



LIFE INSURANCE CORPORATION OF INDIA
ENGINEERING DEPARTMENT
NORTH CENTRAL ZONAL OFFICE,
1st FLOOR "JEEVAN VIKAS", 16/275, M.G. MARG,
KANPUR-208 001

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E – TENDER

TENDER NO. -LIC/NCZ/ENGG/T-14/2022-23

NAME OF WORK:- E-Tender for Proposed Modernization works including Interior, Civil, Electrical Installation, Fire Alarm, Air-conditioning, Data cabling, Modular Chairs, Furniture's and Ancillary works at Branch Office building Lakhimpur under Divisional Office – Lucknow

BID-III

CONDITIONS OF CONTRACT, TECHNICAL SPECIFICATIONS AND DRAWING.

This document is a part of FINANCIAL BID (BID-III). The bidders have to digitally sign all pages of documents with their Digital Signature Certificate & upload the same on e-Tender Portal on or before 12.09.2022; 17:00 Hrs.

1. Downloading of Tender document: From **22.08.2022; 17:00 Hrs. to 12.09.2022; 16:59 Hrs.**
2. Pre Bid Discussions: **On 05.09.2022; 16:30 Hrs**
3. Online submission of Bid-I, Bid-II & Bid-III: **On or Before 12.09.2022; 17:00 Hrs.**
4. Physical submission of EMD & Tender processing fee: **On or Before 12.09.2022; 17:00 Hrs.**
5. Opening of Bid-I & Bid-II : **On 13.09.2022 at 15:30 Hrs.**
6. Opening of Bid-III : **Shall be intimated to eligible bidders only at a later date.**
7. Tender Processing Fee: **Rs.2000/- with GST@18% i.e. Rs.2360/-**
8. Earnest Money Deposit: **Rs.42,200/- (Rupees Forty Two Thousand Two Hundred Only)**

CONTENTS

SR. NO	DESCRIPTION	PAGE	
		FROM	TO
1.	Letter to Contractor from Chief Engineer	3	4
2.	Letter from Contractor to Chief Engineer	5	7
3.	Conditions of Contract	8	44
4.	General Instruction to Contractors for work.	45	52
5.	Performa of Articles of Agreement (Annexure – “A”)	53	54
6.	Form of Bank Guarantee in lieu of Security Deposit in Individual Contract (Annexure – “B”)	55	57
7.	Technical Specification for Civil & Interior Work	58	104
8.	Specifications Approved Make & Special Conditions for Modular Chairs & Furniture.	105	113
9.	Technical Specification for Electrical, Fire Alarm & Data Cabling Work	114	159
10.	Appendix to General Instructions to Contractors	160	160
11.	Special Conditions	161	163
12.	Testing of Materials	164	164
13.	General Preambles to Schedule of Quantities & Measurements of Work (Annexure- M)	165	166
14.	List of Principal Makes/ Agencies/ Brands of various materials (Civil, Electrical , Fire Alarm & Data Cabling Works)	167	176
15.	Special Conditions regarding Inspection of Work	177	177
16.	Appendix to the Conditions of Contract	178	180
17.	No Claim Certificate & Appendix To General Instruction To Contractor & Forfeiture of Earnest Money Deposit	181	181
18.	Amendment to Conditions of Contract	182	182
19.	General Conditions of Comprehensive Annual Maintenance Contract for ACs	183	186
20.	Terms & Conditions of Annual Maintenance Contract	187	189
21.	Bank Account and other details	190	190
22.	Letter of Authorization to Bid- Annexure-“A”	191	191
23.	Internal layout Plan	192	193
24.	Scheduled of Quantities	194	206
25.	General Summary of cost	207	207
26.	Financial Template	01	01

LETTER TO CONTRACTOR FROM CHIEF ENGINEER

Date: 22.08.2022

To,

Dear Sir / Sirs,

NAME OF WORK:- E-Tender for Proposed Modernization works including Interior, Civil, Electrical Installation, Fire Alarm, Air-conditioning, Data cabling, Modular Chairs, Furniture's and Ancillary works at Branch Office building Lakhimpur under Divisional Office – Lucknow

1) We hereby publish the TENDER on e-Tendering Portal (Website) through www.tenderwizard.com/LIC in Electronic Mode hereinafter referred as “e-Tendering” and consisting of following :

(a) **BID I: EMD, TENDER FEE with applicable GST & NEFT details (To be submitted online & physically in case of EMD in the form of Demand Draft/Pay Order/Banker's cheque in a sealed envelope marked as Envelope-I). The NEFT details shall comprise of Cancelled Bank Cheque, Copy of Pan Card and Filled in NEFT Mandate form. The scanned copies of the all documents mentioned shall also be submitted online.**

(b) **BID II : PRE-QUALIFICATION BID**

(c) **BID III : FINANCIAL BID**

Please note that the Bid Documents can be downloaded from above portal (website) and should be mandatorily submitted in **Online Electronic Mode** hereinafter referred as “Online Offer”. The submission of online offer duly Encrypted & Digitally Signed on above portal should be in prescribed Electronic Forms (online) available on the above portal for respective tender in Online Envelope(s) on or before **as per the Key Dates mentioned in the tender document and online portal for above tender.**

2) The drawings for the work will also be available for inspection at the following office:

**The Chief Engineer,
Life Insurance Corporation of India,
North Central Zonal Office,
Engineering Department
(1st floor), “Jeevan Vikas Building,
16/275, Civil Lines, The Mall, Kanpur- 208001**

3) The bidders should submit Tender Fee of **Rs. 2000/- plus GST@18% i.e. Rs. 2360.00 (Rupees Two Thousands Three Hundred Sixty Only)** and **Earnest Money Deposit (EMD) of Rs. 42,200/- (Rupees Forty Two Thousand Two Hundred only)** in the form of Demand Draft of any Nationalized Bank / Scheduled Commercial Bank only (i.e. Indian or Foreign Banks included in Second Schedule of Reserve Bank of India Act 1934 excluding Co-operative Banks and Regional

Rural Banks Bank) in favour of “**Life Insurance Corporation of India**” payable at **Kanpur**, in sealed envelope (**marked as Envelope-I**) at the office of Chief Engineer at above address **on or before the last date & time specified for submission. The Envelope-1 shall also contain the NEFT details as mentioned above. The scanned copies of all the above documents shall also be submitted online** . The Tender fees plus GST shall be accepted only in the form of Demand Draft. The e-Tenders will be opened **As per the Key Dates** in the presence of contractors or accredited representatives, who wish to attend the online Tender Opening process. The bidders can view the Tender Opening details through their respective Login IDs on the above mentioned e-Tender Portal (Website). The Tenderer should ensure that their tender is received **Online Electronically** on or before the due date and time as specified in “**Key Dates**” in the Tender Document and above mentioned Portal (website). **Please note that above e-Tendering System is an automatically time locked system, which will be locked immediately as soon as due date and time is over and will not accept any offer after that. Therefore, the tenderers are strictly advised to do their process well before the due date and time to avoid any such instances.**

- 4) Necessary Guidelines to Submit tenders on Electronic Tendering System is broadly given in the Tender document. The tenderers are advised to carefully read the above document for understanding of e-Tendering System. The Tenderer may also contact the Help Desk of e-Tendering Portal in case of any difficulty in submission of online Bids.
- 5) The Life Insurance Corporation of India does not bind itself to accept the lowest or any tender.

Encl: As above.

Yours faithfully,

CHIEF ENGINEER

LIFE INSURANCE CORPORATION OF INDIA

LETTER FROM CONTRACTOR TO CHIEF ENGINEER

TO BE SUBMITTED ONLINE ON OR BEFORE ON **As per the Key Dates**

Date: **13.09.2022**

From:

.....
.....

To

The Chief Engineer,
Life Insurance Corporation of India
Engineering Department ,
North Central Zonal Office, "Jeevan Vikas",
16/275, Civil Lines, Kanpur-208001

NAME OF WORK:- E-Tender for Proposed Modernization works including Interior, Civil, Electrical Installation, Fire Alarm, Air-conditioning, Data cabling, Modular Chairs, Furniture's and Ancillary works at Branch Office building Lakhimpur under Divisional Office – Lucknow

Dear Sir,

1) Having examined the Enrolment Form, Selection Criteria , Technical Specifications, Schedule of Quantities, Detailed Drawings, Specifications, Conditions of Contract etc. included in the tender document for the Percentage Rate Contract relating to the above work, having visited/examined the site of the existing premises, having acquired the requisite information relating thereto as effecting the tender invited by you on behalf of the Life Insurance Corporation of India, I/We, the undersigned hereby offer to carry out the above mentioned work for a period of One years after Defect Liability Period on Percentage Rate basis in strict accordance with the Contract Conditions and Specifications.

I/We, undertake to complete and deliver the whole of the works within a period as specified in Appendix to the Conditions of Contract from the date of issue of intimation from you that the tender has been accepted and upon receiving possession of the site. I/We shall be under the obligation to complete the entire work within the period of completion failing which to pay the sum as stated in the Appendix to the Conditions of Contract.

2) I/We enclose herewith my/our tender with an Earnest money remittance of **Rs. 42,200/- (Rupees Forty Two Thousand Two Hundred only)** in the form of Crossed Demand Draft of Nationalized Bank/ Scheduled Commercial Bank only (i.e. Indian or Foreign Banks included in Second Schedule of Reserve Bank of India Act 1934 excluding Co-operative Banks and Regional Rural Banks Bank) payable at Kanpur

OR

The **Tender Fee and EMD** can be paid separately through NEFT mode directly to LIC Account, as detailed below :

Name of Bank : Axis Bank Ltd.

Branch : Civil Lines Branch, Kanpur

Account No. : 911020067317027

IFSC Code : UTIB0000133

NEFT Receipt Copy with UTR No. should be physically submitted with Bid I.

I/We, hereby agree that part of this sum shall be forfeited by the 'Life Insurance Corporation of India in the event of my/our tender being accepted and I/We fail to execute Contract when called upon to do so.

3) In the event of the tender being accepted, I/We, agree to the retention of my/our EMD as a part of Security Deposit and the balance amount of Security Deposit to be recovered at 7.5% of Gross Value of work done from my / our Running Account Bills.

OR

I/We, agree to furnish a lump sum Bank Guarantee for total Security Deposit of Rs.-----/(Rupees -----) or two Bank Guarantees each with 50% value from any Nationalized/Scheduled Bank as per specimen given in Annexure "B" to Conditions of Contract, within 07 (Seven) days of acceptance of tender. The Bank guarantee shall be from any Nationalized /Scheduled Bank located preferably at Kanpur or where a Branch/Division of LIC of India exists.

4) I/We, agree to furnish a lump sum Performance Guarantee amounting to Rs.------(Rupees -----only) in the form of Bank Guarantee from any Nationalized/Scheduled Bank as per specimen given in Annexure "C" to Conditions of Contract, within **07 (Seven)** days of acceptance letter. The Bank guarantee shall be from any Nationalized /Scheduled Bank located preferably at Kanpur or where a Branch/Division of LIC of India exists.

5) I/We, note that the Earnest Money Deposit of **Rs. 42,200/-(Rupees Forty Two Thousand Two Hundred only)** would be refunded to me/us.

a. On expiry of the validity of the tender or earlier at the discretion of Chief Engineer in case my/our tender is not accepted and

b. In case my/our tender is accepted, after I/We, furnish Bank Guarantees as mentioned above.

6) I/We, agree,

a) In case my/our tender is withdrawn before expiry of the validity period or before the issue of letter of acceptance, whichever is earlier, or makes any modifications in the terms and conditions of the tender which are not acceptable to the Department, in such case 100% of the EMD will be forfeited by the department.

b) In case of forfeiture of Earnest Money as prescribed above 6(a), the tenderer shall not be allowed to participate in the retendering process of the work.

7) I/we agree to carry out the following works as per terms and conditions of the contract:

- a) Applying for enhancement of Electrical Load and obtaining Demand Note from the concerned local Electrical Distribution Authorities/ companies/ boards within 30 days.
- b) Final Electrical load enhancement of the premises 30 days before the scheduled date of completion in all respect as per the requirement.
- 8) I/we agree that Virtual completion of the mentioned work shall be accorded by Life Insurance corporation of India.

Yours faithfully,

(SIGNATURE OF THE CONTRACTOR)

Name and Seal

NAME OF THE PARTNER OF THE FIRM OR
NAME OF THE PERSON HAVING POWER OF
ATTORNEY TO SIGN THE CONTRACT
(CERTIFIED TRUE COPY OF THE POWER
OF ATTORNEY SHOULD BE ATTACHED)

CONDITIONS OF CONTRACT**1. INTERPRETATIONS:**

- 1.1 In construing these Conditions, the Specifications, the Priced Schedule of Quantities, Tender and Agreement, the following words shall have the meanings herein assigned to them except where the subject or context otherwise requires:
- 1.2 “Employer” shall mean THE LIFE INSURANCE CORPORATION OF INDIA and his (their) heirs, legal representatives, assignees and successors.
- 1.3 “Chief Engineer” shall mean the person occupying the post of head of the Zonal Engineering Department of the Corporation.
- 1.4 “Corporation’s Engineers” shall mean such Deputy Chief Engineers, Superintending Engineers and/or Executive Engineers of the Corporation, who shall from time to time be appointed by the Chief Engineer for supervising the work carried out by the Contractor or for any purpose in connection therewith:
- 1.5 The term “Site Engineer” shall mean the person appointed and paid by the Employer, acting under the order of the Corporation’s Engineer to superintend the work.
- 1.6 The Contractor shall mean the individual, firm or company whether incorporated or not, who is awarded the contract & shall include the legal representative of such individual or the persons composing such firm or company or the successors of such individual, firm or company & the permitted assignees of such individual, firm or company.
- 1.7 The “Site” shall mean the lands/buildings and/or other places on, in, into or through which work is to be executed under the contract or any adjacent land, path or street which may be allotted or used for the purpose of carrying out the contract.
- 1.8 “This Contract” shall mean the Articles of Agreement, these Conditions, the General Instructions to Contractor, General Preambles to Schedule of Quantities, Special Conditions, the priced Schedule of Quantities, the Specifications, the Appendices, the Drawings and other related correspondence.
- 1.9 “Act of Insolvency” shall mean any act of insolvency as defined by the Presidency Towns Insolvency Act, or the Provincial Insolvency Act or any amends Statute.

- 1.10 "Notice in Writing" or written notice shall mean a notice in written, typed 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 registered office of the addressee and shall be deemed to have been received when in the ordinary course of post it would have been delivered.
- 1.11 Words importing persons include Firms and Corporations, words importing the singular only also include the plural and vice versa where the context so requires.
- 1.12 The titles of the Clauses shall not affect or alter the meaning of Clauses and are solely for the purpose of facilitating reference.
- 1.13 The following abbreviations shall be followed for the designations of various LIC Officers:

<u>DESIGNATIONS</u>	<u>ABBREVIATIONS</u>
Executive Director (Engineering)	E.D. (E)
Zonal Manager	Z.M.
Chief Engineer	C.E.
Chief Architect	C.A.
Deputy Chief Architect	D.C.A.
Deputy Chief Engineer	Dy.C.E.
Superintending Engineer	S.E.
Senior Architect	S.A.
Executive Engineer	E.E.
Deputy Senior Architect	D.S.A.
Asstt. Secretary	A.S.

- 1.14 Wherever the words "approved", "directed", "as required", "selected" or words of like effect are used, it is to be understood that the approval/direction, requirement or selection of the Corporation's Engineer are intended unless otherwise specified.
- 1.15 The words "as described" shall mean the description in the Special Conditions, Specifications, General Instructions, Drawings etc. of this tender.
- 1.16 The words "allow" shall mean that the Contractor shall include in his rates for the particular matter referred to.

- 1.17 “Day Work” shall mean items of labour and/or materials which in the opinion of the Corporation’s Engineer are not capable of being evaluated by the accepted method of measurement and analysis.

2. SCOPE OF CONTRACT:

- 2.1 The Contractor shall carry out and complete the works in every respect in accordance with this Contract and in accordance with the directions and to the satisfaction of the Corporation’s Engineer. The Corporation’s Engineer may issue further drawings and/or written instructions, details, directions and explanation in regard to:

- a. The variation or modification of the Design, quality of works or the addition or omission or substitution of any work;
- b. Any discrepancy in the Drawings or between the Schedule of Quantities and/or Drawings and/or Specifications;
- c. The removal from the site of any materials brought thereon by the Contractor and the substitution of any other material thereof;
- d. The removal and/or re-execution of any work executed by the Contractor;
- e. The dismissal from the work of any persons employed thereupon;
- f. The opening up for inspection of any work covered thereupon;
- g. The amending and making good of any defects under relevant Clause giving details of defects after completion.

- 2.2 The Contractor shall forthwith comply with and duly execute all works comprised in such Instructions subject to the provisions of relevant specific conditions of the Contract. In the event of any dispute or difference of opinion the contractor shall refer the matter within 7 (seven) days of the issue of such instruction to the Chief Engineer / Dy. Chief Engineer (I/C) whose decision shall be final & binding.

3. DISCREPANCIES:

- 3.1 If there are varying or conflicting provisions made in any one document forming part of Contract, the Chief Engineer / Dy. Chief Engineer (I/C) shall be the deciding authority with regard to the intention of the document and his decision shall be final and binding on the contractor.

3.2 The several documents forming the Contract are to be taken as mutually explanatory of one another, and the order of precedence shall be as follows;

- a) Special conditions
- b) General preambles to schedule of quantities
- c) General instructions
- d) Conditions of contract

3.3 In case of discrepancies between the Schedule of Quantities, the specifications and/or drawings the following order of precedence shall be observed

- (a) Description in Schedule of Quantities
- (b) Specifications of relevant Trade
- (c) Drawings; detailed drawings shall be followed in preference to small scale drawings and figured dimension in preference to scale.
- (d) Indian Standard Specifications of 'BIS'

4. DRAWINGS AND SCHEDULE OF QUANTITIES:

4.1 Two complete sets of the Drawings and Specifications and Schedule of Quantities shall be furnished by the employer to the contractor. Two copies of the additional Drawings, if any, shall be furnished within such time as the Chief Engineer may consider reasonable which may be necessary for execution of any part of the work. Such copies shall be kept on the work site and the CE and his representatives shall at all reasonable times have access to the same and they shall be returned to the EE by the Contractor on completion of the contract.

This Contract and the signed Drawings, Specifications and Schedule of Quantities shall remain in the custody of the Employer.

5. CONTRACTOR TO PROVIDE EVERYTHING NECESSARY FOR EXECUTION OF WORK:

5.1 Contractor shall provide everything necessary for the proper execution of the work according to the furnish all information to Employer as may be required by it and shall indemnify the Employer against any penalties/claims arising from any default on their part.

6.3 The Contractor shall arrange to give all notices required by the said Acts, Regulations or Bye-Laws to be given to any Authority and to pay to such Authority or to any Public Office all fee that may be properly chargeable in respect of the work and lodge the receipts with the Employer.

