thermal Magnetic Type. (Ics= 36 KA)				
	1 No. 20A Amp 4P MCCB Thermal Magnetic Type. (Ics= 36 KA)				
1.03	**DG Set**				
	Supply installation Testing Commissioning of Following size DG Set as per technical specification compling latest CPCB-II & ARAI Norms with AMF Panel, Acoustic encloser etc. (Make: United Machinary, Ashoke Leyland, Kirloskar)	1	Set	₹ 24,94,067.80	**₹ 24,94,067.80**
	320 KVA, 415 Volt, 3phase, 50Hz				
	Engine Rating : 320KVA				
	Make: MOTEURS BAUDOUIN /Ashok Leyland/ Volvo Eicher/ perkins/ greives /Kirloskar				
	Stroke : 4				
	No. of Cylinders : 6				
	RPM : 1500				
	Cyl. Configuration : Vertical Inline				
	Direction of Rotation : Counter Clockwise viewed from flywheel end				
	Method of cooling : Coolant cooled				
	Type of Governor : Electronic				
	Starting system : 24V Electric Start				
	Overload capacity : 10% for 1hr. in every 12hrs. Running				
	Duty: Prime Power				
	Applicable Standards : ISO 3046,BS 5514				
	ALTERNATOR				
	Make : Kirloskar/ Crompton Greaves/ Leroy Somer/ Stamford				
	Rating: 320 KVA				
	KW : 256 KW				
	Type : Brushless				
	Excitation : Self excited, self regulated (AVR)				
	Enclosure protection : IP 23				
	Rating : Continuous				
	Rated current : 445.19Amps.				
	Rated Voltage : 415V				
	No. of Phases : 3Ph.				
	Frequency : 50Hz				
	Power factor : 0.8pf.				
	Class of Insulation : H				
	Voltage Regulation : +/- 1%				
	Applicable standards : IS 4722/BS 5000				
	Control panel				

	The AMF Control panel shall be made of CRCA Sheet, floor mounted, indoor type, dust and vermin proof and powder coated and suitable for 415 V, 3Phase, 50Hz system. The panel shall consist of the following features:				
	Aluminium Bus Bar.				
	Digital type Multi function Meter for measuring Volts/Amps/Frequency /Power Factor.				
	Microprocessor based AMF Controller with display features for Engine & Alternator parameters.				
	Current Transformers of suitable ratio.				
	MCB for Control protection.				
	Indicating Lamps for DG ON/Load ON/Mains ON.				
	1No. 500A,4Pole, MCCB				
	Suitably rated Auxiliary Contactors.				
	Earth Studs				
	Push Button for Engine Start/Stop, Load ON/Off.				
	Selector Switch for Auto/Manual				
	Battery Charger				
	Hooter				
1.04	**DG Set**				
	Supply installation Testing Commissioning of Following size DG Set as per technical specification compling latest CPCB-II & ARAI Norms with AMF Panel, Acoustic encloser etc. (Make: United Machinary, Ashoke Leyland, Kirloskar)	1	Set	₹ 11,20,338.98	**₹ 11,20,338.98**
	100 KVA, 415 Volt, 3phase, 50Hz				
	Engine Rating : 100KVA				
	Make: MOTEURS BAUDOUIN /Ashok Leyland/ Volvo Eicher/ perkins/ greives /Kirloskar				
	Stroke : 4				
	No. of Cylinders : 4				
	RPM : 1500				
	Cyl. Configuration : Vertical Inline				
	Direction of Rotation : Counter Clockwise viewed from flywheel end				
	Method of cooling : Coolant cooled				
	Type of Governor : Electronic				
	Starting system : 12V Electric Start				
	Overload capacity : 10% for 1hr. in every 12hrs. Running				
	Duty: Prime Power				
	Applicable Standards : ISO 3046,BS 5514				
	ALTERNATOR				
	Make : Kirloskar/ Crompton Greaves/ Leroy Somer/ Stamford				
	Rating: 100 KVA				
	KW : 80 KW				
	Type : Brushless				
	Excitation : Self excited, self regulated (AVR)				
	Enclosure protection : IP 23				
	Rating : Continuous				
	Rated current : 139.12Amps.				
	Rated Voltage : 415V				
	No. of Phases : 3Ph.				
	Frequency : 50Hz				
	Power factor : 0.8pf.				
	Class of Insulation : H				
	Voltage Regulation : +/- 1%				
	Applicable standards : IS 4722/BS 5000				
	Control panel				
	The AMF Control panel shall be made of CRCA Sheet, floor mounted, indoor type, dust and vermin proof and powder coated and suitable for 415 V, 3Phase, 50Hz system. The panel shall consist of the following features:				
	Aluminium Bus Bar.				
	Digital type Multi function Meter for measuring Volts/Amps/Frequency /Power Factor.				
	Microprocessor based AMF Controller with display features for Engine & Alternator parameters.				
	Current Transformers of suitable ratio.				
	MCB for Control protection.				
	Indicating Lamps for DG ON/Load ON/Mains ON.				