- 6.4 The Contractors shall indemnify the Employer against all claims in respect of patent, rights, and shall defend all actions arising from such claims unless he has informed the Chief Engineer before any such infringement and received his permission to proceed and shall himself pay all royalties, license fees, damages, costs and charges of all and every sort that may be legally incurred in respect thereof.
- 6.5 The Contractor should observe that his work shall not cause any nuisance to the Public in general and to the neighboring occupants in particular.
- 6.6 Should the Contractor desire to work on Sundays, Holidays and during night hours, permission in writing from the Corporation's Engineer must be obtained in time. It shall be the responsibility of the Contractor to obtain permission from Civil Authorities, if necessary.

7. SETTING OUT WORK:

- 7.1 The Contractor shall set out the work and shall be responsible for the true and perfect setting out of the same and for the corrections 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 Contractor shall at his own cost rectify such error, if called upon, to the satisfaction of the Corporation's Engineer. The Contractor must not commence work until the outlines of the building and Centre line layout have been pegged out and approved by the Corporation's Engineer.

8. CONTRACTOR IMMEDIATELY TO REMOVE OFFENSIVE MATTER:

- 8.1 All soil, filth or other matter of an offensive nature taken out of any trench, sewer, drain, cesspool or other place shall not be deposited on the surface, but shall be at once carted away by the Contractor to some pit or place provided by him.

9. MATERIALS AND SAMPLES:

- 9.1 All the materials stores and equipment required for the full performance of the Contract must be provided through normal trade channels and must include octroi, excise and import duties, sales tax payable to all authorities and other charges. They shall be of approved quality and the best of their kind available and the Contractor must be entirely responsible for the proper and efficient carrying out of the work. The

Contractor shall order all materials required for the execution of the work from local/outside sources as early as necessary to the satisfaction of the Corporation's Engineer and to ensure that such materials are on site well ahead of requirement for use in the work.

- 9.2 Before ordering such materials, the Contractor shall get samples of the materials approved well in time. Preference shall be given to ISI marked products and approved

brands of requisite quality as mentioned in the tender. For materials, which are neither approved brands nor ISI marked, the same shall be got tested from approved laboratories at the Contractor's cost before approval. Approved brand and ISI marked product will also be tested if desired by the Chief Engineer and if the test results are satisfactory, the cost of testing shall be borne by the Employer otherwise by the Contractor. No claim will be allowed for delay to the progress of work caused by test. If called upon by the Executive Engineer the Contractor shall produce proof for having arranged for the supply of materials well in time.

- 9.3 The Contractor shall furnish well in time before work commences at his own cost, any samples of workmanship that may be called for by the Corporation's Engineer for his approval and any further samples in case of rejection until such samples are approved. Such samples when approved shall be the minimum standard for the work to which they apply. In case of items like suspended ceiling, partitions, etc. Typical sample panels or proto-types shall be erected in position for approval before undertaking work. Rates quoted shall cover for such preliminary work.

10. ACCESS:

- 10.1 Any of the Corporation's Engineers or any persons authorized by any one of them shall at all reasonable time have free access to the work and/or the workshops, factories or other places where materials are being prepared or constructed for the Contract and also to any place where the materials are lying or from which they are being obtained and the Contractor shall give every facility to all of them necessary for inspection and examination and test of the materials and workmanship. Except the representatives of the Public Authorities, no person shall be allowed on the work at any time without the written permission of the Corporation's Engineer.

If any work is to be done at a place other than the site of the work, the Contractor shall obtain the written permission of the Corporation's Engineer for doing so.

11. CONTRACTOR'S SUPERVISION & MINIMUM REQUIREMENT OF TECHNICAL STAFF:

11.1 The Contractor shall either himself supervise the execution of the contract or may appoint a Competent Agent approved by the Chief Engineer to act in his stead.

11.2 Where the contractor is not a qualified Engineer or even if he is so qualified, he cannot in the opinion of Chief Engineer, give his full personal attention to the works, he shall at his own expense employ person(s) possessing the qualification and experience as described hereunder as his accredited agent to supervise the works and to receive instructions from Corporation's Engineers. Any directions, instructions or notices given by the Corporation's Engineer to such supervisor(s) shall be deemed to be given to the contractors.

a. **FOR WORKS COSTING UPTO Rs. 100 LAKHS:**

A qualified resident Engineer having a Government recognized Diploma in Civil

Engineering and minimum of 2 years experience on building construction site.

b. **FOR WORKS COSTING MORE THAN Rs. 100 LAKHS & UPTO Rs. 200 LAKHS:**

A qualified resident Engineer having a Recognized Degree in Civil Engineering or equivalent qualification and minimum of 2 years experience on building construction site/s or a recognized Diploma in Civil Engineering with minimum 5 years experience on such construction jobs.

c. **FOR WORKS COSTING MORE THAN Rs.200 LAKHS:**

i) A qualified resident Engineer having a Recognized Degree in Civil Engineering and minimum of 3 years experience of such major construction site/s or a recognized diploma in Civil Engineering with 8 years experience.

ii) In addition the contractor shall employ suitable number of supervisors with recognized degree / diploma in the relevant branches or recognized qualification & experience in the relevant trades for proper execution of the work as approved by the Chief Engineer.

d. The Chief Engineer may vary any of the above qualification / experience at his discretion if so warranted by conditions prevailing and applicable to any particular work such as Air-conditioning, HT, Interiors etc.

- e. If the contractor fails to employ suitable person(s) to supervise the work or fails to appoint replacement(s) when necessitated, amount as stipulated in the Appendix to the conditions of contract shall be recovered from the contractor for each Engineer and each supervisor for the period of non-employment.

12. DISMISSAL OF WORKMEN:

- 12.1 The Contractor shall, on the instruction of the Corporation's Engineer, immediately dismiss from the work any person employed thereon, who may, in the opinion of the Corporation's Engineer, be unsuitable or incompetent or who may misconduct himself and such person shall not be again employed or allowed on the work without the permission of the Corporation's Engineer.

13. DATES OF COMMENCEMENT AND COMPLETION:

- 13.1 The "Date of Commencement" shall be as stated in the Work Order and the Contractor shall thereupon and forthwith begin the work and shall regularly proceed with and complete the same on or before the "Date of Completion" stated in the Work Order, subject to the provisions for extension of time hereinafter contained.

14. ASSIGNMENT:

- 14.1 The whole of the work included in the Contract shall be executed by the Contractor and the Contractor shall not directly or indirectly transfer, assign or underlet the Contract or any part, share of interest therein nor shall he take a new partner without the written consent of the Chief Engineer and no subletting shall relieve the Contractor from the full and entire responsibility of the Contract or from the active Superintendence of the work during its progress.

15. DEVIATION, VARIATION, EXTRA/DEVIATED ITEMS AND PRICING:

- 15.1 The Contractor should note that unless otherwise stated, the tender is strictly on Percentage Rate basis and his attention is drawn to the fact that rates for each and every item should be correct, workable and self supporting. The quantities in the Schedule of Quantities approximately indicate the total extent of work and no variation i.e. additions, omissions or subtractions shall vitiate the Contract. No liability shall attach to the Employer for any error therein or variation there from.

15.2 The contractor may when authorized and shall when directed, in writing by the Chief Engineer or the Corporation's Engineers, whom the CE may for that purpose appoint, add to, omit from, make alterations in, substitutions for, or vary the works shown upon the Drawings or described in Specifications or included in the priced Schedule of Quantities but the Contractor shall make no additions, omissions, alterations, substitutions or variations without such authorization or direction. A verbal authority or direction by the Chief Engineer, if confirmed by the contractor in writing within 7 (seven) days, be deemed to have been given in writing.

15.3 The rates of such altered, additional or substituted works shall be determined in accordance with the following.

- a. The net rates or prices in the original tender shall determine the valuation of the extra work where such extra work is of similar character and executed under similar conditions as the work priced therein.
- b. The net price of the items in the original tender shall determine the value of the items omitted. However, if omissions vary the conditions under which any remaining items of the work are carried out or if the amount of any omission relative to the amount of the whole of the Contract works or to any part thereof shall be such that in the opinion of the Chief Engineer, the net rate or price contained in the Priced Schedule of Quantities or Tender or for any item of work involves loss or expenses beyond that reasonably contemplated by the Contractor and is by reason of such omission rendered unreasonable or inapplicable, the Chief Engineer shall fix another rate or price as in the circumstance he shall think reasonable and proper.
- c. If the rate for any altered, additional, or substituted item of work is not specified in the schedule of quantities, the rate for that item shall be derived from the rate for the nearest similar item specified therein.
- d. If the rate for altered, additional or substituted item of work cannot be determined in the manner specified above, then such items of work shall be priced on the basis of coefficients of labor and materials as given in the latest CPWD rate analysis handbook and rates for labor and materials wherever applicable shall be the market rate prevailing at the time of execution.
- e. Where such co-efficient are not available in C.P.W.D. rate analysis, the actual Labor/Materials involved and recorded by the Executive Engineer in executing the items shall be considered.
- f. Where extra work cannot be properly measured or valued, the Contractor shall be allowed "Day Work" prices at the net rates stated in the Tender or the Priced Schedule of Quantities or, if not so stated, then in accordance with the local

“Day Work” rates and wages for the district, provided that in either case vouchers specifying the date and time (and if required by the EE the names of workmen employed) and materials incorporated be delivered for verification to the EE or his representative at or before the end of the week following that in which the work has been executed. The EE is not bound to recognize the cost of materials furnished in vouchers; the Chief Engineer at his discretion will fix the price of such materials based upon market value.

- g. While fixing rates of extra items 15% (Fifteen percent only) shall be allowed on the cost of material and labor to cover all supervision overheads, statutory Taxes and Levies and profits. This shall not however apply if 100% advance is given by the employer for purchase of any material (such as cement, steel etc.). In such cases 3.75% of the cost of materials only shall be allowed as handling charges and 15% shall be allowed only on the labor cost.
- h. All the quantities given in tender documents are provisional and it may increase or decrease to any instant. There will not be treated as an extra item.**
- i. For all extra items of work, the contractor should submit to the concerned Corporation's Engineer the necessary particulars along with his analysis and the rate he proposes to claim for consideration within a period of 4 (four) weeks from the time of cropping up of any authorized extra / deviated item. He shall also ensure that all the authorized claims are included in the final bill. If the contractor fails to submit his claim within the stipulated period or the period duly extended by the Corporation's Engineer, then the Chief Engineer shall proceed to fix the rate for the item(s) and the same shall be final and binding on the contractor.
- j. The Contractor shall note that Extra/Deviated items claim and/or any other claim whatsoever if submitted after submission of his Final Bill, will not be entertained and considered by the Employer. The Contractor shall not be allowed to make any Additions/ Alterations/ Revisions / Changes/ Modifications/ Variations in the final bill, after the final bill is submitted by him.

16. SUB-CONTRACTORS:

- 16.1 All specialist Merchants, Tradesmen and others, executing any work or supplying, fixing any goods for which provisional sums are included in the Schedule of Quantities and/or Specifications, who may be nominated or selected by the Chief Engineer who shall be the final authority are hereby declared to be Sub- Contractors and are herein referred to as nominated Sub-Contractors.

16.2 No nominated Sub-contractor shall be employed on or in connection with the work against whom the Contractors shall make reasonable objection or (save where the Chief Engineer and the Contractor shall otherwise agree) who will not enter into a Contract providing:-

- a. That the nominated Sub-Contractor shall indemnify the Contractor against the same obligation in respect of the Sub-Contractor as the Contractor is under, in respect of this Contract;
- b. That the nominated Sub-Contractor shall indemnify the Contractor against claims in respect of any negligence by the Sub-Contractor or his servants or agents or any misuse by him or them of any scaffolding or other plant or the property of the Contractor or under any Workmen's Compensation Act in force.

17. THIRD PARTY LIABILITY, DAMAGE TO NEIGHBOURING PROPERTY, LOSS OF MATERIAL AND WORKMEN'S COMPENSATION:

17.1 The Contractor shall be responsible for all injury to persons, animals or things, and for all damage to structural and/or decorative part of property which may arise from the operations or neglect of himself or of any Sub-contractor or any of his Sub-Contractor's employees, whether such injury or damage arise from carelessness, accident or any other cause whatsoever in any way connected with the carrying out of his Contract. This Clause shall be held to include inter-alias, any damage to Building, whether immediately adjacent or otherwise and any damage to roads, streets, footpaths, bridges, or ways as well as all damage caused to the building, and the works forming the subject of this Contract by frost, rain, wind or other inclemency of the weather. The Contractor shall fully indemnify the Employer and hold him harmless in respect of all and any expenses arising from any such injury or damage to persons or property as aforesaid and also in respect of all and any claim made in respect of injury or damage under any acts of Government or otherwise and also in respect of any award or compensation or damages consequent upon such claim.

17.2 The Contractor shall fully indemnify the employer against any loss, damage or deterioration for whatever reason, of all materials brought at site and especially material supplied by or paid for partly or wholly by the employer.

17.3 The Contractor shall reinstate all damage and loss 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 or otherwise satisfy all claims for damage to the property of the third parties.

- 17.4 The Contractor shall fully indemnify the Employer against all claims which may be made against the Employer by any member of the Public or other third party in respect of anything which may arise in respect of the works or in consequence thereof.
- 17.5 The contractor shall at his own expense arrange to effect from the date of commencement & maintain till the date of virtual completion of contract, with any licensed general insurance company, a **POLICY OF INSURANCE, Contractor's All Risk Policy (CAR)** to cover all such risks detailed above viz. loss, damage & third party liability etc. The policy shall be of an amount as mentioned in Appendix to Conditions of contract and in the joint names of the employer & contractor and shall be deposited with the employer and renewed as required from time to time during the currency of the contract.
- 17.6 The Contractor shall also fully indemnify the Employer against all claims which may be made upon the Employer, whether under the **WORKMEN'S COMPENSATION ACT** or any other **STATUTE** in force during the currency of this Contract or at Common law in respect of any Employee of the Contractor or any Sub-Contractor and shall at his own expense effect and maintain until the Virtual completion of the work, with "licensed General Insurance Company" a **POLICY OF INSURANCE** of adequate amount in the joint names of the Employer and the Contractor against such risks and deposit such policy or policies with the employer & renew the same as required from time to time during the currency of the Contract. As per requirement of the prevalent laws. But the no. of workers covered shall not be less than the numbers mentioned in labour licence.
- 17.7 The contractor shall be responsible for anything, which may be excluded from the Insurance Policies above referred to, and also for all other damage to any property arising out of or incidental to the negligence or defective carrying out of the Contract.
- 17.8 The amount of insurance to be taken for the above policies will be jointly decided between the contractor and the employer before issue of acceptance letter based on the tendered cost, nature of work, location of site, local hazards etc.
- 17.9 In default of the Contractor insuring as provided above, or having insured failing to renew the same as required the Employer on his behalf may so insure/renew and may deduct the premiums paid from any monies due or which may become due to the Contractor together with penalty as the Chief Engineer deems appropriate.

17.10 The Contractor shall also fully indemnify the Employer in respect of any costs, charges or expenses arising out of any claim or proceedings at law and also in respect of any award of compensation of damages arising there from.

17.11 The Employer shall be at liberty and is hereby empowered to deduct fully the amount of any damages, compensation costs, charges and expenses arising or accruing any such claim of damage from any sum or sums due or to become due to the Contractor.

18. DELAY AND EXTENSION OF TIME:

18.1 If the works be delayed due to any of the following:

- (a) by force majeure,
- (b) by reason of any exceptionally inclement weather,
- (c) by reason of proceedings taken or threatened by, or disputes with, adjoining or neighboring owners, or public authorities,
- (d) by the work, or delays, of other Contractors or Tradesmen engaged by the Employer,
- (e) by reason of any additional work or instruction ordered by the employer,
- (f) by reason of Civil Commotion, local commotion of workmen or strike or lock-out affecting any of the building trades,
- (g) in consequence of the Contractor not having received in due time necessary instructions from the Chief Engineer for which he shall have specifically applied in writing,
- (h) from other causes which the Chief Engineer may certify as beyond the Control of the Contractor,
- (i) by reason of non-payment of interim certificate at specified time, then upon the happening of any such event causing delay the contractor shall immediately, give notice thereof in writing to the Corporation's Engineer, but shall nevertheless use constantly his best endeavors to make good this delay.

18.2 Request for extension of time shall be made by the contractor at the earliest but not later than 14 (fourteen) days of the event causing the delay.

18.3 In case of strike or lockout the Contractor shall give written notice thereof to the CE as soon as possible but he shall nevertheless constantly use his endeavors to prevent delay and shall do all that may reasonably be required to the satisfaction of the CE to proceed with the work.

- 18.4 The Chief Engineer shall make a fair and reasonable assessment of the delay and grant extension of time accordingly. Such extension shall be communicated to the contractor by the Corporation's Engineer within 3 (Three) months of the date of receipt of such request. Non- application by the contractor for extension shall however not be a bar for giving fair and reasonable extension which shall be as decided by the Chief Engineer .
- 18.5 The decision of the Chief Engineer as communicated by the Corporation's Engineer to the contractor on the extension of time shall be final & binding.
- 18.6 No claim in respect of compensation or otherwise, howsoever arising, as a result of extension granted under the above conditions shall be admissible.

19. DAMAGE FOR NON-COMPLETION:

19.1 COMPENSATION IN THE FORM OF PENALTY FOR DELAY OF WORK :

The Contractor shall submit a Time and Progress Chart (CPM/ PERT/ Quantified Bar Chart) **within 10 (Ten) days** of Letter of Intent and get it approved by the Chief Engineer, LIC, North Central Zone. The Milestone Chart shall be prepared as produced below in direct relation to the time stated in the contract documents for completion of items of the works. It shall indicate the forecast (milestones) of the dates of commencement and completion of various items, trades, sections of the work and may be amended as necessary by agreement between the Chief Engineer, LIC and the Contractor within the limitations of time stipulated in the Contract documents and further to ensure good progress during the execution of the work, the Contractor shall in no cases in which the time allowed for any work exceeds one month (save for special jobs for which a separate program has to be agreed upon) complete as under :-

Description of Milestone (Physical Progress of work)	Time allowed in days (from date of start)	Amount to be withheld in case of non-achievement of milestone
Complete 1/4 th of the work i.e. Dismantling of old wooden works, clear the site and laying of conduits for Electric/Data	Before 1/4 th of the whole time allowed in the contract has elapsed i.e. Zero date + ¼ period	1.5% of tender value of work per month of delay to be computed on per day basis

cabling etc.		
Complete 1/2 th of the work i.e. laying of tiles in flooring & Brick Masonry works in addition to what is stated above.	Before one half of such time has elapsed i.e. Zero date + ½ period	1.5% of tender value of work per month of delay to be computed on per day basis
Complete 3/4 th of the work i.e. partition, false ceiling Air-conditioning, All internal electrical installations works.	Before 3/4 th of such time has elapsed i.e. Zero date + 3/4 period	1.5% of tender value of work per month of delay to be computed on per day basis
Complete all the works i.e. electrical panels in addition to what is stated above, Modular Furniture's, Chairs, Full height / low height cup board, Agent tables, Electrical fittings & painting etc. complete.	On or before agreed Contract period i.e. Zero date + Total Period	1.5% of tender value of work per month of delay to be computed on per day basis
Note : (1) The external works shall have to be completed parallelly.		