	1No. 160A,4Pole, MCCB				
	Suitably rated Auxiliary Contactors.				
	Earth Studs				
	Push Button for Engine Start/Stop, Load ON/Off.				
	Selector Switch for Auto/Manual				
	Battery Charger				
	Hooter				
1.05	**150 KVAR APFC Panel**				
	Supply, installation, testing & commissioning 150kVAR, 3Phase, Automatic Power Factor Correction(APFC) Panel, factory made branded product, floor/wall mounting type with all std. accessories and comprising of followings : **i) Incoming -** 1 No. of 250 TP MCCB having O/L & short circuit protection (36KA Min.) with neutral link and shall include the followings :- a) 1 Nos. of 5 KVAR capacitors (Heavy Duty) each having 25A TP MCCB (25KA) and 0-30A Ammeter with 30/5A CTs & selector switch. With 7% Detuned Filter b) 2 Nos. of 10 KVAR capacitors (Heavy Duty) each having 32A TP MCCB (25KA) and 0-30A Ammeter with 30/5A CTs & selector switch. With 7% Detuned Filter c) 3 Nos. of 25 KVAR capacitors (Heavy Duty) each having 63A TP MCCB (35KA) and 0-60A Ammeter with 60/5 A CTs & selector switch. With 7% Detuned Filter d) 1 Nos. of 50 KVAR capacitors (Heavy Duty) each having 125A TP MCCB (35KA) and 0-60A Ammeter with 120/5 A CTs & selector switch. With 7% Detuned Filter e) 1 No. Automatic panel complete with 8 steps (Min.) electronic power factor correction relays with digitial built-in P.F. Meter, indicating lamps, etc. Complete APFC Panel as specified above. L&T / SIEMENS / ENERECON /	1	Set	₹ 4,72,033.90	**₹ 4,72,033.90**
1.06	**250 KVAR APFC Panel**				
	Supply, installation, testing & commissioning 250kVAR, 3Phase, Automatic Power Factor Correction(APFC) Panel, factory made branded product, floor/wall mounting type with all std. accessories and comprising of followings : **i) Incoming -** 1 No. of 400 TP MCCB having O/L & short circuit protection (36KA Min.) with neutral link and shall include the followings :- a) 1 Nos. of 5 KVAR capacitors(Heavy Duty) each having 25A TP MCCB (25KA) and 0-30A Ammeter with 30/5A CTs & selector switch. With 7% Detuned Filter b) 2 Nos. of 10 KVAR capacitors(Heavy Duty) each having 32A TP MCCB (25KA) and 0-30A Ammeter with 30/5A CTs & selector switch. With 7% Detuned Filter c) 3 Nos. of 25 KVAR capacitors(Heavy Duty) each having 63A TP MCCB (35KA) and 0-60A Ammeter with 60/5 A CTs & selector switch. With 7% Detuned Filter d) 3 Nos. of 50 KVAR capacitors (Heavy Duty) each having 125A TP MCCB (35KA) and 0-60A Ammeter with 120/5 A CTs & selector switch. With 7% Detuned Filter e) 1 No. Automatic panel complete with 12 steps (Min.) electronic power factor correction relays with digitial built-in P.F. Meter, indicating lamps, etc. Complete APFC Panel as specified above. L&T / SIEMENS / ENERECON	1	Set	₹ 7,01,694.92	**₹ 7,01,694.92**
1.07	**DG Synchronizing Panel**				
	Design, Manufacturing, Supply, Installation, Testing & Commissioning of LT Panel, cubicle type, made out of 2mm thick CRCA sheet,totally enclosed, IP 54,floor mounting, indoor, compartmentalised, suitable for operation on 3 phase and neutral, 415 V, 50Hz AC system with busbars including internal wiring with suitable size wires/cable, interconnection, duly powder coated painting etc. including supply & installation of following switchgears, metering & protection instruments, earthings and following accessories in the LT Panel as per SLD & specifications.(All MCCB will equiped with Extended Rotary Handle & ON, OFF TRIP Indicator) (Switchgear component Make: L&T, Schneider, ABB, Simence)	1	Set	₹ 5,84,745.76	**₹ 5,84,745.76**
	INCOMER				
	1 No.500A 4P, Power Contactor AC3 Duty and 1 no 160 Amp 4P Power Contactor AC3 Duty				
	BUSBARS				
	1 Set of 415V, 800A,3Ø,4W,50Hz,36KA FOR 1 SEC. busbars of high conductivity electrolytic quality Aluminium Busbar				
	INSTRUMENTS				

	3 No. Multifunction meter of class 1.0 with CT secondary 5 Amp, 96x96 Flush Mounted, 3 nos Digital Ammeter & 3 Nos Digital Voltmeter with LED Display with suitable size CT. Synchronizing Relay Make Woodward. PLC for Load Sharing arrangement(make of PLC Siemens or GIC)				
	OUTGOING				
	1 No. 800A 4P ACB Electricaly operated Drawout type with microprocessor based releash. (Ics= 50 KA)				
2.00	**CABLES/WIRES**				
2.01	**HT Cable Supply**				
	Supplying of 33 kV power cable of following size, Stranded,Standard compacted circular Aluminium (H4 Grade) Conductor, shielded with black extruded semi-conducting compound XLPE insulated, core shielded with black extruded semi-conducting compound, black semi-conducting tape and a copper tape, coloured strips having Red, Yellow & Blue for core identification, shielded cores laid up with fillers, binder taped and Black extruded PVC (Type ST-2) inner sheath, single layer of round galvanised steel wire armoured and black extruded PVC (Type ST-2), overall sheathed, conforming generally to IS:7098(PartII). (Make: Polycab, GLoster, Crystal)				
	150 sq. mm 33KV Unearth Cable	100	Meter	₹ 3,371.19	**₹ 3,37,118.64**
2.02	**HT Cable laying through Underground Trench**				
	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 33 KV grade of following size in the existing masonry open duct as required. Above 120 sq. mm and upto 400 sq. mm	100	Meter	₹ 101.69	**₹ 10,169.49**
2.03	**S/F HV cable termination**				
	supplying and making indoor cable end termination with heat shrinkable jointing kit complete with all accessories including lugs suitable for following size of 3 core, XLPE aluminium conductor cable of 33 KV grade as required :				
	For 3 Core				
	upto 240 sq. mm.	6	Set.	₹ 28,996.61	**₹ 1,73,979.66**
2.05	**L.T CABLE SUPPLY:**				
	Supplying of following size cross -linke polyethylene (XLPE) insulated, PVC outer sheathed armored cable with galvanized round steel wire or steel strip, with Al./Cu. conductor suitable for rated voltage of 1.1 kV grade & conforming to IS:7098 (Part-I) 1988 amended up to date.(Compulsory ISI marked) as per technical specification. (Make: Polycab, Mescab, Crystal, Gloster)				
	4 Core 10 Sq.mm (Al/A)	140	RM	₹ 232.20	**₹ 32,508.47**
	3.5 Core 25 Sq.mm (Al/A)	263	RM	₹ 320.34	**₹ 84,249.15**
	3.5 Core 70 Sq.mm (Al/A)	66	RM	₹ 717.80	**₹ 47,374.58**
	3.5 Core 120 Sq.mm (Al/A)	200	RM	₹ 1,100.85	**₹ 2,20,169.49**
	3.5 Core 240 Sq.mm (Al/A)	1480	RM	₹ 2,100.00	**₹ 31,08,000.00**
	3.5 Core 300 Sq.mm (Al/A)	250	RM	₹ 2,566.10	**₹ 6,41,525.42**
2.06	**Laying of LV Cable through RCC/Hume/GI Pipe**				
	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size in the existing RCC/ HUME/ METAL pipe as required.				
a	Above 185 sq. mm and upto 400 sq. mm	980	RM	₹ 113.56	**₹ 1,11,288.14**
2.07	**Laying of LV Cable through Cable Tray**				
	Laying and fixing of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size on cable tray as required.				
a	Upto 35 sq. mm (clamped with 1mm thick saddle)	393	RM	₹ 38.14	**₹ 14,987.29**
b	Above 35 sq. mm and upto 95 sq. mm (clamped with 25x3mm MS flat clamp)	56	RM	₹ 77.97	**₹ 4,366.10**
c	Above 95 sq. mm and upto 185 sq. mm (clamped with 25/40x3mm MS flat clamp)	190	RM	₹ 97.46	**₹ 18,516.95**
d	Above 185 sq. mm and upto 400 sq. mm (clamped with 40x3mm MS flat clamp)	740	RM	₹ 156.78	**₹ 1,16,016.95**
2.08	**Laying of LV Cable saddled on Wall**				
	Laying and fixing of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size on wall surface as required.				
a	Upto 35 sq. mm (clamped with 1mm thick saddle)	10	RM	₹ 46.61	**₹ 466.10**
b	Above 35 sq. mm and upto 95 sq. mm (clamped with 25x3mm MS flat clamp)	10	RM	₹ 110.17	**₹ 1,101.69**
c	Above 95 sq. mm and upto 185 sq. mm (clamped with 25/40x3mm MS flat clamp)	10	RM	₹ 129.66	**₹ 1,296.61**
d	Above 185 sq. mm and upto 400 sq. mm (clamped with 40x3mm MS flat clamp)	10	RM	₹ 191.53	**₹ 1,915.25**
2.09	**S/F LV/MV cable termination with Brass Compression Glands:**				