The physical progress report including photographs shall be submitted by the Contractor on the prescribed format & the intervals (not exceeding one month) as decided by the Chief Engineer. The compensation for delay as per clause shall be livable at intermediate stages also, in case the required progress is not achieved to meet the above time deadlines of the completion period and / or milestones of time and progress chart, provided always that the total amount of Compensation in the form of Penalty for delay to be paid under this condition shall not exceed 10% of the tendered value of work.

Compensation in the form of Penalty for delay of work @ 1.5% of tendered value of work per month of delay to be computed on per day basis.

The amount of compensation in the form of Penalty shall be adjusted or set-off against any sum payable to the Contractor under this or any other contract with LIC. In case, the contractor does not achieve a particular milestone mentioned elsewhere in the tender document, or the rescheduled milestone(s), the amount shown against that milestone

shall be withheld and to be adjusted against the compensation levied at the final grant of Extension of Time if needed. With-holding of this amount on failure to achieve a milestone shall be automatic without any notice to the Contractor. However, if the contractor catches up with the progress of work on the subsequent milestone(s), amount mentioned against each milestone missed subsequently also will be withheld. However, no interest, whatsoever, shall be payable on such withheld amount.

19.2 REWARDS FOR EARLY COMPLETION:

If the Contractor completes the work in advance before the stipulated period stated in the "Appendix to Condition of Contract" in all respects and the Chief Engineer certifies in writing that in his opinion the same has been completed, the reward for early completion is applicable and payable to the contractor. If contractor completes the work 2 months in advance in all respects, 0.5% of the final contract completion value shall be rewarded. If the contractor completes the works less than 2 months in advance, 0.1% of the final contract completion value shall be rewarded. The amount, if payable, shall be paid along with the final bill.

20. FAILURE BY CONTRACTOR TO COMPLY WITH CHIEF ENGINEER 'S INSTRUCTIONS :

20.1 If the Contractor after receipt of written notice from the Chief Engineer , requiring compliance with such further Drawings and/or his instructions, fails within 7 (seven) days to comply with the same the Chief Engineer may employ and pay other persons to execute any such work whatsoever as may be necessary to give effect thereto and all additional costs incurred in connection therewith shall be deducted from any money due or to become due to the Contractor.

21. PAYMENT OF BILLS :

a. MEASUREMENT OF WORKS

21.1 The EE may, from time to time, intimate the contractor that he requires the work to be measured and the contractor shall forthwith attend or send a qualified representative to assist the EE or his representative in taking such measurements and calculations and to furnish all particulars or to give all assistance required by either of them. All items having a financial value shall be entered in the Measurement Book. All measurements and levels shall be taken jointly by the Contractor or his authorized representative and Site Engineer or his authorized representative from time to time

during the progress of the work and such measurements shall be signed and dated by both the parties in token of their acceptance. If any of the measurements recorded are objected by any one of the party, a note shall be made to that effect with reason, signed by both parties and referred to Corporation's Engineer whose decision in the matter shall be final and binding. Measurements can also be recorded through electronic medium where specifically approved by Chief Engineer. In case of electronic medium of measurement, the measurement shall be recorded as per the under-mentioned procedure:-

I) Clause no. 21(Measurement of work)- **Conditions of Contract**

21.1-Written as

" All items having financial value shall be entered by the Corporation Site Engineer or by an Engineer authorized for the purpose, in the Measurement Book(MB)"-----

Read as

" All items having financial value shall be measured, recorded and entered by the Contractor or person duly authorized by the Contractor for the purpose, in the Digital Measurement Recording System"----- as per details & procedure given below:-

It has been decided to dispense with the printed Measurement Books and move towards Digital measurement Recording System. Now all the measurements shall be recorded and preparation of Abstract of Bill shall be done in EXCEL Sheet and the record shall be maintained on EDMS Server.

The Standard Operating Procedure for recording Measurement , Test Check by Sr. Officials, Account Checking and keeping of records shall be as under:-

1. The Measurements of Projects, Modernization and all other works will be recorded in EXCEL format (**Annexure A1& A2**) by the Contractor/ Authorized Representative of Contractor at the site as work progress. The description of items is to be imported in totality from **the approved protected soft file (Excel File) of BOQ in tender**. However any inadvertent deviations after importing the file, the original contract document will prevail upon.

Any extra /deviated work executed during the period will also be measured in EXCEL format after/ following all laid down procedures as per tender conditions.

2. The EXCEL Sheet Measurement will be submitted by the Contractor to the LIC Site Engineer in both hard and soft format . The measurement then will be checked 100% by LIC Site Engineer and if required , the same shall be corrected by LIC Site Engineer to establish that the measurements so given by the Contractor is in order and complete in all respects.
3. The corrected hard copy of the EXCEL Measurement Sheet thereafter will be test checked by the Higher Officials as per the laid down process and if there exists zero correction, such Excel measurement sheet will be PDF formatted.

All concealed measurements shall be verified by LIC Site Engineer and Test Checked by Higher Officials, wherever required before its concealing and hard copy duly signed by Contractor and LIC Engineer shall be maintained /preserved.

4. If there is any variation of measurement after the test checking, the particular measurement will be re-entered by the LIC Site Engineer and then the corrected EXCEL measurement sheet will be converted to PDF formatted measurement sheet. A print of such PDF formatted Measurement Sheet will be taken and signed by the LIC Site Engineer, Test Checking Engineer and the Contractor on the Hard Copy. (A Sample copy is attached for reference as per **Annexure-A1 & A2**).
5. Abstract of Bill (**Annexure-B**) in EXCEL and PDF will be submitted by Contractor. The description of the items, Tender Qty, unit and Rates will be imported from the approved soft file of BOQ in the tender. The Contractor will only Key in the quantities of the corresponding items from the PDF formatted measurement Sheet. However any inadvertent deviations after importing the file, the original contract document will prevail upon.
6. The hard copy of PDF formatted measurement sheet, Bill processing Note initiated by the LIC Site Engineer and Abstract Sheet as corrected by LIC Site Engineer (attached as per **Annexure-B**) will be submitted to Engineering Account section for all necessary verification.

The soft copy of measurement sheet and abstract in EXCEL Format may also be submitted to Accounts Section to facilitate speedy checking of the bills. However correction by Accounts Section will be done only on Hard Copy of PDF Formatted measurement sheets and thereafter on Abstract sheet. The certified contract documents must be referred during account checking.
7. After scrutiny of the bill and certification by Engineering Account Section, all corrected documents in Hard copy will be shared with Contractor.
8. The Contractor on receipt of the corrected Hard copy of abstract of bill from LIC will prepare their tax invoice on their Letter head.(A sample copy is attached for reference as per **Annexure-C**) and submit to LIC of India for further processing of their bill for release of payment. The Tax invoice will have Zero correction.
9. After all account verification is over, the RA Bill and Measurement sheet of the Contractor should be numbered containing the details of work, date of Commencement etc and the same should be kept in hard bound form in a particular folder till the project work is completed and thereafter also.
10. The scanned copy of RA/Final Bill duly verified, Bill Approval note along with measurement sheet in PDF will be uploaded on EDMS Server under the different Heads of Project, Modernization and Repair & Maintenance/ Addition- alteration works costing each more than Rs. 5.00 Lakhs. All supporting documents of final bills should also be uploaded on EDMS server shall have proper Identification Number, which will contain name of work and work place.

The flow chart of the process is given in the enclosed **Annexure-D**.

Enclosures:- **Annexure-A1, A2, B, C and D**

[illegible]

[illegible]

Annexure-A2

E-Measurement Sheet (Reinforcement)

RA Bill -----/Final bill -----

1. Name of work:
2. Agreement no. & date / contract ref:
3. Name of the contractor & Address:
4. Name designation of LIC measurer with S.R. no.:
5. Period of measurement:
6. Name of the contractor's authorised Engineer/s

Attending measurement . Authorization letter ref:

Location description & size of RCC member	Number of RCC member	Sketch of reinforcement bar and position in RCC member if possible to draw.	Reinforcement bar as marked on the drawing/ position of bar	No. Of bars.	Length of bars	Total length of bars , col. (2X5X6)	Remarks	Diameter of bars and total length as per col. 7						
								8 mm#	10mm#	12mm#	16mm#	20mm#	25mm#	32mm#
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Signature of contractor

Signature of LIC site Engineer

Signature LIC test checking Engineer.

Name & Seal

Name & Sr. No.:

Name & Sr. No.:

Le

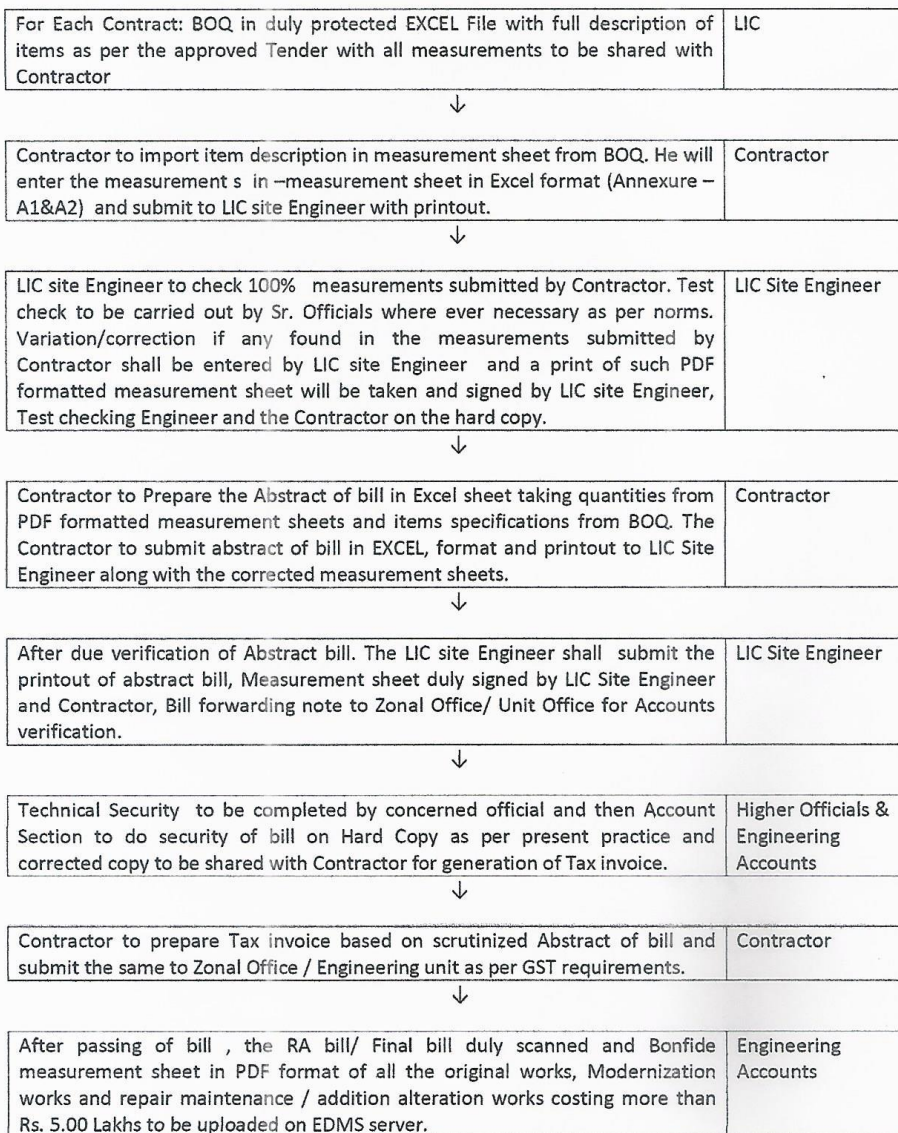
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E-MEASUREMENT SHEET							Annexure - A1	
BILL NO.								
i	Name of work							
ii.	Agreement No. & date / Contract Ref :							
iii	Name of the Contractor & Address							
iv	Name , Designation of LIC measurer with S.R.No.							
v	Period of measurement							
vi	Name of the Contractor's authorised Engineer/s attending measurement. Authorisation letter ref :							
T.Item No.	Description of Item	Unit	No.	Length	Breadth	D/H	Quantity	Remarks/ Notes
	Signature of Contractor's Engineer (Name)		Signature of LIC Site Engineer (Name & S.R. No.)					Signature of LIC Test Checking Engineer (Name & S.R. No.)

"Annexure -D"

FLOW CHART OF e-MEASUREMENT PROCESS.

ACTION BY



- 21.2 Should the contractor not attend or neglect or omit to send such representative, then the measurements taken by the EE or representative shall be taken to be correct measurements of the work. Wherever not specified in the "Schedule of Quantities or elsewhere" the mode of measurements shall be in accordance with the latest brochure issued by the Indian Standards Institutions (now renamed as Bureau of Indian Standards) on "Method of measurement of Building works".
- 21.3 The Contractor or his representative may, at the time of measurement, take such notes and measurements as he may require.
- 21.4 All authorized extra work. Omissions and all variations made without the Chief Engineer's knowledge if subsequently sanctioned by him in writing shall be included in such measurement.
- 21.5 If the contractor or his authorized representative does not record the measurements periodically for the completed works, then the site Engineer shall take measurements after giving notice in writing of at least 3 (three) days. Measurements recorded in the absence of Contractor shall be intimated with a copy of such measurements to the contractor. If the contractor fails to countersign or record objections within a week from the date of measurement, then such measurement recorded in absence by the Site Engineer shall be deemed to be accepted by and binding on the Contractor.
- 21.6 The Contractor shall, without any extra charge provide all assistance with every appliance, labor and other things necessary for taking measurements (either by him or by site Engineer) and recording levels including test checking of such measurements by any person authorized by the Employer.
- 21.7 All work shall be measured net as fixed in its place. All measurements of 'cutting' shall be held to include for the consequent wastage on the materials used.
- 21.8 Except where any general or detail description of the works expressly shows to the contrary, measurements shall be taken in accordance with the procedure set forth in the specifications notwithstanding any provision in the relevant Standard Method of measurement or any general or local custom. In the case of items for which procedure is not covered in the specification, measurement shall be taken in accordance with the relevant Standard Method of measurement issued by BIS and if for any item no such standard is available then a mutually agreed method shall be followed.
- 21.9 Measurements of all hidden/concealed items of work including extra items if any, such as, work in foundations including excavations, plinth filling, masonry, concrete etc. steel in all R.C.C. work, pipe to be encased etc. shall be jointly recorded by the contractor and Site Engineer or his authorized representative before they are covered up. Immediately after the work is ready for measurements, Contractor will give specific

notice to the Site Engineer for recording the measurements. If the Site Engineer or his authorized representative fails to record the measurements, the Contractor will refer the matter to the Corporation's Engineer for instructions, but in no case shall cover up work without the latter's permission.

22. PAYMENTS:

22.1 The contractor shall be paid by the Employer, from time to time, by instalment under Interim Certificate to be issued by the EE to the Contractor on account of the work executed, when in the opinion of the EE, work to the approximate value named in the Appendix to the conditions of Contract as "Value of work for Interim certificate" (or less at the reasonable discretion of the Executive Engineer) has been executed in accordance with this contract, subject however to a retention of the percentage of such value mentioned in Appendix to the Conditions of Contract hereto as "Retention percentage on account of Security Deposit". The Interim Certificate shall be based upon interim Bills of Running Account Bills to be prepared by the Contractor and supported by the detailed measurements. The EE may include in the Interim Certificate such amount as he may consider proper on account of materials delivered upon the site by the contractor for use in the work, after satisfying price of materials on basis of vouchers/bills submitted by the contractor.

In case any material have been supplied by the Employer to the contractor in connection with the work, necessary recovery for the same shall be effected from the bills of the contractor by the Chief Engineer at the issue rates of such materials as stipulated while calling for tenders and in other cases at a stock rate or market rates of such materials, whichever is higher. The contractor will, however, not be entitled to modify his rates for items of work requiring use of such materials and when the work has been virtually completed and the Chief Engineer shall have certified in writing that it has been so completed on the basis of detailed measurements and after obtaining written endorsement by the Chief Engineer that the Chief Engineer has made a final Scrutiny and that there are no disputed items, rates of quantities, the contractor shall be paid by the Employer in accordance with certificate to be issued by the Chief Engineer the sum of money named in the Appendix as "Instalment after Virtual Completion" and the contractor shall be entitled to the payment of the final bill in accordance with the final certificate to be issued in writing by the Chief Engineer with the approval of the Chief Engineer with expiration of the period referred to as "Defects Liability Period", in the Appendix to Conditions of Contract hereto from the date of Virtual Completion or as soon after the

expiration of such period as to work shall have been finally completed and all defects made good according to the true intent and meaning hereof, whichever shall last happen.

Provided always that the issue by the EE of any certificate during the progress of the works or at after their completion shall not relieve the contractor from his liability under

Clause (2) in cases of fraud, dishonesty or fraudulent concealment relating to the work of materials or to any matter dealt with in the certificate in case of all defects and insufficiencies in the work or materials which a reasonable examination would not have disclosed. No certificate of the Deputy Chief Engineer or Executive Engineer shall of itself be conclusive evidence that any work or materials to which it related are in accordance with the contract.

The Deputy Chief Engineer may by any certificate make any correction in previous certificate which shall have been issued by the Executive Engineer.

Payment upon the EE's certificate shall be made within the periods named in the

Appendix "Period for honoring Interim Certificate" after such a certificate has been delivered to the Employer.

The Chief Engineer shall have power to withhold any certificate if the work or any part thereof is not being carried out to his satisfaction.

22.2 Provided always that the issue by the Corporation's Engineer of any Certificate during the progress of the works or after their completion shall not relieve the Contractor from his liability in cases of fraud, dishonesty or fraudulent concealment relating to the work or materials or any matter dealt with in the Certificate in case of all defects and insufficiencies in the work or materials which a reasonable examination would not have disclosed. No Certificate of the Corporation's Engineer shall of itself be conclusive evidence that any work or materials to which it related are in accordance with the Contract.

22.3 Payment upon the Corporation's Engineer's Certificate shall be made within the periods named in the Appendix "Period for honoring Interim Certificate" after such a Certificate has been delivered to the Employer;

22.4 The Chief Engineer shall have power to withhold any Certificate if the work or any parts thereof are not being carried out to his satisfaction. However, if the final certificate is not issued within the period as mentioned under Clause No.22.5, 26 due to Audit Para

by CTE etc., the amount involved for such items of deficient work as decided by Chief Engineer would be withheld. The same would be allowed as agreed upon by the CTE & the Chief Engineer and the final certificate would accordingly be issued and final bill passed. For such withheld amount, a simple interest @ 6% per annum shall be paid to the contractor along with the said payment. Such interest will be calculated from the last date (as mentioned in Appendix to Conditions of Contract) for honoring final certificate till the date of payment.

22.5 The measurements and valuation in respect of the Contract shall be completed within the

"Period of Final Measurement" stated in the Appendix or if not so stated then within six Months of the completion of the contract works as defined in Clause (26) hereof. No further claim shall be made by the contractor after submission of the final bill and these shall be deemed to have been waived and extinguished.

22.6 The final certificate shall be based on the submission of final measurements or overall measurements of the work (to be taken if so directed by Corporation's Engineer) with all relevant details similar to 22.1 above. The Chief Engineer may direct the Contractor to resubmit details if the same are found incomplete to issue the final certificate and his decision to accept the details is final and binding on the Contractor. Final Certificate shall be issued by the CE after the conditions are met with as per 22.4, 22.5, 22.6 and 26 and contractor's submission of **No Claim certificate cum receipt** as per the Proforma given in Appendix to Conditions of Contract.

23. SECURED ADVANCE AGAINST MATERIALS

23.1 The Contractor shall be entitled to be paid advance along with interim bill against materials which are not perishable and which are in the opinion of Corporation's Engineer, required for the works and have been brought on site for incorporation in the work but have not been so incorporated and are safeguarded against loss due to any cause whatsoever, (refer clause no-17). The amount of such advance against materials shall be arrived at on the following basis:

- a) 80% of the market value of materials required for the work and brought on site.

OR

80% of the cost of such materials (brought on site) as derived from the relevant accepted tender rate for the particular item involving such materials, whichever is lower.

- b) Such advance payment made against materials shall be recovered from or adjusted from the interim bills as and when the materials are utilized in the

work. Examples of certain perishable materials on which no advance shall be paid are Sand, Paint, Bitumen, Hard Boards/Soft Boards and other paper products, Petroleum Products, Coal Tar, and Insulating Boards etc.

- 23.2 In case of dispute, the decision of the Chief Engineer on whether advance payment can be made against specific materials shall be final and binding.

24. UNFIXED MATERIALS AND EQUIPMENTS:

- 24.1 All tools, plants and materials brought to the site by the Contractor shall vest in the and shall not be removed from the site of works except by permission of the Corporation's Engineer in writing. The Employer shall have a lien on these materials and plants.

25. REMOVAL OF IMPROPER WORK:

- 25.1 The Corporation's Engineer shall during the progress of the work have power to order in writing from time to time the removal from the work within such reasonable time or as may be specified in the order, of any materials, which in their opinion are not in accordance with the Specifications or instructions, 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 Instructions and the Contractor shall forthwith carry out such an order at his own cost. In case of default on the part of the Contractor to carry out such an order, the Chief Engineer shall have the power to employ other persons to carry out the same and all expenses consequent thereon or incidental thereto as certified by the EE shall be borne by the Contractor and may be deducted from any amounts due or that may become due to the Contractor.

26. VIRTUAL COMPLETION:

- 26.1 The work shall be completed in accordance with the Contract and to the entire satisfaction of Chief Engineer . All unused materials, tools, plants, scaffoldings, temporary structures, hutments and things belonging to the Contractor shall be removed and the site of works cleared of rubbish and all waste materials by the contractor at his own expenses and delivered up tidy to the employer. After completion of the work, the contractor will serve a written notice to the Chief Engineer to this effect. The Chief Engineer after satisfying himself shall thereupon approve the virtual completion. The Defect Liability Period shall commence from the date of such certification.

27. DEFECTS AFTER COMPLETION:

27.1 The defects, shrinkage, settlements or other faults, which may appear within “the Defects Liability Period, stated in the “Appendix to the Conditions of Contract” or if not stated then, within 12 (twelve) months after virtual completion of the work, arising on account of materials or workmanship not in accordance with the Contract shall, upon the directions in writing of the Corporation’s Engineer and within such reasonable time specified therein, be amended and made good by the Contractor at his own cost unless the Chief Engineer shall decide that he ought to be paid for such amendment and for making good, and in case of default, the Chief Engineer may employ and pay other persons to amend and make good such defects, shrinkage, settlement or other faults, and all damages, loss and expenses consequent thereon or incidental thereto shall be recovered from any monies due or that may become due to the Contractor. The Chief Engineer may in lieu of such amending and making good by the Contractors, deduct from any money due or that may become due to the Contractor, a sum to be determined by the Chief Engineer equivalent to the cost of amending such work. Should any defective work have been done or materials supplied by any Sub-Contractor employed on the work, who has been nominated or approved by the Chief Engineer as provided in Clause No.16 the Contractor shall be liable to make good in the same manner as if such work or material had been done or supplied by the Contractor and been subjected to the provisions of this Clause and Clause No.2 hereof. The contractor shall remain liable under the provision of this Clause notwithstanding the payment of any Certificate or the passing of any accounts.

28. PROVISIONAL SUMS, APPLICATION OF:

28.1 For all the work listed under items for which provisional sums are provided in the tender, the Chief Engineer reserves the right to invite separate tenders or select or order from any manufacturer or firms at his discretion and reserves to himself the right of paying direct to persons or firms for any such work. The Contractor will not have any claims over these items, but if tenders are invited for such items, he will also be invited to quote along with others.

28.2 If ordered by the Chief Engineer, Contractor shall be required to carry out provisional sum items at the same conditions and rates as applicable for this Contract.

29. OTHER PERSONS ENGAGED BY THE EMPLOYER:

29.1 Chief Engineer reserves the right to execute any work not included in this Contract, which he may desire to have carried out, by other persons and the Contractor shall allow all reasonable facilities and the use of his scaffolding and plant for the execution of such work, but is not required to provide any special plant or materials for the execution of such work except by special arrangement with

the Employer. Such work shall be carried out in such manner as not to impede the progress of the work included in the Contract and the Contractor shall not be responsible for any damage or delay which may happen to or be occasioned by such work

30. SUSPENSION BY THE CONTRACTOR:

30.1 If the Contractor except on account of any legal restraint upon the Employer preventing the continuance of the work, shall suspend the work or in the opinion of the Chief Engineer shall neglect or fail to proceed with due diligence in the performance of his part of the Contract or if he shall make default in respect of Clause No.2, the Employer shall have the power to give notice in writing to the Contractor requiring that the work be proceeded within a reasonable manner and with reasonable dispatch. Such Notice shall purport to be a notice under this clause. After such notice is given, the Contractor shall not be at liberty to remove from the site of the work or from any ground contiguous thereto any plant or materials belonging to him, which shall have been placed thereon for the work and the Employer shall have a lien upon all such plant and materials to subsist from the date of such notice being given until the notice shall have been complied with. If the Contractor shall fail for 7 (seven) days after such notice given to proceed with the work as therein prescribed, the Chief Engineer may proceed as provided in Clause No.31.

31. DETERMINATION OF CONTRACT BY EMPLOYER:

31.1 If the Contractor (being an individual or a firm) commit any "Act of Insolvency" or shall be adjudged as Insolvent or shall make an assignment or composition of the greater part in number or amount of his creditors or shall enter into a deed of assignment with his creditors, or being an Incorporated Company shall have an order made against him or pass an effective resolution for winding up either compulsorily or subject to the supervision of the Court or Voluntarily or if the official Assignee of the Contractor shall repudiate the Contract or if the official Assignee or the Liquidator in any such winding up shall be liable within 7 (seven) days after notice to him requiring him to do so, to show to the reasonable satisfaction of Chief Engineer that he is able to carry out and fulfill the Contract and if required by the CE to give security therefore or if the Contractor (whether an Individual Firm or Incorporated Company) shall suffer execution to be issued or if the Contractor shall suffer any payment under this Contract to be attached by or on behalf of any of the creditors of the Contractors or if the contractor shall assign or sublet the Contract

without the consent in writing of the Chief Engineer first obtained or if the Contractor shall charge or encumber this Contract or any payment due or which may become due to the Contractor there under, or if the Chief Engineer shall certify in writing that in his opinion the Contractor,

- a. has abandoned the Contract, or
- b. has failed to commence the work, or has without any lawful excuse under these conditions suspended the progress of the work for 7 (seven) days after receiving from the Chief Engineer written notice to proceed, or
- c. has failed to proceed with work with such due diligence and failed to make such due progress as would enable the work to be completed within the time agreed upon, or
- d. has failed to complete the work within the stipulated date including authorized extensions or
- e. has failed to remove the materials from the site or to pull down and replace the work within 7 (seven) days after receiving a written notice from the Corporation's Engineer that the said materials or work were condemned or rejected or
- f. has neglected or failed persistently to observe and perform all or any of the acts, matters, or things, by this Contract to be observed and performed by the Contractor for 7 (seven) days after written notice shall have been given to the Contractor requiring the Contractor to observe or perform the same, or
- g. has to the detriment of good workmanship or in defiance of the Chief Engineer 's instructions to the contrary sub-let any part of the Contract.

then and in any of the said causes, the Chief Engineer not with standing any previous waiver, after giving 7 (seven) days notice in writing to the Contractors, determine the Contract, but without thereby affecting the powers of the Chief Engineer or the obligations and liabilities of the Contractor, the whole of which shall continue to be in force as fully as if the contract has not been so determined and as if the work subsequently executed had been executed by or on behalf of the Contractor. And further, the Employer, his agents or servants, may enter upon and take possession of the work and all plant, tools, scaffolding, sheds, machinery, steam and other power, utensils and materials, lying upon the premises or the adjoining lands or road and use the same as his own property or may employ the same by means of his own servants and workmen in carrying on and completing the work

or by employing any other Contractors or other person or persons to complete the work, and the Contractor shall not in any way interrupt or do any act, matter, or thing to prevent or hinder such other Contractor, other persons or person employed for completing and finishing or using the materials and plant for the work. When the work shall be completed or as soon thereafter as convenient, the Chief Engineer shall give a notice in writing to the Contractor to remove his surplus materials and plant and should the Contractor fail to do so within a period of 14 (Fourteen) days after receipt thereof by him, the Employer may sell the same by public auction and shall give credit to the Contractor for the amount so realized. The Chief Engineer shall thereafter ascertain and certify in writing under his hand what (if anything) shall be due or payable to or by the Employer for the value of the said plant and materials so taken possession of by the Employer and the expense or loss which the Employer shall have been put to in getting the work to be so completed, and the amount, if any, owing to the Contractor and the amount, which shall be so certified shall thereupon be paid by the Employer to the Contractor or by the Contractor to the Employer, as the case may be and the Certificate of the Chief Engineer shall be final and conclusive between the parties.

32. TERMINATION OF CONTRACT BY CONTRACTOR:

32.1 If payment of the amount payable by the Employer under any Certificate of the EE shall be in arrears as unpaid for 60 (sixty) days after notice in writing requiring payment of the amount with interest of aforesaid shall have been given by the Contractor to the Employer, or if the work be stopped for six months under order of the Chief Engineer or by any injunction or other order of any Court of Law, then and in any of the said cases, the Contractor shall be at liberty to determine the Contract by notice in writing to the Employer and he shall be entitled to recover from the Employer payment for all the work executed and for any loss, he may sustain upon any plant or material supplied or purchased or prepared for the purpose of the Contract.

32.2 In arriving at the amount of such payment, the net rates contained in the Contractor's original tender shall be followed or where the same may not apply, valuation shall be made in accordance with Clause No.15 hereof.

33. DETERMINATION OF CONTRACT DUE TO ABANDONMENT OR REDUCTION IN SCOPE OF WORK:

- 33.1 If at any time after the acceptance of the tender, the Employer shall for any reasons whatsoever not require the whole or any part of the works to be carried out, the Chief Engineer shall give notice in writing to the Contractor who shall have no claim to any payment of compensation or otherwise whatsoever on account of any profit or advantage which he might have derived from the Execution of the whole of the works.

The Contractor shall be paid at contract rates for the full amount of work executed and in addition:

- a. The cost at site of all surplus approved materials collected for incorporation in the work, which the Contractor does not wish to retain and which shall thereafter become the property of the Employer.
- b. Where the Contractor desires to retain the surplus of approved materials (excepting materials supplied by the Employer or obtained in Employer's name, which shall, in any case, be returned to the Employer) the cost of handling and cartage charges for removal from the site to a reasonable distance not exceeding 25kms.
- c. If upon the determination of the Contract under this condition, the Contractor is of the opinion that he has suffered hardship by reason of the operation of these conditions, he may refer the circumstances with full details to the Chief Engineer, who on being satisfied that such hardship exists or has existed, shall make such allowance, if any as in his opinion is reasonable, and his decision shall be final, conclusive and binding.

34. DISPUTES TO BE FINALLY DETERMINED BY CHIEF ENGINEER:

- 34.1 The Instruction, Decision, Opinion, Direction, Certificate or Valuation of the Chief Engineer with respect to all or any of the matters under Clause (2), (3), (5), (6), (9), (14), (15), (18), (23), (27), (30), (31) and (33) hereof (which matters are herein referred to as EXCEPTED MATTERS) shall be final and conclusive and binding on the parties hereto and shall be without appeal. Any other Decision, Opinion, Direction, Certificate or Valuation of the Chief Engineer or any refusal of the Chief Engineer to give any of the same shall be subject to the right of Arbitration and review as given under Clause No.36.

35. SECURITY DEPOSIT AND PERFORMANCE GUARANTEE:

- 35.1 Amount towards Security deposit shall be calculated as per details given under Serial No.9 of "APPENDIX TO CONDITIONS OF CONTRACT" in Bid-III of the tender. Security Deposit can be either in Cash or in the form of Bank Guarantee.

In case of cash option, the EMD shall be retained as part of Security Deposit and balance Security Deposit shall be accumulated through deductions from Running

Account Bills at 7.5% (maximum) of gross amount of bill. In case of Bank Guarantee option, the Contractor shall furnish one Bank Guarantee for full amount of Security deposit valid till end of defects liability period OR, two Bank Guarantees of like amounts each equal to half the Security deposit; one valid till virtual completion and the other till end of defects liability period. If the EMD is submitted partly in the form of Bank Guarantee and if the contractor desires to avail cash option for Security Deposit, then the contractor has to deposit the amount equal to the amount of EMD in the form of Bank Guarantee, in the form of Demand Draft/Pay Order drawn in favour of Life Insurance Corporation of India, payable at Kanpur within 21 days of intimation to the contractor of acceptance of tender and balance Security Deposit shall be accumulated through deductions from Running Account Bills at 7.5% (maximum) of gross amount of bill.

- 35.2 Performance Guarantee under 9(b) of "Appendix to Conditions of Contract" shall be only in the form of Bank Guarantee valid up to scheduled date of completion.
- 35.3 The Bank Guarantee/s shall be from any Nationalized / Scheduled Bank approved by the Chief Engineer, which is located at the Zonal Office Headquarters of L.I.C within whose jurisdiction the work falls or at the place of work.
- 35.4 Bank Guarantee/s (BGs) against Security Deposit (SD) and Performance Guarantee (PG) shall be executed as per the specimen pro-forma at Annexure B and C. These guarantee/s shall be submitted within 21 (twenty one) days from the date of acceptance letter.
- 35.5 In case of failure by the contractor to furnish the Bank Guarantee against Performance Guarantee as per Cl.35.2 by the stipulated date or extended date if any, Employer shall without prejudice to any other right or remedy available in law, be at liberty to cancel the tender and forfeit the Earnest Money absolutely.
- 35.6 50% of the Security Deposit (cash option) shall be refunded / released within 15 days from date of approval of virtual completion issued to the contractor & provided that the employer has no claim for forfeiture of part or whole of the said deposit.
- 35.7 Balance 50% of Security deposit will be refunded / released within 15 days to the contractor after the satisfactory completion of the defects liability period, subject to deductions for any appropriations thereof required to be made by the employer as per the conditions of contract.

- 35.8 If one Bank Guarantee in lieu of total Security Deposit is furnished, the same will be released only after the successful completion of Defects Liability period subject to any appropriations as aforesaid.
- 35.9 If two Bank Guarantees in lieu of Security deposit are furnished, the First Bank Guarantee will be released after the certificate of Virtual completion is issued to the contractor and second shall be released after the satisfactory completion of Defects Liability Period subject to any appropriations as aforesaid.
- 35.10 Bank Guarantees towards Performance Guarantees (where applicable) shall be valid upto scheduled / actual date of completion of work as per scope of tender and same shall be refunded within 15 days from date of approval of virtual completion.
- 35.11 Contractor shall keep the Security Deposit and Performance Guarantee, where applicable, replenished to its full value whenever any recovery or appropriation there from occurs. The employer reserves the right to do so from any money(s) due to the contractor lying with them.
- 35.12 The Contractor should note that no interest will be allowed on any part of the Security deposit.
- 35.13 No deductions will be effected from the bills when the total security deposit is paid in the form of Bank Guarantee(s) and the EMD shall be refunded after acceptance of Bank Guarantee(s).
- 35.14 In the event of failure by the contractor to submit Bank Guarantee(s) by the specified / extended date, recovery of Security deposit shall be effected from the R.A Bills. However, where the contractor fails to furnish Bank Guarantee against Performance Guarantee the matter shall be dealt with as per Cl. 35.5 above.
- 35.15 In all cases of Bank Guarantees, there shall be further provision of claim period of 6 months. If the contract period gets extended for any reason whatsoever, the contractor shall obtain the required extensions to the Bank Guarantee(s).

36. SETTLEMENT OF DISPUTES, ARBITRATION:

- 36.1 All disputes and differences of any kind whatsoever arising out of or in connection with the contract or the carrying out the work (whether during the progress of the work or after its completion and whether before or after determination, abandonment or breach of the contract) shall be referred a Standing Committee consisting of 1 Retired High Court Judge and 2 Members from Engineering fraternity retiring as senior Engineer from Government / Government Undertaking. The Committee will be constituted by the Chairman, LIC of India.

The Chief Engineer shall, upon receipt of such reference/s will arrange to enter all such dispute(s) on the date of actual receipt in his office in a register and serially numbered. The receipt of such reference shall be acknowledged by the Office of

Chief Engineer. However mere acknowledgment of receipt of claim does not entail that the claim is admitted or accepted.