	Supplying and making end termination with brass compression gland and aluminium lugs for following size of PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 KV grade as required.				
	For 4 Core				
	upto 10 sq. mm.	8	Set.	₹ 227.97	**₹ 1,823.73**
	For 3.5Core				
	upto 25 Sq.mm	14	Set.	₹ 265.25	**₹ 3,713.56**
	upto 70 Sq.mm	4	Set.	₹ 396.61	**₹ 1,586.44**
	upto 120 sqmm	8	Set.	₹ 519.49	**₹ 4,155.93**
	upto 240 sqmm	40	Set.	₹ 870.34	**₹ 34,813.56**
	upto 300 sqmm	8	Set.	₹ 1,012.71	**₹ 8,101.69**
3.00	**PERFORATED CABLE TRAY:**				
	Supplying and installing following size of perforated Hot Dipped Galvanised Iron cable tray (Galvanisation thickness not less than 50 microns) with perforation not more than 17.5%, in convenient sections, joined with connectors, suspended from the ceiling with G.I. suspenders including G.I. bolts & nuts, etc. as required.				
	300 mm width X 50 mm depth X 1.6 mm thickness	70	Meter	₹ 816.10	**₹ 57,127.12**
3.01	**Ladder type CABLE TRAY:**				
	Supply & Fixing of ladder type cable tray of 500 made of 50x50x6 MS angle side wall of following size	45	Meter	₹ 1,108.47	**₹ 49,881.36**
4.00	**Supply & Laying of HDPE Pipe**				
	Supplying and laying of following size DWC HDPE pipe ISI markedalong with all accessories like socket, bend, couplers etc.conforming to IS 14930, Part II complete with fitting and cutting,jointing etc.direct in ground (75 cm below ground level) includingexcavation and refilling the trench but excluding sand cushioningand protective covering etc., complete as required.				
a	200 mm dia (OD-200 mm & ID-175 mm nominal)	200	Meter	₹ 566.10	**₹ 1,13,220.34**
b	160 mm dia (OD-160 mm & ID-135 mm nominal)	20	Meter	₹ 407.63	**₹ 8,152.54**
5.00	**EARTHING:**				
5.01	**Earthing Installation with pipe electrode**				
	Earthing with G.I. earth pipe 4.5 metre long, 40 mm dia including accessories, and providing masonry enclosure with cover plate having locking arrangement and watering pipe etc. with charcoal/ coke and salt as required. **[4 nos for CSS-1, 4 Nos for CSS-2, 4 Nos for DG1, 4 Nos for DG2, 2 nos For HT METER Room, 2 nos for LT Panel, 2 nos for each Lift total 8 Nos]**	28	Set	₹ 5,809.32	**₹ 1,62,661.02**
5.02	**Equipment earthing:**				
	Connecting the equipments body withSupplying and laying 25 mm X 5 mm G.I strip at 0.50 metre below ground as strip earth electrode, including connection/ terminating with G.I. nut, bolt, spring, washer etc. as required. (Jointing shall be done by overlapping and with 2 sets of G.I. nut bolt & spring washer spaced at 50mm) (Two runs for each strip)	200	Mtr.	₹ 122.03	**₹ 24,406.78**
5.03	Providing and fixing earth bus of 50 mm X 5 mm copper strip on surface for connections etc. as required.	20	Mtr.	₹ 1,790.68	**₹ 35,813.56**
5.04	Providing and laying earth connection from earth electrode with 6 SWG dia G.I. Wire in 15 mm dia G.I. pipe from earth electrode including connection with G.I. thimble excavation and re-filling as required.	10	Mtr.	₹ 243.22	**₹ 2,432.20**
5.05	Providing and fixing 6 SWG dia G.I. wire on surface or in recess for loop earthing as required.	35	Mtr.	₹ 59.32	**₹ 2,076.27**
6.00	**SAFETY ITEMS:**				
	Supply and Fixing of following safety items in the Substation:				
a	Supply & Fixing 33 KV, statutory caution boards made of mild steel of 250 mm x 200 mm and at least 2 mm thick and vitreous enamelled, white on both sides and with inscription in signal red colour on front side as required.	2	Set	₹ 1,042.37	**₹ 2,084.75**
b	Supply & Fixing 433 Volt. Statutory caution boards made of mild steel of 200 mm x 150 mm and at least 2 mm thick and vitreous enamelled, white on both sides and with inscription in signal red colour on front side as required	2	Set	₹ 1,042.37	**₹ 2,084.75**
c	Supply & Fixing shock treatment chart in local and English language duly mounted on wooden frame with glass as required	2	Set	₹ 5,338.98	**₹ 10,677.97**
d	Supply & Fixing of rubber mat 1000 mm wide, min 25mm thick to withstand Di-electric strength of 33KV as per IS:15652	2	Set	₹ 8,177.97	**₹ 16,355.93**
e	Supply & Fixing of rubber mat 1000 mm wide, 6 mm thick to withstand Di-electric strength of 1.1 KV as per IS:15652	2	Set	₹ 7,440.68	**₹ 14,881.36**