- 36.2 The claims arising out of the Contract will be placed before the Committee once in a quarter and decision will be conveyed to both the contractually agreed parties.
- 36.3 Either of the party on being dis-satisfied with the decision may approach to a Three Member Arbitral Tribunal, one each will be appointed by Either Party and 2 appointed Arbitrators will appoint 3rd Arbitrator who will act as the Presiding Arbitrator.
- 36.4 Executive Director (Engg.) will appoint the Arbitrator on behalf of LIC of India. The Arbitration shall be conducted in accordance with Arbitration and Conciliation (Amendment) Act 2015(3 of 2016) and any other amendment thereafter if any.
- 36.5 The Contractually Agreed Parties hereby also agree that the Arbitration under this clause shall be a condition Precedent to any Right of Action in Law of Court under the Contract

37. LUMP SUM ADVANCE (APPLICABLE TO CONTRACT COSTING Rs.25 LAKHS AND ABOVE)

- 37.1 Loan will be available if required by the Contractor, and may be given as under on submission of application by him subject to other conditions being fulfilled.
- 37.2 A lump sum amount not exceeding 5% of the Contract sum may be advanced against a Bank Guarantee and at the interest rate as specified in Appendix to the Conditions of Contract, repayable half-yearly-compounded. The advance shall be utilized by the Contractor for the purpose of this Contract only and for no other purpose.
- 37.3 The Bank Guarantee (Performa at Annexure 'C') shall be for the equivalent amount of loan 'plus' simple interest at specified rate plus 1% of loan amount to cover costs. The Bank Guarantee shall be from any Nationalized or approved scheduled Bank preferably located at Zonal Head Quarters of LIC or place of work and shall be valid till the date of completion as specified in Appendix to Conditions of Contract.
- 37.4 The amount of loan which may be given to the Contractor shall be at the sole discretion of the Chief Engineer and may be in one or more installments.
- 37.5 Recovery of the sums advanced by way of loan as above and of interest, thereon shall be made by deduction from the Contractor's running account bills in suitable percentages in relation to the progress of work as fixed by the

Chief Engineer subject to the condition that entire amount of loan with interest thereon shall be fully recovered by the time the work amounting to 75% of the Contract sum is completed or completion period whichever is earlier. Provided that if at any time the Contractor fails to execute the Contract to the satisfaction of the Employer for any reason whatsoever, the Employer shall be entitled to recall forthwith the entire amount so advanced with interest, cost and legal expenses, etc. and/or recover the whole/balance amount as the case may be, from the bill if any, payable to the Contractor or by enforcing the Bank Guarantee.

- 37.6 Whenever extension of time is granted to the Contractors for the completion of the project and where the loan is not fully recovered, Contractor shall furnish fresh Bank Guarantee for extended period of Contract for the outstanding loan amount together with specified simple interest for the remaining period and 1% of outstanding loan amount towards costs.
- 37.7 Whenever the full amount of loan plus interest has been fully recovered, the Bank Guarantee shall be released.
- 37.8 If the situation so warrants a second loan will be available if required by the contractor subject to the following conditions:
- a) At least 50% of the first loan stands recovered.
 - b) The amount of the loan shall not exceed 5% of the balance amount of work.
 - c) The sum of amount outstanding plus amount of second loan shall not exceed 5% of the total value of work.
- 37.9 All other conditions applicable to lump-sum advance shall apply for the Second loan also.

GENERAL INSTRUCTIONS TO CONTRACTORS FOR WORK

1. DRAWINGS:

- 1.1 Drawings shall be kept open for inspection at places as mentioned in the letter to the contractor from the Chief Engineer. Drawings generally include the site plan, floor plans, elevations and sections of the proposed work.

2. INSPECTION OF SITE:

- 2.1 The Tenderer shall visit and examine the site of work and satisfy himself as to the nature of the existing roads or other means of communication, the character of the soil and of the excavations, the correct dimensions of the work and facilities for obtaining materials and shall obtain generally his own information on all matters affecting the execution of the work. No extra charge made, in consequence of any misunderstanding or incorrect information on any of these points or on the grounds of insufficient description will be allowed. All expenses incurred by the Tenderer in connection with obtaining information for submitting this tender including his visits to site and efforts in compiling the Tender shall be borne by the Tenderer and no claims for reimbursement thereof shall be entertained.

3. WHOLE WORK TO BE COMPLETED IN THE SPECIFIED COMPLETION PERIOD:

- 3.1 The whole work is to be completed within the completion period stated in the Appendix to Conditions of Contract or the extended date of completion, if any. The Contractor will be required if necessary, to work overtime to complete the work by the stipulated date. No extra will be allowed on the Contract sum for such overtime work.

4. TIME AND PROGRESS CHART:

- 4.1 A time and Progress Chart is to be submitted by the contractor according to the activities. The Contractor shall submit his version of time and progress chart fitted within the specified overall period of completion (as stated in Appendix to Conditions of Contract) within 07 (days) days of the communication of acceptance of the tender, to the Corporation's Engineer. In case of contractor does not come forward for any change in the time and progress chart as provided in the General Instruction to the contractors, it shall be presumed that the Time & progress Chart is accepted in full in letter and script to maintain the pace of the progress of the work
- 4.2 Ancillary work should be so started that all such work is completed before the specified overall contractual period of completion.
- 4.3 The Contractor shall assume full responsibility for any delay in delivery of materials by Merchants or nominated Sub-Contractors not having completed the work in accordance with

the Time and Progress Chart. Such excuses shall not form any criterion for extension of time, or any claims by the Contractor.

- 4.4 Any failure on the part of the contractor to adhere to the starting and completion date of individual items mentioned in the chart shall entail application of the liquidated clause on whole or part at the discretion of the Chief Engineer, notwithstanding the overall period of completion stated in the appendix to the conditions of contract.

5. BENCHES:

- 5.1 The Contractor is to construct and maintain proper benches to indicate the inter-section of all main walls in order that the lines and levels may be accurately checked at all times. The Contractor shall provide suitable stones with flat tops and build the same in concrete for temporary or permanent benchmarks. All the pegs for setting out the work and fixing the necessary levels required for the execution thereof shall, if desired by the Corporation's Engineer likewise, be built in masonry at such places and in such a manner as the Corporation's Engineer may determine. Contractors' rates shall cover for these factors.

6. DRAWINGS ON SITE:

- 6.1 The Drawings maintained on the site are to be carefully mounted on boards of appropriate size and covered with a coat of approved transparent varnish or laminated at the cost of the Contractor. They are to be protected from the ravages of termites, ants, silver fish and other insects.

7. ORDER OF WORK:

- 7.1 The Chief Engineer reserves the right to fix the order in which the various items of work involved in this Contract is to be executed and Contractor shall comply with the same. There shall be no extra claims on account of this.

8. WORKMANSHIP:

- 8.1 The Work calls for a high standard of workmanship combined with speed.

9. REJECTED WORKMANSHIP OR MATERIALS:

- 9.1 Any workmanship, or materials not complying with the specific requirements or approved samples, or which have been damaged, contaminated or deteriorated, must be removed immediately from the site and replaced at the Contractor's expense as directed.

10. QUOTED RATES:

The tenders shall be percentage rate tender.

- 10.1 Contractor should note that unless otherwise stated the tender is strictly on Item rate basis and his attention is drawn to the fact that quoted Item Rate should be correct, workable and self supporting.

10.2 If called upon by the Chief Engineer, the details analysis of quoted Item Rate shall be submitted by the Contractor. The Chief Engineer is not bound to recognize Contractor's analysis and reserves the right to reject abnormal high Item Rate quoted by the Contractor. In case there are inconsistencies in the rate of item of same description, in the different parts of Schedule of Quantities, the lowest of such rates shall be considered unless Chief Engineer finds that there is justification for such inconsistent rates.

11. WATCHING AND LIGHTING:

11.1 The Contractor from the time of being placed in possession of the site must allow for watching, lighting and protecting the work, the site and surrounding, properly by day and night on all days including Sundays or other holidays, at his own cost.

12. WATER:

12.1 The rates quoted by the Contractors shall include for providing all water required for the work including that required by special tradesmen and Sub-Contractors and pay all charges required by Local Municipal or other Authorities. Water must be clean, fresh, pure and free from earth, vegetable or organic matters, acid or alkaline substance in solution or suspension. The Contractors shall make their own arrangements for water supply. If supply from the Municipality or other local bodies be inadequate, the Contractor should provide tube well or wells or open well at his own cost. The Contractors must execute any temporary plumbing and pay all fees and charges. All health regulations in force shall be strictly observed by the Contractor and pay all necessary charges.

However, water is available in surplus with LIC, the same may be permitted for use in work and in such case necessary recovery will be effected from contractor's bill as detailed below:

Recovery of water charges from Contractors bill if used from LIC source @ 0.25% of the Gross value of work done.

13. ELECTRICITY:

13.1 The Contractor shall arrange with the concerned Electricity Supply Authorities for a temporary meter and supply to the site and shall provide all temporary wiring, power and lighting points for the whole of the works and clear away when no longer required. He shall pay all charges for the same and for electricity consumed, including that consumed by Sub-Contractors. **The Contractor should submit disconnection & no dues certificate from the supplying authority along with his final bill.**

However, Where existing source of Electricity is available in surplus with LIC, the same may be permitted for use in work and in such case necessary recovery will be effected from contractor's bill as detailed below:

Recovery of Electricity charges from Contractors bill if used from LIC source @ 0.25% of the Gross value of work done.

14. OFFICE FOR CORPORATION'S ENGINEER ON SITE:

14.1 The Contractor shall at his cost, provide a separate office (of suitable size) for the Corporation's Engineer/s on site with writing tables, chairs, electric lights and fans, drinking water arrangements, etc. as directed by the Executive Engineer and clear away at completion of work and make good all work disturbed and pay all charges. The Contractor shall also provide facilities for having the Corporation Engineer's office cleaned every day and kept in good and hygienic condition.

15. OFFICE ACCOMMODATION FOR CONTRACTOR'S STAFF :

15.1 The Contractor shall, at his cost, provide, fit-up and maintain in an approved position proper office accommodation for his representative and staff, which offices shall be open at all reasonable hours to receive instructions, notices or communications and clear away on completion and make good all work disturbed.

16. SECURITY AND PROTECTION:

16.1 The Contractor shall at his cost, provide any necessary temporary enclosures, gates, entrances, etc. for the protection of the work and materials and for altering and adapting same as may be required and removing at completion of the works and making good all works disturbed.

16.2 During inclement weather, the Contractor shall suspend concreting or plastering for such time as the Corporation's Engineer may direct and shall protect such work in course of execution from damage by approved measures.

16.3 Should the work be suspended by reason of rain, strike, lock-outs or any other cause, the Contractor shall at his cost take all precautions necessary for the protection of the work and shall make good any damage arising from any of these causes.

16.4 The Contractor shall at his expense cover-up and protect from injury from any cause, all new work and supply all temporary doors protection to windows, and any other requisite protection for the whole work executed, whether by himself or special tradesmen of Sub-Contractors and any damage caused must be made good by the Contractor at his own expense.

16.5 All fences, trees, shrubs, grasses, lawn and other surfaces around the buildings or approaches thereto, which are required to be maintained are to be kept free from damage due to operations in connection with the work, at Contractor's expense.

16.6 The Contractor shall, at his expense, protect all projecting sills, jambs, copings, stone or concrete treads and moldings and all concrete steps, wood work and joinery and the like from injury during the progress of the work.

16.7 The Contractor shall at his cost, protect joinery and make good all damages to the same from any cause whatsoever during the performance of the Contract and leave perfect to the satisfaction of the CE at completion. Before giving possession, the Contractor must see that all doors, windows and ventilation etc. work easily and shall make all necessary adjustments for such smooth working.

17. SANITATION:

17.1 The Contractor shall at his cost provide adequate latrine facilities and keep the same in a clean and hygienic condition to the satisfaction of the Public Health Authorities and shall cause such latrine and night soil to be cleared away whenever necessary and shall make good all works disturbed by these conveniences.

18. MINIMUM WAGES ACT:

18.1 The Contractor shall pay rates of wages and observe hours of work and conditions of employment to existing rules under Minimum Wages Act. Further, it shall be Contractor's responsibility to ensure that he pays his workmen wages, which are not lower than the minimum prescribed by the Union Government and State Government in which area this Contract, is being operated.

19. SHEDS FOR MATERIALS:

19.1 The Contractor shall at his cost provide and maintain proper approved sheds for the storage and protection of materials etc. and other work that may be executed on the site including the tools and materials of Sub-Contractors and remove on completion. Sheds for storage of Cement are to have floors raised from the ground.

20. TEMPORARY ROADS:

20.1 The Contractor shall, at his expense, provide such temporary roads on the site as may be necessary for the proper performance of the Contract and for his own convenience but not otherwise. Upon completion, such roads shall be broken up and levelled where so required by the Drawings at Contractor's expense unless the CE shall otherwise direct.

21. OBJECTS OF VALUE AND ANTIQUITY FOUND ON SITE:

21.1 All objects of value or antiquity found on the site shall remain the property of the Employer and such findings shall be immediately reported to the Chief Engineer.

22. WORKS AND SITE TO BE KEPT AND DELIVERED UP CLEAN:

- 22.1** All shavings, cuttings and other rubbish as it accumulates from time to time during the progress of the work and at completion, including that of Sub-Contractor and special tradesman to be cleared and carted away. All rejected materials shall be removed. Contractor's quoted rates shall allow for these factors.

23. USEFUL EXCAVATED MATERIALS:

- 23.1** Any sand, gravel, moorum or rock taken from excavation will remain the property of the Employer and in the event of it not being allowed to use in the work, the Employer reserves the right to dispose it off in any way he wishes or to direct the Contractor to cart it away as ordinary materials.
- 23.2** Should suitable sand or gravel or morang or rock be found in the excavations and the Contractor be allowed to use the same in the work, in place of materials to be brought by him from outside he will be required to pay the Employer the full market value of the same.

24. SIGN BOARD AND HOARDINGS:

- 24.1** The Contractor shall not affix or place any placards or advertisement of any description or permit the same to be affixed or placed in or upon any hoarding, gantry, buildings or structure other than that approved by the Chief Engineer.

25. SCIENTIFIC AND MEASURING INSTRUMENTS:

- 25.1** Theodolite, levelling instruments, prismatic compass/chain, steel and metallic tapes and all other surveying instruments found necessary on the works, shall be provided by the Contractor at his expense for the due performance of this Contract as instructed by the Corporation's Engineer.

26. TOOLS FOR MASONS:

- 26.1** Every bricklayer or plasterer on the work shall be provided with suitable level, battens, trowels, wooden floats and breaking hammers for cutting bricks and templates, to enable him to carry out the work in a neat and workman like manner and each gang of brick layers or plasterers not exceeding six in number shall be provided with a suitable measuring rule, a plumb bob, a spirit level and a square in addition to the above mentioned, all to be to the approval of the Site Engineer.

27. CONTRACTOR'S MISTRIES AND SUPERVISORS:

- 27.1** The Contractor's Masson and the Supervisors on the works shall carry with them a suitable measuring rule, a measuring tape, a spirit level, a plumb bob and a square and shall check the work of the bricklayer, plasterers, and carpenters and joiners to see that the work is being done according to the Drawings and Specifications. The Corporation's

Engineer/Supervising Staff will use any and all measuring instruments or tools belonging to the Contractor as he chooses, while checking the work executed or being executed on the works.

28. NO OVER LOADING OF SLABS:

28.1 Floors of buildings under construction shall not be loaded by stacks of materials during construction without the prior approval of Corporation's Engineer. It is important that no load comes on the reinforced concrete floors until they are at least three weeks old and at no time must the load placed upon them exceed the load for which they are designed.

29. ALTERNATIVE ITEMS:

29.1 In regard to alternative items, if any, specified in the Schedule of Quantities, Contractor should note that the Employer reserves the right to order the Principal item or its alternatives at the CE's discretion.

30. ATTENDANCE ON SUB-CONTRACTORS:

30.1 Co-ordination: The Contractor shall be responsible for the co-ordination of all the work including that of Sub-Contractors, for arranging runs of all services and working to the requirements and layout of the specialist trades, in all matters necessary for the complete execution of the work.

30.2 Rates quoted by the Contractor shall be inclusive of all attendance on Sub-Contractors or other Contractors nominated by the Employer. Contractor must allow for provision of the use of his scaffolding to Sub-Contractors and for its retention until such time all relevant Sub-Contract works are completed.

30.3 The Contractor shall accept liability for and bear the cost of the supply of all necessary water, electricity, lighting, watching etc. for the Sub-Contractors work.

30.4 The Contractor must allow in his rates for making good any holes and chases left by the Sub-Contractors or other Contractors nominated by the Employer before the Builder's Work is completed and handed over

30.5 The Contractors shall, at all times, give access to workmen employed by the local or other authorities or any men directly employed on the buildings and to provide such parties with proper, sufficient, and if required, special scaffolding, hoists and ladders and provide them with water and lighting, and leave or make any holes, grooves etc. in

any work directed by the Chief Engineer, as may be required, to enable such workmen to lay or fix pipes, electric wiring, special fittings etc. Contractor's quoted rates shall allow for these factors.

31. OCCUPATION BY EMPLOYER:

- 31.1** The Employer reserves the right to occupy the works by sections as completed, as may be considered by the Chief Engineer both practicable and reasonable and without hindrance to the Contractor's progress.

32. TAXES, DUTIES, LEVIES AND DEDUCTION AT SOURCE:

- 32.1** The contractor shall be responsible to pay all statutory taxes / levies imposed by the State and Central Government from time to time. It is deemed that the rates quoted by the contractor for each item of works include all applicable taxes except GST on works contract which shall be reimbursed by LIC as applicable from time to time as per notification from Govt. of India.
- Liabilities towards GST for Contractor and Employer shall be in accordance with relevant provisions of the **Central Goods and Service Tax Act 2017** or any amendment issued by concerned Authority from time to time.
 - Rates are inclusive of all the taxes & levies such as Income Tax & Labour Cess etc. but excluding GST. The payment of GST shall be made separately in part or full to contractor / concerned authority as per the rates, rules & procedure prevailing at the time of bills payment.
 - Payment of GST to contractors can be made along with the bills payments after the invoice is raised & uploaded by the contractors on the GST portal & tax is paid to the credit of Government.
 - All the participating bidders must have valid GST Registration Certificate of any state/ Union Territory at the time of submission of bid. GST registration should be obtained by a taxable person under GST in each of the state or UNION TERRITORY, from where the taxable supply of goods or services is made. Any vender if making inter-state supplies he shall charge IGST and if making intra-state supplies he shall charge CGST plus SGST/UTGST in his invoice.
 - All the bidders are required to submit a copy of the GST Registration number provided by the relevant authority.
 - Deduction at source of Income tax and Labour Cess etc. shall be made by LIC of India as per the provisions prevailing from time to time from the Running Account or Final Bills and remitted to the concerned Taxation Authorities/ State Government on behalf of the contractor.
 - **The clauses given above will supersede all the provisions given in the tender elsewhere regarding any taxes /levies and GST.**

ANNEXURE –‘A’

**PROFORMA FOR
ARTICLES OF AGREEMENT**

ARTICLES OF AGREEMENT made at.....this.....day of20.... between THE LIFE INSURANCE CORPORATION OF INDIA, a body corporate constituted and established by the Life Insurance Corporation Act, 1956 (Act 31 of 1956) and having its Central Office at "Yogakshema", Jeevan Bima Marg, Mumbai and its Zonal Office at hereinafter called the Employer (which expression shall include its successors and assignees wherever context or meaning shall so require or permit) of the one part and M/s(hereinafter called "**The Contractor**") of the other part.

WHEREAS the Employer is desirous of constructing the.....

and has prepared drawings and specifications and the Schedule of Quantities which have been signed by or on behalf of the parties hereto.

AND WHEREAS the Contractor has agreed to execute upon and subject to the conditions and instructions set forth herein (hereinafter referred to as "**the said Conditions**") the works shown upon the said drawings and /or described in the said Specifications and included in the said Abstract Schedule of Quantities at the item rates therein set forth amounting to the contract sum of Rs..... hereinafter referred to as "**the said contract Amount**".

NOW IT IS HEREBY AGREED AS FOLLOWS:

1. In consideration of the said Contract Amount to be paid at the times and in the manner set forth in the said conditions, the contractor shall upon and subject to the said Conditions execute and complete the works shown upon the said Drawings and described in the Specifications and/or the priced Schedule of Quantities.
2. The Employer shall pay the contractor the said Contract Amount or such other sum as shall become payable for the items and in the manner hereinafter specified in the said conditions.
3. The said Conditions and Appendices thereto shall be read and construed as forming part of this Agreement, and the parties hereto shall respectively abide by and submit themselves to the conditions and perform the Agreement in their part respectively in such conditions contained.
4. All disputes arising out of or in any way concerned with this Agreement shall be deemed to have arisen in _____ and only the Courts in _____ shall have jurisdiction to determine the same.
5. The contract comprises :-
 - i) Tender Documents Serial Pages.....
 - ii) Subsequent Correspondence Serial Pages.....
 - iii) Architectural Drawings Serial Pages
6. Only () alterations have been made in these documents and as evidence that these alterations were made before the execution of Contract

Agreement, they have been initialed by the contractor and.....
.....
.....Engineer, Zone, Life Insurance Corporation of India The said officer is hereby authorised to sign and initial on the Employer's behalf, the documents forming part of this contract.

7. IN WITNESS WHEREOF THE Official seal of the LIFE INSURANCE CORPORATION OF INDIA, ZONE, was thereto affixed and signed on its behalf by the Chief Engineer and by on behalf of the Contractor/s on the dates respectively mentioned against their signatures in the presence of the witnesses whose signatures are also appended.

In the presence of

CHIEF ENGINEER

1. Signature :

Name :

Address :
.....

FOR AND ON BEHALF OF THE
LIFE INSURANCE CORPORATION
OF INDIA

Date :

2. Signature :

Name :

Address :
.....

In the presence of

1. Signature :

Name :

Address :
.....

FOR AND ON BEHALF OF THE
CONTRACTOR
M/S

Date :

2. Signature :

Name :

Address :
.....

ANNEXURE – “B”

FORM OF BANK GUARANTEE IN LIEU OF SECURITY DEPOSIT IN INDIVIDUAL CONTRACTS

To

THE LIFE INSURANCE CORPORATION OF INDIA

In consideration of the Life Insurance Corporation of India having its _____ Zonal Office at _____ in the State of _____ (hereinafter called **‘the Corporation’** which expression shall unless repugnant to the subject or context include its successors and assignees) having agreed under terms and conditions of contract (vide its acceptance letter No. _____ dated _____) made between _____ (hereinafter called the said Contractor) and the Corporation in connection with _____ (hereinafter called **‘the said contract’**) to accept a Deed of Guarantee and Indemnity as herein provided for Rs. _____ from the _____ in lieu of the Security Deposit to be made by the contractor and/or in lieu of the deduction to be made from the Contractor's bills, for the due fulfillment by the said contractor of the terms and conditions contained in the said contract, we the _____ (hereinafter referred to as **‘the said Bank’**) and having our office at _____ do hereby undertake and agree to indemnify and keep indemnified the Corporation from time to time to the extent of Rs. _____ (Rupees _____ only) against any loss or damage, costs, charges and expenses caused to or suffered by or that may be caused to or suffered by the Corporation by reason of any breach or breaches by the said contractor in respect of the said contract or of any of the terms and conditions contained in the said contract, or in respect of all its claims for money and / or material found due and recoverable from the said contractor and to unconditionally pay the amount claimed as such by the Corporation on demand and without demur to the extent aforesaid.

2. We, the said Bank further agree that the Corporation shall be the sole judge of and as to whether the said contractor has committed any breach or breaches of any of the terms and conditions of the said contract and the extent of loss, damage, costs, charges and expenses caused to or suffered by or that may be caused to or suffered by the Corporation from time to time on account thereof and the decision of the Corporation in this respect shall be final and binding on us.

3. The Corporation shall have the fullest liberty without affecting in any way the liability of the Bank under this Guarantee or Indemnity from time to time to vary any of the terms and conditions of the said contract or to extend time of performance by the said contractor, or to postpone for any time and from time to time any of the powers exercisable by it against the said contractor and either to

enforce or forbear from enforcing any of the terms and conditions governing the said Contract or securities available to the Corporation and the said Bank shall not be released from its liability under these presents by any exercise by the Corporation of the liberty with reference to the matters aforesaid or by reason of time being given to the said contractor or any other forbearance, act or omission on the part of the Corporation or any indulgence by the Corporation to the said contractor or of any other matter or thing whatsoever, which under the law-relating to sureties would but for this provision have the effect of so releasing the Bank from its liability.

4. It shall not be necessary for the Corporation to proceed against the contractor before proceeding against the Bank and the Guarantee and Indemnity herein contained shall be enforceable against the said Bank, notwithstanding any security which the corporation may have obtained or obtain from the contractor shall at the time when proceedings are taken against the Bank hereunder be outstanding or unrealized.

5. Notwithstanding anything contained in any of the foregoing clauses the liability of the Bank under this Guarantee shall not exceed Rs. _____ (Rupees _____ only). The guarantee shall remain in force till _____. If any extension of time be granted to the contractor, we undertake to extend the guarantee with the consent of the contractor. Unless a claim or demand under this guarantee is made or presented to the Bank within six months from the expiry date, all the rights of the Corporation under this Guarantee shall cease and the Bank shall be released and discharged from all liability hereunder.

6. We, the said bank lastly undertake not to revoke this guarantee and indemnity during its currency except with the previous consent of the Corporation in writing and agree that any change in the constitution of the said contractor or the said Bank shall not discharge our liability hereunder.

For and on behalf of the Bank
(Name and Designation)

The above Guarantee is accepted by the
LIFE INSURANCE CORPORATION OF INDIA.

For and on behalf of the LIC of India

(Name and Designation) Dated:

Note No.1 : FILL IN AS APPLICABLE

A) For Proprietary concerns:-

Shri _____ son of _____ resident of _____
 _____ carrying on business under the name and style of _____
 _____ at _____
 (hereinafter called '**the said contractor**' which expression shall unless the context requires otherwise include his heirs, executors, administrators and legal representative).

OR

B) For Partnership concerns:-

1. Shri _____
 son of _____
 resident of _____.

2. Shri _____
 son of _____
 resident of _____
 carrying on business in partnership under the name and style of _____
 of _____ at (hereinafter collectively called '**the contractor**' which expression shall unless the context requires otherwise include each of them and their respective heirs, executors, administrators and legal representatives)

OR

C) For companies :-

M/S / Shri _____ a company under the Companies Act 1956 and having its registered office at _____ in the state of _____
 _____ (hereinafter called '**the said contractor**' which expression shall unless the context requires otherwise include its successors and assignees).

Note No.2:

Please fill in the name and address of Bank.

TECHNICAL SPECIFICATIONS FOR CIVIL & INTERIOR WORKS**1. CONCRETE WORK****GENERAL :**

P.C.C shall mean Plain Cement Concrete.
R.C.C. shall mean Reinforced Cement Concrete.
R.M.C shall mean Ready Mixed Concrete

1. All concrete specified in this tender shall be ordinary mix./ Design Mix/ Ready Mix concrete.

2. **MIXES OF CONCRETE:**

Concrete used shall be in volumetric mix such as 1:4:8, 1:3:6, 1:2:4, 1:1.5:3, 1:1:2, etc.
(Cement: Sand: Stone Chips) / Design Mix/ RMC such as M20, M25 etc.

3. **WORKABILITY:**

Workability of concrete should be controlled by direct measurement of water content, making allowance for any surface water in the fine and coarse aggregates. The slump test or compacting factor test shall be carried out at intervals as directed by the Corporation's Engineer. The slump test is suitable for slump of 5 cm. to 15 cm.

4. **ALLOW IN RATES FOR CONCRETE ITEMS:**

Apart from various factor mentioned elsewhere in the tender, rates quoted for all concrete items shall include for:-

- a) All labour, materials, use of equipments, tools and plants etc.
- b) All necessary operations for the proper volume batching, mixing, handling, transporting, placing, directed, hacking of concrete surfaces where they have to receive plaster (but the plaster on concrete surfaces shall be measured and paid separately under respective plaster items) etc.
- c) Pouring concrete around reinforcement for reinforced concrete work but reinforcement shall be measured and paid for separately, unless otherwise stated in the tender.
- d) Rates quoted for all concrete items shall include for concreting of structural members of any shape and sections as per drawings including providing slopes to slabs, beams, chajjas, canopies etc. wherever required. Form work shall be measured and paid separately.
- e) Allowing work of another agencies being carried out by them like laying conduits, boxes, pipes, clamps etc. as directed before laying concrete and coordinating with other agencies viz, electrical, sanitary ,air conditioning and ventilation Contractor and other agencies working on site.
- (f) Filling the bolt holes (of the shuttering) on concrete surface with cement mortar (1:3) and finishing the same as directed.

5. FORM WORK:

- a) Irrespective of what is stated in general specifications for builder's work, trade preambles for "CONCRETE", contractor's rates quoted for concrete items shall be exclusive of form work. Formwork for all concrete items shall be measured and paid for separately. Form work or shuttering shall be water tight and for all concrete of mix 1:2:4 and higher grades shall be of timber/Steel/Plywood unless otherwise specified. Area of shuttering in contact with concrete surface shall be measured for payment purposes.
- b) Unless otherwise stated, rates quoted for formwork shall include columns /slabs /beams etc. at regular floor heights upto 3.5 meter or at smaller heights as shown on the drawings.
- c) The materials used for shuttering, if not confirming to the specifications required for providing waterproof shuttering, shall be rejected.
- d) For the purpose of measurement of formwork for external side of external/end beams full heights from top of slab to bottom of beams shall be considered under formwork for the beams.

6. ALLOW IN RATES FOR FORM WORK:

Apart from various factors mentioned elsewhere in the tender, rates quoted for the formwork items shall include for:-

- a) All labour, materials, use of equipments, tools, nails, bolts, screws, Centering, oiling etc. required for formwork specified in the tender.
- b) All necessary operation for the proper erection and removal of the formwork when directed.
- c) For necessary provision in the formwork for forming holes and pockets for bolts, balusters, for taking out dowels bars, fan hooks and for other inserts in the concrete as shown including making provisions for other large size openings for doors/ windows/ ventilators/grills etc. in the walls.
- d) For formwork of any shape and sections as per drawings including providing necessary slopes, camber to slab, etc. wherever required.
- e) For necessary provisions in the formwork for forming chamfers, bands, splays, drip moulding, rounded or curved angles, chases, grooves, rebates, making notches, dowels etc. in the concrete wherever directed.
- f) For making construction joints and dummy joints as directed.
- g) Work involving plain or circular, straight or curved forms or in slopes etc. as directed.
- h) Sinking of formwork wherever shown on drawings.

7. **CEMENT SHOULD CONFORM TO FOLLOWING STANDARDS (IS: 269-1976 / IS: 8114) / IS: 455:**

a) **FINENESS:**

When tested for fineness in terms of specific surface by Blaines' air permeability method as directed in IS:4031-1968, the cement shall comply with the following requirements:

Type of Cement	Specific Surface Sq/Cm/g
Ordinary	Not less than 2250
Low heat	Not less than 3200

b) **SOUNDNESS:**

b.1. When tested by the 'Le Chatelier' method described in IS:4031-1968, unaerated ordinary and low heat Portland cements shall not have an expansion of more than 10mm.

b.2. In the event of the cement failing to comply with the above requirement, a further test shall be made by the 'Le Chatelier' method described in IS:4031 - 1968, from another portion of the same sample, after aeration, by being spread out to a depth of 75mm at a relative humidity of 50 to 80 % for a total period of 7 days, when the expansion of each of the two types of cements mentioned above, shall not be more than 5mm.

b.3. Un aerated ordinary and low heat Portland cements having a magnesia content of more than 3 % shall be tested for soundness by autoclave test described in IS:4031-1968 and shall not have an expansion of more than 0.8%. However, if specified by the purchaser at the time of placing the order, cements having a magnesia content of less than or equal to 3%, shall be also tested for autoclave expansion as described in IS:4031-1968 and shall not have an expansion of more than 0.8%.

c) **SETTING TIME:**

The setting time of the cements, when tested by the Vicat apparatus method described in IS: 4031-1968 shall confirm to the following requirements:

	<u>Ordinary</u>	<u>Low heat</u>
i) Initial setting time in Minutes, not less than	30	60
ii) Final setting time in Minutes, not more than	600	600

d) **Compressive Strength:** The average compressive strength of at least three mortar cubes (area of face 50 Sq.cm.) composed of one part of cement, three parts of standard sand (Confirming to IS: 650-1966) by mass and P/4 + 3 % (of combined

mass of cement plus sand) water and prepared, stored and tested in the manner described in IS: 4031-1968 shall be as follows:

Kgf/SqCm.	Ordinary	Low Heat
a) 72 + 1h, not less than	160	100
b) 168 + 2h, not less than	220	160
c) 672 + 4h, not less than	-	350

Note 1: Standard sand shall confirm to IS:650-1966

Note 2: P is the percentage of water required to produce a paste of standard consistency.

8. WATER PROOFING COMPOUND:

Cement water proofing compound wherever mentioned in the items shall be "IMPERMO" manufactured by M/s SNOWCEM (India Ltd.), 2% by weight of cement or "CICO" waterproofing compound manufactured by M/s STRUCTURAL WATERPROOFING Co. Pvt. Ltd., Kolkata, 3% by weight of cement or other equal and approved as per Manufacturer's Specification and rates quoted shall include for the same (As per approved materials).

9. MATERIALS: ALL MATERIALS SHALL BE OF APPROVED QUALITY.

10. AGGREGATES:

Aggregates shall conform to IS:383/1970 and IS:2386-1963 and shall be from approved sources.

11. LOADING OF FLOOR SLABS:

Materials shall not be stored or stacked on suspended floors and roofs without the Corporation's Engineer's prior approval.

12. WATER :

Water used for both mixing and curing shall be potable and free from injurious amounts of deleterious materials which are likely to affect the strength or durability of concrete. Water containing any sugar shall not be allowed for use. Also, water which fails to satisfy the following requirements shall be not be used

- To neutralize 100 ml. sample of water, it should not require more than 5 ml. of 0.2 normal HCL.
- To neutralize 100 ml. sample of water, it should not require more than 25 ml. of 0.02 normal H_2SO_4 .
- Water should not contain solids in excess of the following :-

Organic	200 mg/ltr.
Inorganic	3000mg/ltr.
Sulphate (as SO_4)	400mg/ltr.

Chloride (as Cl)	2000mg/ltr. (for P.C.C)
Chloride (as Cl)	500 mg/ltr. (for R.C.C)
Suspended matter	2000mg/ltr.
The PH value of water shall be between 6 to 8.	

13. SAMPLES AND TEST:

Every facility shall be provided to enable the Corporation's Engineers to obtain samples and carry out test on the materials of construction, if these tests show that any of the materials of construction do not comply with the requirements of this specification, the Contractor will be responsible for the cost of the tests and the replacement of the defective materials and/or construction.

14. REJECTED MATERIALS:

All materials which have been damaged contaminated or have deteriorated or do not comply in any way with the requirements of the specifications shall be rejected and shall be removed immediately from the site at the Contractor's own expense.

2.0 BRICK WORK

2.1 BRICKS :

- a. The bricks shall be table moulded first quality of regular and uniform size, shape and colour, uniformly well burnt through out but not over burnt. They shall have plane rectangular faces with parallel sides and sharp, straight and right angled edges. They shall be free from cracks or other flaws. They shall have a frog of 10 mm depth on one of their first faces.
- b. They shall give a clear metallic ringing sound when struck.
- c. They shall show a fine grained, uniform, homogeneous and dense texture on fracture and be free from lumps of lime, lamination, cracks, airholes, soluble salts causing efflorescence of other defects which may in any way impair their strength, durability, appearance or usefulness for the purpose intended. They shall not have any part under burnt. They shall not break when thrown on the ground on their flat face in a saturated condition from a height of 60 cm.
- d. Bricks of one standard size shall be used on one work unless specially permitted by the Executive Engineer. In part of Eastern Zone (i.e., West Bengal, Assam, Odisha and Bihar etc.) bricks which are commonly of size 25 x 12.5 x 7.5 cm. shall be used. The following tolerances are permitted in the standard conventional size adopted on a particular work :-

Length	Plus or minus	3mm (about 1/8")
Breadth	Plus or minus	1.5mm (About 1/16")
Depth	Plus of minus	1.5mm (About 1/16")

- e. After immersion in water, absorption by weight shall not exceed 20 percent of the dry weight of the brick when tested according to I.S.S. No. 1077-1976.
- f. Unless otherwise specified, the load to crush the brick when tested according to I.S.. No. 1077-1976 shall not be less than 50 Kg / Sq.cm.

2.2 **MORTAR :**

Unless otherwise specified, mortar for brick work shall be composed of 1 part of cement to 5 parts of coarse approved sand for walls of one brick thick (i.e., 23 cms.) and over and one part of cement to 4 parts of coarse approved sand for half thick wall. Other specifications for mortar in brick work shall be as per I.S.S. 2116-1965.

The particle size grading of sand in mortar for unreinforced masonry work shall be within the limits specified below :-

I.S. Sieve designation	Percentage by weight Passing I.S. Sieve.
4.75 mm	100
2.36 mm	90-100
1.18 mm	70-100
600 micron	40-100
300 micron	5-70
150 micron	0-15

2.3 **CONSTRUCTION DETAILS :**

a. **SOAKING :**

All bricks shall be immersed in water for two hours before being put into work so that they will be saturated and will not absorb water from the mortar.

b. **BATS:**

No bats or cut bricks shall be used in the work unless absolutely necessary around irregular openings or for adjusting the dimensions of different course and for closers, in which case, full brick shall be laid at comers, the bats being placed in the middle of the coarse.

c. LAYING :

The bricks shall be laid in mortar to line level and shapes shown on the plans, slightly pressed and thoroughly bedded in mortar and all joints shall be properly flushed and packed with mortar and no hollows left anywhere. Bricks shall be handled carefully so as not to damage their edges. They should not also be thrown from any height to the ground but should be put down gently. All courses shall be laid truly horizontal and all vertical joints made truly vertical. Vertical joints in one course and the next below shall not come over one another and shall not normally be nearer than quarter of a brick length. For battered faces bedding shall be at right angles to the face. Fixtures, plugs, frames etc., if any, shall be built in at places shown in the plans while laying the courses only and not later by removal of brick already laid. Care shall be taken during construction to see that edges of bricks at quoins, walls, heads etc., are not damaged.