f	Supply & Fixing fire bucket (4 nos. bucket in one set) with sand on iron bracket as approved by the Directorate of Electricity	2	Set	₹ 5,542.37	**₹ 11,084.75**
g	Supply & Fixing of fire extinguisher of approved make suitable for electric fire complete 4.5 Kg. CO2 including of fixing material	2	Set	₹ 40,883.05	**₹ 81,766.10**
h	Supply & Fixing of foam filled fire extinguisher for electric fire of approved make including of fixing material	2	Set	₹ 12,033.90	**₹ 24,067.80**
i	Supply of first aid box complete with all items as required	2	Set	₹ 2,033.90	**₹ 4,067.80**
j	Supply of Hand-gloves as per specification and IS 477-1991	2	Set	₹ 1,525.42	**₹ 3,050.85**
7.00	**Lift Distribution Work**				
7.01	**S/F prewired VTP&N MCB DB**				
	Supplying and fixing of following ways surface/ recess mounting, vertical type, 415 V, TPN MCB distribution board of sheet steel, dust protected, duly powder painted, inclusive of 200 A, tinned copper bus bar, common neutral link, earth bar, din bar for mounting MCBs (but without MCBs and incomer) as required. (Note : Vertical type MCB TPDB is normally used where 3 phase outlets are required.)				
	6 way (4 + 18), Double door (Make: L&T/Schneider/Legrand/Siemens)	1	Set	₹ 9,326.27	**₹ 9,326.27**
7.02	**S/F MCCB in existing DB**				
	Providing and fixing following rating and breaking capacity and pole MCCB with thermomagnetic release and terminal spreaders in existing cubicle panel board including drilling holes in cubicle panel, making connections, etc. as required				
	100 A, 30kA, FPMCCB	1	Set	₹ 6,544.92	**₹ 6,544.92**
7.03	**S/F 'C' series, MCB:**				
	Supplying and fixing 5 A to 32 A rating, 240/415 V, 10 kA, "C" curve, miniature circuit breaker suitable for inductive load of following poles in the existing MCB DB complete with connections, testing and commissioning etc. as required.				
	Triple pole	6	Set	₹ 853.39	**₹ 5,120.34**
	Double pole	12	Each	₹ 555.93	**₹ 6,671.19**
	Triple pole and neutral 5-32 Amp	4	Each	₹ 1,040.68	**₹ 4,162.71**
7.04	**S/F 'C' series, RCBO:**				
	Supplying and fixing 6-32 A rating, 415 V, 30/100/300mA as per lift vendor specification of following poles in the existing MCB DB complete with connections, testing and commissioning etc. as required.				
	Four Pole	4	Set	₹ 3,820.34	**₹ 15,281.36**
7.05	**Main & Submains Cable:**				
	Supplying of following sizes of 1.1kv grade multicore aluminium/ Copper conductor XLPE insulated and PVC sheathed armoured/ unarmoured Heavy duty Electric cable (as per IS : 7098:1988 with upto date amendments) complete as requried as per specifications.				
	4 core, 10 Sq.mm. (Cu) Flexible	160	Meter	₹ 618.64	**₹ 98,983.05**
	4 core,6 Sq.mm. (Cu)(A)	100	Meter	₹ 588.98	**₹ 58,898.31**
	2 core,2.5 Sq.mm. (Cu)(A)	100	Meter	₹ 181.36	**₹ 18,135.59**
7.06	**S/F LV/MV cable termination with Brass Compression Gland and Copper Lug**				
	Supplying and making end termination with brass compression gland and Copper lugs for following size of PVC insulated and PVC sheathed / XLPE Copper conductor cable of 1.1 kV grade as required.				
	4 X 10 sq. mm	8	Set.	₹ 227.97	**₹ 1,823.73**
	4 X 6 sq. mm [upto 4x10sqmm]	8	Set.	₹ 227.97	**₹ 1,823.73**
	2X 2.5 sq. mm [upto 2x6sqmm]	8	Set.	₹ 203.39	**₹ 1,627.12**
7.07	**Group wiring for lift shaft:**				
	Group wiring from switchboard for light/fan by supplying and laying of 1.1kV grade 2-2.5 sq.mm + 1-2.5 sq.mm (for earthing) PVC insulated, FR stranded copper wire through concealed PVC conduit in surface or recessed with JB as required, with all necessary accessories (around 3-7 points approx.) including 7 nos Bulkhead light with 9 Watt LED Bulb and 5 nos 6/16 Amp Combined Switch Scocket board [For Lift Well]	1	Set	₹ 15,923.73	**₹ 15,923.73**
7.08	**P/F 4mm dia Cu loop earthing wire in surface / recess for Lift**				
	Providing and fixing4mm dia Cu. wire on surface or in recess for loop earthing as required.	200	Meter	₹ 131.36	**₹ 26,271.19**
8.00	**Water Pump Distribution Work**				
8.01	**L.T CABLE SUPPLY:**				
	Supplying of following size cross -linke polyethylene (XLPE) insulated, PVC outer sheathed armored cable with galvanized round steel wire or steel strip, with Al./Cu. conductor suitable for rated voltage of 1.1 kV grade & conforming to IS:7098 (Part-I) 1988 amended up to date.(Compulsory ISI marked) as per technical specification. (Make: Polycab, Mescab, Crystal, Gloster)				