The verticality of the walls and horizontality of the courses shall be checked very often with plumb-bob and spirit level respectively.

d. BOND:

Unless otherwise specified, brick work shall be done in English bond.

e. JOINTS:

Joints shall not exceed 10mm (About 3/8") in thickness and this thickness shall be uniform throughout. The joints shall be raked out not less than 10mm (about 3/8") deep when the mortar is green where pointing is to be done. When the brick surfaces are to be plastered the joints shall be raked to a depth of 5mm when the mortar is green, so as to provide good key to plaster.

f. UNIFORM RAISING :

Brick work shall be carried up regularly in all cases where the nature of work will admit, not leaving any part 60 cm lower than another. But where building at different level is necessary, the breaks shall be stepped so as to give later a uniform level and effectual bond. Horizontal courses should be to line and level and even and face plumb or to batter as shown on the plan. The rate of laying masonry may be up to a height of 80 cm per day if cement mortar is used and 45 cm (about 18") if lime mortar is used.

- 2.4 SCAFFOLDING :** Scaffolding will be double or single as is warranted for the particular work. Put log holes shall be made good by bricks to match the face work when put logs are removed after ensuring that the holes behind are solidly filled in with 1:4:8 cement concrete.

2.5 CURING :

All brick work shall be kept well watered for 14 days after laying. Where pozzolana cement is used for mortar, the curing shall be extended by one week at the Contractor's expense.

2.6 EXPOSED WORK :

Where exposed brick work is prescribed, the usual specifications for the "Brick Work" as mentioned above will be applicable for "Exposed Brick Work" but in addition specially selected bricks shall be used for facing, ensuring regular and clean faces of uniform colour. No bricks which are broken, chipped, wrinkled or which have irregular edges or corners shall be used. Depending on the quality of bricks and if instructed by the Corporation's Engineers, the exposed face of every brick shall be rubbed before laying without extra charge. Wooden fillets 10 mm thick and 10mm wide shall be placed at the edge of joints so that no mortar comes on the surface of the bricks and a regular thickness of joints is maintained. The surface shall be rubbed down with brushes of bricks if necessary, and thoroughly washed. No mortar shall be allowed to stick to the surface, which shall be left clean to the Corporation's Engineer's satisfaction with all joints even and true to a straight line. Double scaffolding shall be used in exposed brick work.

2.7 REINFORCEMENT IN HALF BRICK THICK WALLS :

Half brick thick and brick on edge walls shall be provided with reinforcement consisting of 2 nos, 6mm dia M.S. round bars of 500mm long (each) as dowels, embedded in mortar 15mm thick at every fourth course and securely anchored at their ends where the partitions bond with the cross walls. The cost of reinforcement in half brick thick and brick on edge walls shall be paid separately unless otherwise stated in the schedule of quantities.

2.8 RATES TO INCLUDE :

Apart from other factors mentioned elsewhere in this contract, the rate for items of brick work shall include for the following:

- a. All labour, materials, use of tools, equipment and other items incidental to the satisfactory completion of brick masonry at all heights and levels.
- b. Erecting and removing of all scaffolding, ladders and plant required for the execution of the work to the height and depths and shapes as shown on the plan or ordered by the Engineer.
- c. Constructing brick work to lines, levels, batters, pillars, curves and to any position or shape, to any heights or levels including raking of joints and housing frames, fixtures etc.
- d. Curing the brick work.
- e. Removing of all stains and adhering mortar lumps on the brick work surfaces.

2.9 MEASUREMENTS :

- a. Half brick thick and brick on edge walls shall be measured in Sqm. unless otherwise mentioned.
- b. One brick thick wall and thicker walls shall be measured in Cum. Brick walls up to and including 3 bricks in thickness should be measured if multiples of half bricks which shall deemed to be inclusive of mortar joints. Widths of more than three bricks in walls will be measured actually and limited to the width specified.
- c. No deductions or additions shall be made on any account for :-
 - i. Ends of dissimilar materials (i.e.,) joints, beams, lintels, posts, girders, rafters, purlins, trusses, corbels, steps etc.) up to 500 cm² in section and
 - ii. Openings up to 0.1 m² in section.

NOTE :

- i. In calculating the area of openings, any separate lintels or sills be included along with the size of the openings but the end portions of the lintels shall be excluded and the extra width of debated reveals, if any, shall be excluded.
- ii. Wall plates and bed plates, and beating of slabs, CHAJJAS and the like which the thickness does not exceed 10 cm and the bearing does not extend over the full thickness of the wall.

3. STEEL DOORS, WINDOWS AND VENTILATORS

3.1 I.S. SPECIFICATION :

Unless otherwise stated, the Indian Standard Specification applicable for steel doors, windows and ventilators shall be IS-1038-1957 - "Specification for Steel Doors, Windows and Ventilators"

3.2 OPENING :

All the window and ventilator shutters should open outside unless otherwise specified.

3.3 FLASH WELDING :

Both the fixed and opening frames of the doors, windows and ventilators shall be formed by cutting sections to required lengths, and mitred. The corners shall be electrically flash welded. Sash-bars of the units shall be tenoned and reveted into the frames. Slots shall be cut in the fixed frames and hinges shall be inserted inside and welded to frames.

3.4 HANDLES, PEGSTAYS :

Each side hung shutter shall be provided with suitable protruding hinges and pegstay arms 300 mm (12") long and shall have holes to keep the shutter open in three different positions

up to 90 degree (The peg and the arm for the pegstay shall be riveted). The handle shall be mounted on a handle plate and the plate shall be welded to the opening frame. The handle shall have a two point nose which will engage with suitable tapered striking plate provided on the fixed frames to keep the shutter open in a slightly open position as well as in a last position.

3.5 TOP/BOTTOM HUNG VENTILATORS :

Top hung and bottom hung ventilators shall be provided with two plain hinges, with 300 mm (12") pegstay arms, which will keep the shutter open in three different positions and will act as a stopper too.

3.6 CENTRE HUNG VENTILATORS :

Centre hung ventilators shall be made with two outer frames with mastic waterproof compound embedded between these two other frames. They shall also be provided with a spring catch which when pulled by a cord, the upper half shall open inside and the lower half shall open out.

3.7 BEADING :

Where wooden or metal beading is specified in the Drawing or elsewhere for the glazing, the Contractor should provide windows with threaded holes for fixing the beading with screws.

3.8 SAMPLE OF WINDOW :

A typical approved sample window for each building should be kept in the office of the Executive Engineer of the Corporation until the satisfactory completion of the building. All windows and ventilators supplied and fixed at site should be of the same quality as of the approved sample ; otherwise they shall be rejected. The decision of the Chief Engineer or his Authorised Representative whether a window or ventilator compares well with the approved sample shall be final and binding on the Contractor.

3.9 CHIEF ENGINEER'S APPROVAL :

All windows and ventilators are subject to the approval of the Chief Engineer or his authorised representatives and they shall be strictly in accordance with the specifications without any bends, dents etc.

3.10 AS PER DRAWINGS :

All windows and ventilators shall be manufactured as per drawings supplied to the Contractor.

3.11 FIXING TO BRICK WORK/CONCRETE :

Steel windows and ventilators shall be fixed to brick work by means of standard M.S. lugs of size 100x16x3 mm and to concrete work by means of 125mm long counter sunk screws with rawl plugs after drilling into concrete with a power drill. Steel windows/ventilators etc., shall be fixed as per manufacturer's recommendations or I.S. specifications. Holdfasts shall be grouted in concrete of 1:2:4 mix of dimensions as directed. Quoted rates to cover for all these factors.

3.12 IMPORT LICENSE :

No import license shall be made available for obtaining any material not available in India.

3.13 STRUCTURAL SUFFICIENCY OF WINDOWS :

All windows, doors and ventilators shall be manufactured from standard extruded sections of approved, appropriate size suitable for the particular type and size of the window etc. Detailed shop drawings indicating the full design of every type of window and ventilators shall be furnished for approval before undertaking the work. Contractor shall assume full responsibility regarding soundness of the window, doors and ventilators and adequacy of the sections used for the particular sizes required to provide appropriate stiffness and strength. If, in the opinion of the Chief Engineer deficiencies in the sections used are found the Contractor shall replace the windows, ventilators, etc. at his expense by windows and ventilators etc., made from approved sections.

3.14 ALL TYPES OF WINDOWS :

Rates quoted for steel windows and ventilators shall cover for all types of windows and ventilators whether of standard sizes or purpose made. Where composite or continuous windows over long lengths (In plan) are required, rates shall cover for mullions, transoms at vertical or horizontal junctions of approved design. Rates should also cover for partly openable type of continuous windows, shutters of any type like side hung, centre hung, top hung etc., as per drawings.

3.15 PAINTING :

All steel windows, doors and ventilators etc. to have two coats of ready mixed oil paint of approved shade, colour and manufacture (M/s Jenson & Nicholson or other equivalent and approved) over a coat of red oxide primer. Contractors rates to be inclusive of such painting. If a proper and even surface is not obtained to the satisfaction of Chief Engineer in the number of coats specified, Contractor shall carry out additional coats of painting to approval at his expense.

3.16 **RATES TO COVER :**

Unless otherwise stated Contractor's rates for steel windows, ventilators shall, apart from any other factors mentioned elsewhere in this contract, include for providing and fixing the following.

- a. Windows/Ventilator frames and shutters with hinges as described,
- b. M.S. holdfasts or lugs as specified projecting 100mmx16mmx3mm in the positions and as per design in I.S. Specification or where fixed to concrete 125 mm long counter sunk screws with rawl plugs,
- c. Rolled Steel Mullions
- d. Transoms with projecting weather bars for side hung shutters and plain ones for fixed windows
- e. Aluminium beading with brass screws
- f. Bolts, nuts, screws
- g. Handles and peg stays
- h. Manganese brass spring catches
- i. Chords for centre hung windows
- j. Painting as described in these specifications
- k. Grouting of holdfasts in 1:2:4 concrete.

3.17 **MEASUREMENT :**

Measurement shall be in Sqm.

4. **WOOD WORK AND JOINERY**

4.1 **TIMBER**

- i. Unless otherwise specified all timber for frames and shutters for doors, windows, ventilators, cupboards etc., shall be first class, sound, well seasoned, C.P. Balarshah or other equivalent and approved teak and shall be free from knots, shakes, fissures, flaws, sun cracks and other defects. The planned surface shall be smoothened free from blemishes and discolorations. Timber shall be wrought, framed and cut to shape as shown on drawings and/or as directed.
- ii. All timber for carpentry and joinery in touch with masonry or concrete shall be coal tarred or creosoted before fixing. All rough frame work in partitions, suspended ceilings and veneering to walls etc., shall be treated with approved wood preservative 'Bison' or other equivalent and approved as per manufacturer's instructions and specifications. The rates quoted shall provide for such treatments.
- iii. All fully fabricated timber shall be air seasoned on site of work for a period of not less than two months to allow for any shrinkage that may take place. The preparations of timber for joinery is to commence simultaneously with the beginning of the project work generally and should proceed continuously until all the wood work is prepared and fixed/stacked on or near the site as the case may be. Generally wood shall be free from knots, however, wood with knots may be permitted provided individual hard and sound knot shall not be more than 40

mm n diameter and aggregate area of all the knots shall not exceed one half percent of the area of the piece

Teak wood shall be approved incorporating in the work Contractor should ensure wood work does not warp or show other defects due to lack of proper seasoning.

4.2.1 HOLD FASTS :

Three hold-facts shall be fixed to each post of the door from and two to each post of the window frame. Unless otherwise mentioned in the item, the M.S. Hold-fasts shall be of the Size 300mm x 35 mm and 6 mm and shall be fixed to the frames by means of screws and not nails. The other. End of the hold fast shall be fixed into jambs within 1:2:4 P.C.C if dimensions as directed.

Whenever asked for, rawl plugs or bolts as directed shall be used for rough grounds framing hangers etc. The rates quoted for wood work and joinery shall allow for all types of hold fasts as directed (Horns in frames shall be cut and shall not be used as hold facts)

4.3 WORKMANSHIP AND CONSTRUCTION :

- i. The workmanship shall be first class and to the approval of the E.E. Scantling and boarding shall be accurately sawn and shall be of required width and thickness. All carpenter's work shall be wrought except where otherwise described. The workmanship and joinery shall be accurately set out in strict accordance with the drawings and shall be framed together and securely fixed in approved manner and with properly made joints. All work is to be properly tenoned, shouldered, wedged, pinned, braded etc. and properly glued with approved quality glue to the satisfaction of the E.E.

ii. SCREWS :

All screws to be used in wood work and joinery shall be of brass and not iron.

lii TOLERANCES :

15mm (1/16") will be allowed for each wrought face of the sizes specified except where described as 'finished' in which case they shall hold to the full dimensions. For door/window frames tolerance shall be +/- 2/3 mm. in cross sectional dimensions and for shutters +/- mm in thickness +/- 2/3 mm in width of styles and rails. For flush door shutters tolerance in width/height shall be +/- 3 mm and on thickness +/- 1.2 mm.

iv. PROTECTION :

Il wood work and joinery edges of timber frames etc., shall be protected from being damaged during construction by the Contractor.

- v. If it is decided by the Employer to provide antitermite treatment, the Building Contractor shall coordinate his work suitably as directed by the Executive Engineer.

- vi. Door/Window frames shall have cut rebates. Planted rebates shall not be permitted.

4.4 WOODEN FLUSH SHUTTERS (SOLID CORE TYPE)

- a. Solid core flush shutters shall be of commercial or Teak veneered type as specified in the item manufactured by M/s Sita Board Mysore Commercial Union Ltd., or other equivalent and approved quality. An approved sample shall be deposited in the office of the Corporation's Engineer on site for reference. The shutters will be provided with lipping. Finished thickness of the shutter shall be as mentioned in the item.

a. **PARTITION BOARD :**

Shall be of waterproof quality 'NOVA TEAK SUPER' (Phenol bonded, 3 layers flat pressed), manufactured by M/s Plywood Manufacturing Ltd., Bombay or other equal and approved.

4.5 TEAK WOOD PANELLED SHUTTERS :

Solid wood panels for shutter shall be of pattern and size specified. Wherever possible each panel shall be in a single width piece. But where two pieces are used, width of each piece should not be less than 12.5 cm. In order to avoid warping, splitting and cracking, normally pieces not exceeding 20 cm. in width should be used. When made from more than one pieces. The pieces shall be jointed with a continuous tongued and grooved joint and glued together and reinforced the longer dimension of the panel. Planes shall be framed in to grooves to the full depth of the groove leaving an air space of 1.6 mm and the faces shall be closely fitted to the sides of the groove. Mouldings to the edges of panel openings shall be scribed at the joints.

4.6 FIXTURES AND FASTENINGS :

Unless otherwise specified in the Schedule of Quantities each shutter shall be hung with three iron butt/parliamentary hinges of approved quality size and make with iron screws the things and screws bolt should be copper Oxide coated and the Contractors rate shall cover for providing and fixing hinges to the shutters. Unless otherwise specified in the Schedule of Quantities other fittings, if ordered, shall be paid separately as prime cost items. Hardware for doors and windows shall be of M/s Bivon, M/s Manmatha Hari & Sons, M/s De's Lock Industries, M/s Godrej, M/s Garnishor other equivalent and approved make.

4.7 FINISHING :

The wood work shall be finished by 3coat of painting. French polishing or wax polishing as specified in the item.

4.8 RATE TO INCLUDE :

Apart from other factors mentioned elsewhere in this Contract, the rate for item of wood work and joinery shall include for the following :-

- i. All labour, materials and equipments for carrying out the work.
- ii. Providing and fixing frames and shutters, fastening and fixtures including embedding in the floor about 40/50 mm deep and labour for fixing hardware fittings, supplied by L.I.C.I. or purchased under prime cost items.

- iii. Bison or other equivalent wood preservative treatment to rough frame work in partitions, suspended frame work in ceilings and timber veneering to walls etc.
- iv. Coal tarring / creosoting of embedded parts of woodwork in masonry and concrete.
- v. Unless otherwise specified, sheet glass (plain or frosted) for shutters of doors/windows/fanlight, as manufactured by M/s Hindustan Pilkington or other equal and approved.
- vi. T.W. beadings/T.W. planted beads for fixing panels of shutters of doors, wherever required to be provided.
- vii. Providing T.W. cover mould of approved size.
- viii. 3 coats of 1st quality synthetic Enamel paint of approved colour and shade including primer as manufactured by M/s The Alkalis & Chemical Corporation of India Ltd. (With I.S.I. trade mark), M/s Goodlace Nerolac, M/s Jenson & Nicholson or equal and approved, 3 coats of French or wax polishing to approval as specified in the item.

4.9 **MODE OF MEASUREMENT :**

Timber Doors/Windows shall be measured in Sqm. over door, window frames if the item specified is composite one otherwise only shutter shall be measured in Sqm. Length shall be measured nearest to centimeter.

5. **WHITE GLAZED TILES IN FLOORING AND DADO**

5.01 **TILES**

White glazed tiles including specials shall be of approved make and quality and shall conform to IS-777-1961 in all respects. Samples of tiles shall be got approved by the Chief Engineer, who will keep them in his office for verification as to whether the materials brought for use conform to the approved samples. White glazed tiles shall be of the size 152x152x 5 mm.

5.02 **MORTAR BEDDING :**

Unless otherwise specified the tiles in Flooring shall be laid In the cement mortar 1:6 bedding . The amount of water added shall be minimum necessary to give just sufficient plasticity for laying and satisfactory bedding. Care shall be taken in preparing the mortar to ensure that there are no hard lumps that would interfere with the even bedding of the tiles. Before spreading mortar, sub-floor or base shall be cleaned of all dirt, scum, loose materials and laitance if any, by scrubbing with coir or steel wire brush or by hacking if necessary and then well wetted without forming any pools of water on the surface. Before laying, the mortar , the sub-grade shall be got approved by the Executive Engineer in case of R.C.C. floors, the top shall be left a little rough. All points of level for the finished paving surface shall be marked out. The mortar shall then be evenly and smoothly spread over the base by the use

of screed battens only over so much area as will be covered with tiles before the setting of the mortar. The thickness of the mortar bed shall not be less than 20 mm.

5.03 LAYING, FINISHING, CURING AND CLEANING :

The tiles before laying shall be soaked in water for at least 2 hours. Tiles which are fixed in the floor adjoining the wall shall be so arranged that the surface of the round edge tiles shall correspond to the skirting or dado. Neat cement grout of honey like consistency shall be spread over the bedding mortar just to cover so much area as can be tiles within half an hour. The edges of the tiles shall be smeared with neat white cement slurry and fixed in this grout one after the other, each tile being well pressed and gently tapped with a wooden mallet till it is properly bedded and in level with the adjoining tiles. There shall be no hollows in bed of joints. The joints shall be kept as close as possible and in straight lines. The joints between the tiles shall not exceed 1.5mm wide. After fixing the tiles finally in an even plane, the flooring shall be covered with wet saw dust. The tile flooring shall be cured for 14 days.