	3 Core 4 Sq.mm (Cu/A)	200	RM	₹ 330.51	**₹ 66,101.69**
	3 Core 6 Sq.mm (Cu/A)	140	RM	₹ 456.78	**₹ 63,949.15**
8.02	**Laying of LV Cable through RCC/Hume/GI Pipe**				
	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size in the existing RCC/ HUME/ METAL pipe as required.				
a	Upto 35 sq. mm	140	RM	₹ 26.27	**₹ 3,677.97**
8.03	**Laying of LV Cable through Cable Tray**				
	Laying and fixing of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size on cable tray as required.				
a	Upto 35 sq. mm (clamped with 1mm thick saddle)	140	RM	₹ 27.97	**₹ 3,915.25**
8.04	**Laying of LV Cable saddled on Wall**				
	Laying and fixing of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size on wall surface as required.				
a	Upto 35 sq. mm (clamped with 1mm thick saddle)	60	RM	₹ 33.05	**₹ 1,983.05**
8.05	**S/F LV/MV cable termination with Brass Compression Glands:**				
	Supplying and making end termination with brass compression gland and Copper lugs for following size of PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 KV grade as required.				
	For 3Core				
	upto 6 Sq.mm [upto 3Cx6 sqmm]	34	Set.	₹ 217.80	**₹ 7,405.08**
8.06	**P/F 6 SWG GI loop earthing wire in surface / recess for Pumps**				
	Providing and fixing 6 SWG dia GI. wire on surface or in recess for loop earthing as required.	100	Meter	₹ 59.32	**₹ 5,932.20**
9.00	**Fire Pump Distribution Work**				
9.01	**LT CABLE SUPPLY:**				
	Supplying of following size cross -linke polyethylene (XLPE) insulated, PVC outer sheathed armored cable with galvanized round steel wire or steel strip, with Al./Cu. conductor suitable for rated voltage of 1.1 kV grade & conforming to IS:7098 (Part-I) 1988 amended up to date.(Compulsory ISI marked) as per technical specification. (Make: Polycab, Mescab, Crystal, Gloster)				
	3 Core 35 Sq.mm (Cu/A)	80	RM	₹ 2,313.56	**₹ 1,85,084.75**
	3 Core 6 Sq.mm (Cu/A)	80	RM	₹ 456.78	**₹ 36,542.37**
9.02	**Laying of LV Cable through RCC/Hume/GI Pipe**				
	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size in the existing RCC/ HUME/ METAL pipe as required.				
a	Upto 35 sq. mm	40	RM	₹ 31.36	**₹ 1,254.24**
9.03	**Laying of LV Cable through Cable Tray**				
	Laying and fixing of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size on cable tray as required.				
a	Upto 35 sq. mm (clamped with 1mm thick saddle)	100	RM	₹ 38.14	**₹ 3,813.56**
9.04	**Laying of LV Cable saddled on Wall**				
	Laying and fixing of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size on wall surface as required.				
a	Upto 35 sq. mm (clamped with 1mm thick saddle)	20	RM	₹ 46.61	**₹ 932.20**
9.05	**S/F LV/MV cable termination with Brass Compression Glands:**				
	Supplying and making end termination with brass compression gland and Copper lugs for following size of PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 KV grade as required.				
	For 3 Core				
	upto 6 sq. mm. [upto 3Cx6sqmm]	10	Set.	₹ 217.80	**₹ 2,177.97**
	upto 35 Sq.mm	8	Set.	₹ 297.46	**₹ 2,379.66**
8.06	**P/F 6 SWG GI loop earthing wire in surface / recess for Pumps**				
	Providing and fixing 6 SWG dia GI. wire on surface or in recess for loop earthing as required.	50	Meter	₹ 59.32	**₹ 2,966.10**
				TOTAL AMOUNT (EXCLUDING GST) =	**₹ 2,80,23,168.64**
				ADD: GST @ 18% =	**₹ 50,44,170.36**
				TOTAL AMOUNT (INCLUDING GST) =	**₹ 3,30,67,339.00**

''ANNEXURE – E''

SUMMARY OF PRICE

Sl. No.	Description	Amount/ Remarks
A	Total Estimated Cost for the Work as per SOQR (including GST)	**Rs. 3,30,67,339/- (including GST)**
B	Percentage above / below / at par on total estimated cost as stated above (A) , applicable uniformly on all items of SOQR	In figure (+) / (-) / at par ……..% In word…….Percent
Total Quoted Price including GST (in figures) =		Rs.
Total Quoted Price including GST (in words) =		Rupees

Note:

1. The bidders shall quote percentage above / below / at par under Sl. B as above, maximum upto two decimal places.

2. If the percentage is not quoted in Sl. B above or 'NIL' is not indicated, it shall be considered 'NIL' for price evaluation / award.

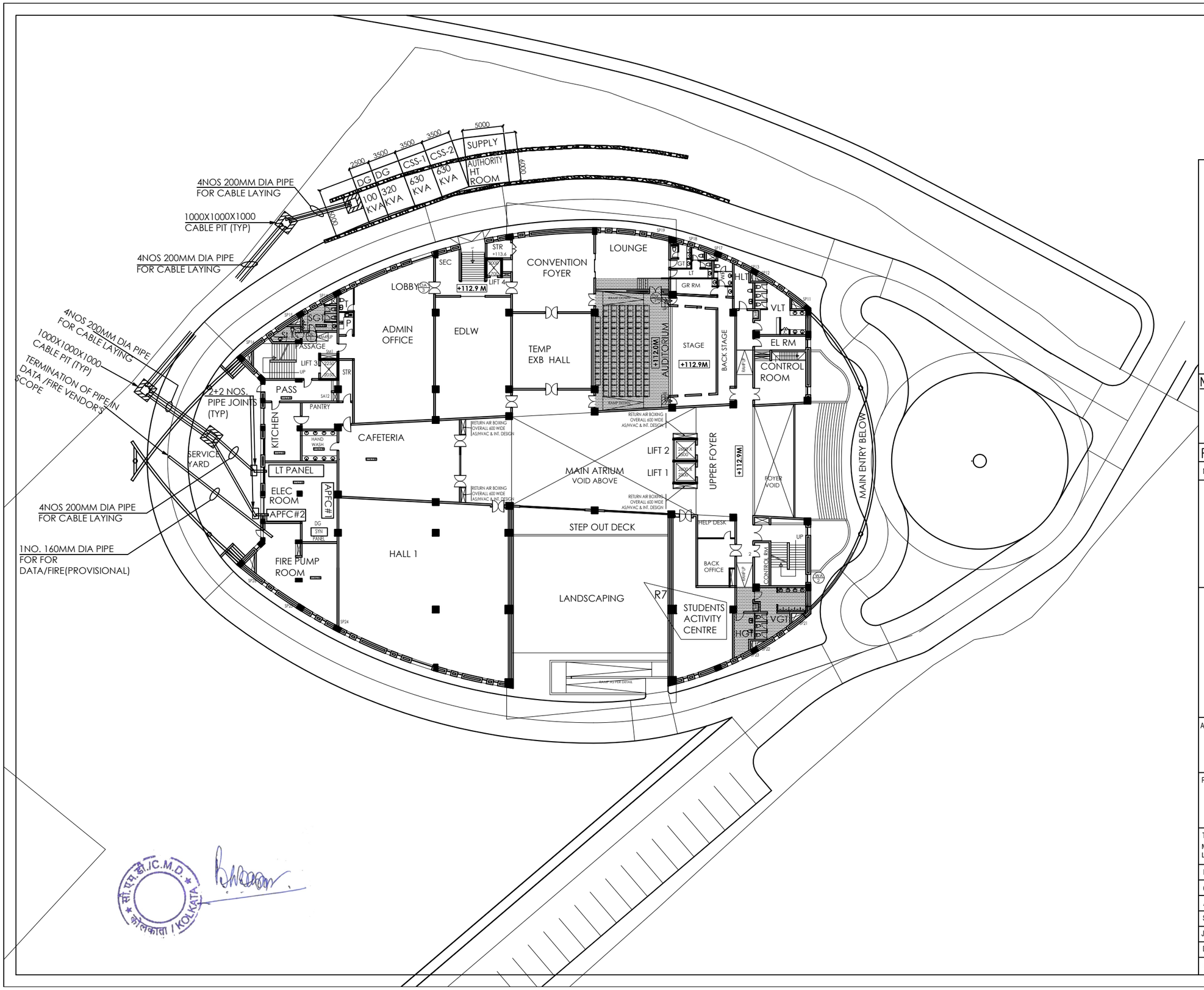
3. Bidders to strike out (+) or (-) above, as applicable.

(Signed & Stamped by the Bidder)

BAR CHART FOR EXTERNAL ELECTRICAL WORKS AT K D MALAVIYA NATIONAL OIL MUSEUM, GUWAHATI, ASSAM

SL. NO.	ACTIVITY	PERIOD (WEEKS)																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Mobilisation at site			■	■	■																			
2	Load Application, Shop Drawings & Approval				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■					
3	Order & Delivery of Transformer and Approval from Supply						■	■	■	■	■	■	■	■	■	■	■	■	■	■					
4	L.T. Panel Order & Manufacture										■	■	■	■	■	■	■								
5	Order & Delivery of D.G.										■	■	■	■	■										
6	Order & Delivery of Cables (H.T. & L.T.)												■	■	■	■	■	■							
7	Preparation of Foundation & Trench											■	■	■	■	■	■								
8	Installation of Panels, D.G. & Transformer																		■	■					
9	Cable Laying & Termination																			■	■				
10	Final Charging including rectification work and Approval																					■	■	■	
11	Site clearance & Handing over																							■	■

Note: This is indicative bar chart only. Successful vendor shall prepare their own bar chart for completion of work within the stipulated time as per tender conditions.



NOTE

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2 WORK TO FIGURED DIMENSIONS ONLY.

3 DIMENSIONS ARE TAKEN TO STRUCTURAL SURFACES OR CENTRE LINES. DO NOT INCLUDE FINISHES UNLESS MENTIONED OTHERWISE

4 ALL DIMENSIONS ARE TO BE CHECKED ON SITE. ANY DISCREPANCIES IN DIMENSIONS BETWEEN THIS DRAWING AND ANY OTHER SHOULD BE BROUGHT TO THE NOTICE OF THE ARCHITECT BEFORE COMMENCING WORK ON SITE.

NOTE

REVISIONS

NO	DATE	PARTICULARS	BY

TENDER PURPOSE ONLY

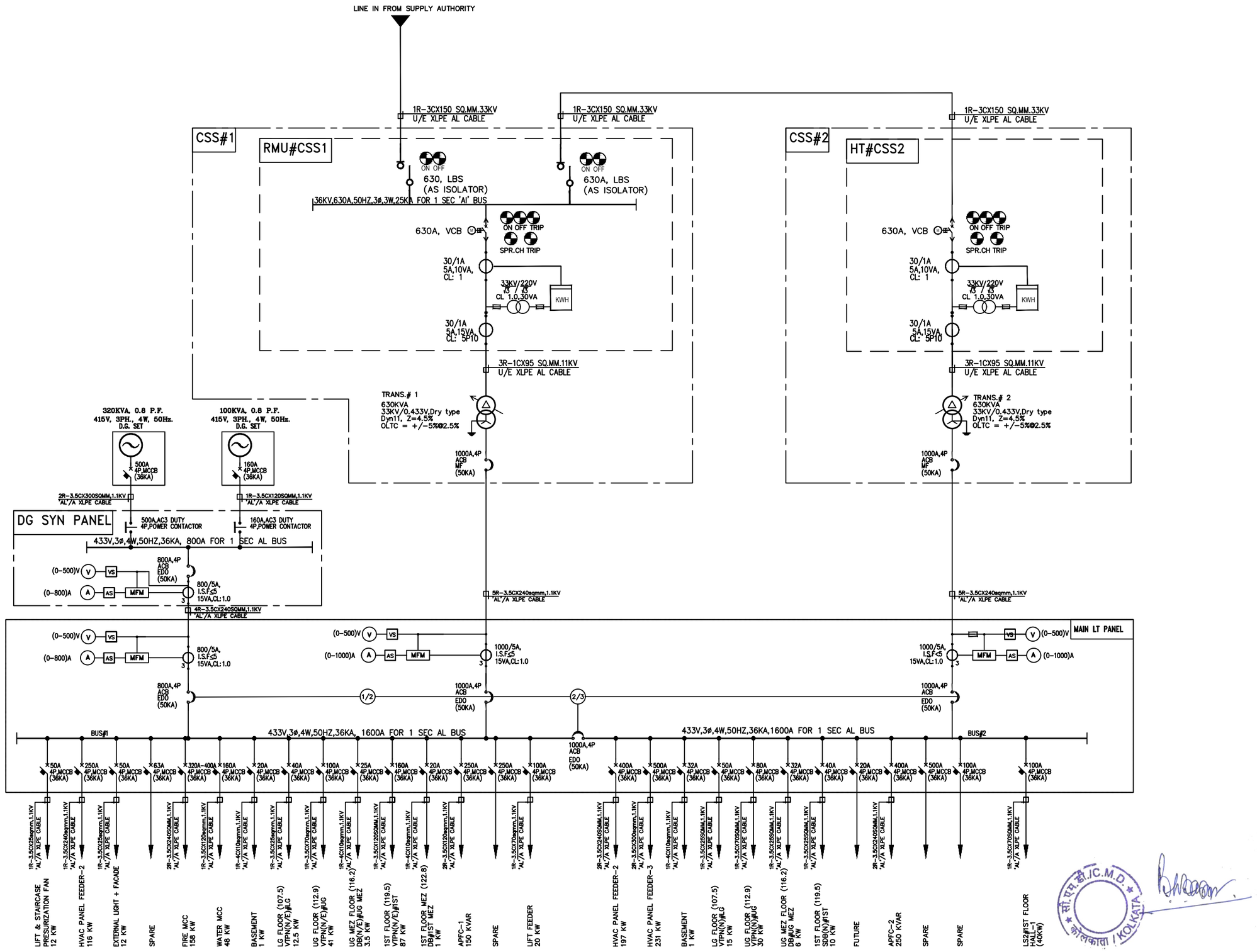
ARCHITECTS
KOTHARI & ASSOCIATES
14B, Camac Street, KOLKATA - 17

PROJECT
K D MALAVIYA NATIONAL OIL MUSEUM AT GUWAHATI : ASSAM

TITLE
MASTER PLAN SHOWING THE SUBSTSTION LOCATION & CABLE ROUTING

DRAWN BY	S . CHAKROBORTY
CHECKED BY	C. BANERJEE
APPROVED BY	C. BANERJEE
SL NO.	DATE 26.09.2022
JOB NO.	SCALE NTS
DRAWING NO.	REVISION NO.
KDMN / OMG/ ELEC. / TD-1	

सी.एम.डी.C.M.D. कोलकाता / KOLKATA



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NOTE

FOR 80AMP FEEDER OF UG FLOOR (+112.9) 70SQMM CABLE HAS BEEN CONSIDERED TO AVOID VARIETY.

REVISIONS

NO	DATE	PARTICULARS	BY

TENDER PURPOSE ONLY

ARCHITECTS
KOTHARI & ASSOCIATES
14B, Camac Street, KOLKATA - 17

PROJECT
K D MALAVIYA NATIONAL OIL MUSEUM AT GUWAHATI : ASSAM

TITLE
ELECTRICAL SINGLE LINE DIAGRAM

DRAWN BY	S CHAKROBORTY
CHECKED BY	C BANERJEE
APPROVED BY	C BANERJEE
SL NO.	DATE 06.09.2022
JOB NO.	SCALE NTS
DRAWING NO.	REVISION NO.
KDMN / OMG/ ELEC. / TD-2	