After the tiles have been laid in a room or the day's fixing work is completed the surplus cement grout that may have come out of the joints shall be cleaned off before it sets. Once the floor has set, the floor shall be covered with oil free dry saw dust which shall be removed only after completion of the construction work and just before the floor is occupied.

5.04 RATES TO INCLUDE :

Apart from other factors mentioned elsewhere in this contract, the Contractor's rate quoted include for the following.

- i. Cleaning the base and providing and laying bedding mortar and levelling.
- ii. Providing and fixing the tiles including all specials like round edges corner cups, angles etc. in neat cement float over the bedding mortar.
- iii. Filling the joints of tiles with neat white cement slurry.
- iv. Finishing, curing and cleaning.
- v. All labour, materials and use of tools for carrying out the items as specified above.

5.05 MODE OF MEASUREMENT :

Measurement for flooring tiles shall be in square metres as provided.

5.06 WHITE GLAZED TILES DADO :

a. TILES

White glazed tiles shall be same as described under white glazed tiles flooring.

b. MORTAR BACKING :

All joints in the face work shall be raked out to a depth equal to not less than the width of the joints or as directed by the Executive Engineer. Concrete surfaces shall be properly hacked. All dirt, soot oil, or any other material that might interfere with satisfactory bond shall be removed. The surface shall be cleared and scrubbed with fresh water and kept wet for 6 hours prior to applying backing mortar. The dado work shall not be commenced unless the preparatory work is passed by the Executive Engineer. The proportion of mortar bedding shall be 1:3 cement mortar. Sand in mortar bedding shall be from approved source, and shall conform to I.S.1542-1960 as applicable to internal wall and ceiling plastering and external wall plastering. The thickness of mortar backing shall not be less than 12mm and not more than 20mm.

c. FIXING DADO TILES :

Dado work shall be done after fixing tiles on the floor. The white glazed tiles shall be soaked in water for atleast 2 hours before being used for dado work. Tiles shall be fixed when the cushioning mortar is still plastic and before it gets very stiff.

The back of tiles shall be covered with a thin layer of neat cement paste and the tile shall then be pressed in the mortar and gently tapped against the wall with a wooden mallet. The fixing shall be done from bottom of wall upwards without any hollows in the bed or joints. Each tile shall be fixed as close as possible to the one adjoining. The tiles shall be jointed with white cement slurry. Any difference in the thickness of tiles shall be evened out in cushioning mortar so that all tiles faces are in one vertical place. The joints between the tiles shall not exceed 1.5mm in width and they shall be uniform. The tiles shall be fixed with straight joints. After fixing the dado, they shall be kept continuously wet for 14 days. If doors, windows or other openings are located within the dado area, the sills, jambs angles etc., shall be provided with white glazed tiles and appropriate specials according to the foregoing specification and such tiled area be measured net along with the dado.

d. CLEANING :

After the tiles have been fixed the surplus cement grout that may have come out of the joints shall be cleaned off before it sets. After the complete curing, the dado or skirting work shall be washed thoroughly clean.

5.07 RATES TO INCLUDE :

Apart from other factors mentioned elsewhere in this contract, the rates for the item or dado or skirting shall include the following:-

- i. Backing mortar.

- ii. Providing and fixing tiles including all specials like round edges, angles, capping etc. in neat cement float over backing mortar.
- iii. Jointing of the tiles with white cement slurry.
- iv. Curing.
- v. Cleaning.
- vi. All labour, material, use of tools and equipments for carrying out the items as specified above.

5.08 MODE OF MEASUREMENT :

Dado shall be measured in square metres as provided.

6. POLISHED KOTAH/SHAHABAD/TANDUR STONE FLOORING, DADO/LINING AND SKIRTING FLOORING**6.1 STONE SLABS :**

The stone slabs shall be hard, sound, durable, resistant to wear. Unless otherwise specified, stone slabs shall be square in shape 30 x 30 cm size and 25mm thick. The stone slabs shall be without any soft veins, cracks or flaws and shall have a uniform colour. A tolerance of 3mm in thickness at any point shall be permitted. The exposed surface of stone slabs, shall be machine polished to a smooth even and true plan and the edges to be chiselled to half its depth, true and square to ensure uniform width of joint. The edges of stone slabs shall be machine cut square to the required shape, if necessary. The stone slabs shall be of approved colour and shades. A few approved samples of stone slabs to be used shall be deposited by the Contractor in the office of the Corporation's Engineer.

6.2 MORTAR BEDDING :

Lime mortar shall be prepared in mortar mill or pan. The amount of water added shall be the minimum necessary to give just sufficient plasticity for laying and satisfactory bedding. Care shall be taken in preparing the mortar to ensure that there are no hard lumps that would interfere with the even bedding of the stone slabs. Before spreading the mortar the sub-floor or base shall be cleaned of all dirt, scum, loose materials and laitance if any by scrubbing with coir or steel wire brush or by hacking if necessary, and then well wetted without forming any pools of water on the surface. Before laying the mortar, the sub-grade shall be got approved by the Executive Engineer. In case of R.C.C. floors, the top shall be left a little rough. All points of level for the finished paying surface shall be marked out. The mortar shall then be evenly and smoothly spread over the base by the use of screed battens, only over so much area as will be covered with slabs within half hour. The thickness of the mortar bedding shall not be less than 15mm and not more than 25mm. The required slope shall be given to the bed. Unless otherwise specified, the proportion of mortar bedding shall be 20 mm

thick average cement mortar 1:6 and where lime bedding is specified in the scheduled of the quantities proportion of Lime mortar shall be 1:3 1 lime : 3 sand).

6.3 LAYING, CURING, POLISHING, FINISHING AND CLEANING :

Before laying the stone slabs shall be thoroughly wetted with clean water. Neat cement grout of honey like consistency shall be spread on the mortar bed over as much area as could be covered with the slabs within half an hour. The stone slabs shall be laid on the neat cement float and shall be evenly and firmly bedded to the required level and slope in the mortar bed. The stone slabs shall be laid in the approved pattern in single or two tone colour.

Each stone slab shall be gently tapped with a wooden mallet till it is firmly and properly bedded. There shall be no hollows left. If there is a hollow sound on gently tapping of the stone slab, such stone slabs shall be removed and reset properly. The mason shall make the joint of uniform thickness and straight lines. The thickness of joints shall not exceed 1.5mm. The joints shall be grouted with neat cement slurry. No border stone slabs shall be less than 100mm in width, unless otherwise approved by the Executive Engineer.

When the bedding and joints of the flooring have been completely set, the surface shall be machine polished to give a smooth, even and true plane to the floor and thoroughly cleaned.

6.4 RATES TO INCLUDE :

Apart from other factors mentioned elsewhere in this contract, the Contractors rate quoted shall include for the following :

- i. Cleaning the base of providing and laying bedding mortar and leveling.
- ii. Providing and fixing the stone slabs in neat cement float on the bedding mortar.
- iii. Filling joint of stone slabs with neat cement slurry of required colour to match the colour of the stone slabs.
- iv. Chiselling, polishing, finishing and cleaning.
- v. All labour, materials and use of tools for carrying out the item as specified above.

6.5 MODE OF MEASUREMENT :

Measurement for flooring, stone slabs shall be in square metre as provided.

6.6 DADO / LINING AND SKIRTING

The stone slabs shall be as specified above for flooring unless otherwise mentioned. The stone slabs shall be in approved lengths to match the flooring. The exposed edges of stone slabs such as in dado/lining and skirting, jams, soffits, sills etc, shall be machine cut and polished smooth.

a. MORTAR BACKING :

All joints in the face work shall be raked out to a depth equal to not less than the width of the joints or as directed by the Executive Engineer. Concrete surfaces shall be properly backed. All dirt, oil or any other materials that might interfere with satisfactory bond shall be removed. The surface shall be cleaned and scrubbed with fresh water and kept wet for 6 hours prior to applying backing mortar. The dado/lining or skirting work shall not be commenced unless the preparatory work is passed by the Executive Engineer. The proportion of mortar for backing shall be 1:3 cement mortar. Sand in mortar bedding shall be from approved sources and shall conform to I.S. 1542-1960 as applicable to internal wall and ceiling plastering and external wall plastering. The thickness of mortar backing shall not be less than 12mm and not more than 20mm.

b. FIXING DADO/LINING OR SKIRTING STONE SLABS :

Dado/lining or skirting shall be done only after fixing stone slabs on the floor. The stone slabs shall be thoroughly wetted in water before being used for Dado/lining or skirting work. The stone slabs shall be fixed when the backing mortar is still plastic and before it gets stiff. All the stone slabs shall be covered with an additional layer of neat cement paste and stones shall then be pressed in mortar and gently tapped against the wall with wooden mallet. The fixing shall be done from the bottom of wall upwards without any hollows in the beds or joints. Each stone slab shall be fixed as close as possible to the adjoining stone slab. The stone slab shall be jointed in neat cement slurry to match the colour of the stones. The joints shall not exceed 1.5mm in width and they shall be uniform. While fixing the stone slabs in dado/lining or skirting work, care shall be taken to see that the joints in the adjoining flooring below, matches with the joints in the dado/lining or in skirting, as the case may be, or shall be staggered as directed. When specified brass cramps and bins etc. of approved size shall also be used for fixing dado/lining.

c. POLISHING :

When stone slabs are completely set, polishing shall be done by hand with approved type of polishing stone. A smooth and even polished surface shall be obtained to match the finished surface of the flooring.

d. CURING :

The dado/lining or skirting shall be kept wet for 14 days.

6.7 RATES TO INCLUDE :

Apart from other factors mentioned elsewhere in this contract the rate for the item of dado/lining or skirting shall include the following :-

- i. Backing mortar.
- ii. Providing and fixing stone slab with exposed edges machine cut including all special tiles and finishing the edges with plaster.

- iii. Providing and fixing brass cramps and pins etc., for dado/lining where specified.
- iv. Joints of the stone slabs filled with coloured cement slurry to match the stone slabs.
- v. Curing.
- v. Chiselling, polishing, use of tools and equipments for carrying out the items as specified above.

6.8 **MODE OF MEASUREMENT :**

- a. Dado/lining shall be measured in Square Metres as provided.
- b. The height of skirting shall be specified in the item and shall be measured in R.M.
(Skirting up to 30 cm. in height shall be measured in running metres)

7. **CAST IN SITU MARBLE MOSAIC FLOORING, DADO AND SKIRTING.**

7.1 **CAST IN SITU MARBLE MOSAIC FLOORING :**

i. **PREPARATION OF SUB-GRADE :**

The sub-grade shall be prepared as for the cement concrete flooring.

ii. **FLOORING COMPOSITION :**

This will compose of two layers, the bottom one called the 'Under coat' and the top one called the 'Top coat'. The bottom coat shall be 30mm thick and the top coat shall be 10mm thick. The total thickness shall be 40mm unless otherwise stated.

a. **UNDER COAT :**

The under coat will have the same proportion and consistency as for cement flooring and shall be mixed and placed in the same manner, except that no finishing shall be done to make the surface smooth ; the top surface of concrete in the under coat shall be kept sufficiently rough to form a key to the top coat.

b. **ALUMINIUM STRIPS :**

While laying the under coat, aluminium strips of 10 gauge and 40mm wide as separators shall be provided to form approved panels. The area of each panel in the flooring shall not exceed 1.5 Sq. Metres the longest side of any panel not exceeding 2 metres. The cost of providing aluminium strips in the flooring shall be included in the rate quoted for mosaic flooring.

c. **TOP COAT :**

The grading, proportion and colour of the marble chips shall be got approved from the Executive Engineer after preparing a few samples of cast in situ mosaic flooring. The proportion of white cement, grey cement, coloured cement, pigments and marble chips in the top coat shall be got approved from the Executive Engineer to get light

shades, medium shades and dark shades as required. The proportion of cement to marble chips shall be 1:2. The top coat shall be laid as per I.S.:2114-1962.

iii. **POLISHING AND FINISHING :**

After the top coat has hardened enough to prevent dislodgement of aggregate particles, the surface shall be machine polished and finally washed with 'TATRI' and then wax polished to give a smooth and shining surface.

iv. **CURING :**

The flooring shall be kept covered and damp till it is properly set and given final finish.

v. **RATES TO INCLUDE :**

Apart from other factors mentioned elsewhere in this contract, the rates shall include for the following:

- a. Providing and laying 1:2:4 cement concrete for under coat in panels.
- b. Providing and fixing aluminium strips to form panels.
- c. Mixing the ingredients of terrazzo mix in white cement grey cement coloured cement/approved pigments and marble chips of approved quality, maximum size and graded down as required and laying it in the top coat.
- d. Curing
- e. Machine polishing and finishing as specified above.

vi. **MODE OF MEASUREMENT :**

The measurement shall be in Square Metre of cast in situ mosaic flooring provided.

7.2 DADO AND SKIRTING :

- a. Dado and skirting shall be laid in two layers, the under coat being laid as plaster and the top coat with marble chips in white/grey/coloured cement as required.

b. **UNDER COAT :**

The under coat shall be in 1:3 cement mortar and shall be applied to the wall surface as per plaster. The thickness of the plaster shall be 12mm for brick and concrete faces, and 20mm for stone faces. The surfaces of the under coat shall be kept rough to form a key for the top coat of the marble chips in white/grey/coloured cement as required in different proportions.

c. **ALUMINIUM STRIPS :**

Aluminium strips shall be provided minimum 10 gauge and width to suit the thickness of the dado (Inclusive of top coat). The aluminium strips shall be fixed in plaster when it is green. Spacing of aluminium strip shall not exceed 2 metres.

d. **TOP COAT :**

This shall be similar to the top coat in cast-in-situ mosaic flooring.

e. **POLISHING :**

The finished surface shall be rubbed with Carborandum stone and finally washed with "Tatri" and then wax polished to get smooth and shining surface. The surface shall be kept damp till it is properly set.

7.3 RATES TO INCLUDE :

Apart from other mentioned elsewhere in this contract, the rates shall include for the following :-

- i. Applying under coat in 1:3 cement mortar and roughening the surface.
- ii. Providing and fixing aluminium strips.
- iii. Mixing the ingredients of terrazzo mix as required and laying it in top coat.
- v. Curing.
- v. Polishing and finishing the dado/skirting.

7.4 MODE OF MEASUREMENT :

- i. Dado shall be measured in Square Metre.
- ii. Skirting less than 30 cm. height shall be measured in running metre.

7.

8. PLAIN OR COLOURED CEMENT TILES OR TERRAZZO TILES FLOORING DADO AND SKIRTING

8.1 FLOORING :

8.2 TILES :

Plain or coloured cement tiles and terrazzo tiles shall be manufactured as per I.S.: 1237-1980 using grey or white cement and pigments and marble chips of sizes as required. Tiles shall be of the size 250x250x22 mm (10"x10"x7/8") or any other approved size. Tiles shall be of tiles to be used shall be deposited by the Contractor in the office of the Corporation's Engineer.

8.3 CONCRETE BASE AND MORTAR BEDDING :

The base of cement or lime concrete shall be laid and compacted to a reasonably true plain surface and to the required slopes and below the levels of the finished floor to the extent of the thickness of the tiles and mortar bedding. Cement concrete or lime concrete base shall be paid under a separate item. Lime surkhi-mortar for bedding shall be prepared in a mortar mill. The amount of water added shall be minimum necessary to give just sufficient plasticity for laying and satisfactory bedding. Care shall be taken in preparing the mortar to ensure that there are no hard lumps that would interfere with the even bedding of the tiles. Before spreading mortar, sub-floor or base shall be cleaned of all dirt, scum, laitance and all loose

materials and then well wetted without forming any pools of water on the surface. In case of R.C.C. floors, the top shall be left a little rough. All points of level for the finished paving surface shall be marked out. The mortar shall then be evenly and smoothly spread over the base by the use of screed battens only over so much area as will be covered with tiles before the setting of the mortar. The thickness of the mortar bedding shall be 1:1:1 (1 lime putty: 1 surkhi: 1 sand). Sand for mortar bedding shall be as per I.S.S. No. 2116-1965 as applicable to unreinforced masonry work. Skirting, dado and raisers of steps/staircase shall be fixed on backing of cement mortar 1:3, 12mm thick with thick cement paste.

8.4 LAYING CURING, POLISHING, FINISHING AND CLEANING :

Before laying, the tiles shall be thoroughly wetted with clean water. Tiles shall be laid as per approved pattern on the mortar bed and floated in neat cement slurry. The joints of the tiles shall not be more than 1.5 mm wide and shall be filled with neat cement slurry of required colour to match the colour of the tiles if required, the border tiles shall be cut to proper sizes and the rate quoted shall cover for the same. No border tile shall be less than 100 mm in width, unless otherwise approved by the Executive Engineer.

Flooring shall be kept wet for 14 days.

Polishing and cleaning of the whole floor shall be done according to I. S. 1443-1959

8.5 RATES TO INCLUDE :

Apart from other factors mentioned elsewhere in this contract, the contractor's rate quoted shall include for the following:-

- i. Cleaning the base and providing and laying bedding mortar and leveling.
- ii. Providing and fixing the tiles in neat cement float on the bedding mortar.
- iii. Filling the joints of tiles with neat cement slurry of required colour to match the colour of the tiles.
- iv. Polishing finishing and cleaning. All labour, materials and use of tools for carrying out the item as specified above.

8.6 MODE OF MEASUREMENT :

Measurement for flooring tiles shall be in Square Metre as provided.

8.7 NOTE :

- a. Tiles with white cement shall be considered as light shade tiles.
- b. Tiles approximately 50% white cement and 50% ordinary cement shall be considered as medium shade tiles.
- c. Tiles with ordinary cement shall be considered as dark shade tiles.
- d. Marble chips for terrazzo/marble mosaic tiles shall be varying from the smallest up to 20mm size.

8.8 DADO AND SKIRTING :

- a. Tiles shall be as specified above for flooring, except that in the case of skirting the height of tiles may be less than the height of 1 full tile.
- b. **MORTAR BACKING :**
The proportion of mortar for backing shall be 1:3 cement mortar. Sand in mortar bedding shall be as per I.S. No.1546-1960 as applicable for under coat of internal plastering.
- c. **FIXING DADO OR SKIRTING TILES :**
Dado or skirting shall be done only after fixing tiles on the floor. The tiles shall be soaked in water before being used for dado or skirting work. The tiles shall be fixed when the backing mortar is still plastic and before it gets stiff. All the tiles shall be covered with an additional layer of neat cement paste and tiles shall then be pressed in mortar and gently tapped against the wall with wooden mallet. The fixing shall be done from the bottom of wall upwards without any hollows in the beds or joints. Each tiles shall be fixed as close as possible to the adjoining tile. The tile shall be jointed in neat cement slurry to match the colour of the tiles. The joints shall not exceed 1.5mm in width and they shall be uniform. While fixing the tiles in skirting or in dado work care should be taken to see that the joints in the adjoining flooring tile below matches with the joints in the skirting or the dado tiles, as the case maybe, or shall be staggered as directed.
- d. **POLISHING :**
Polishing may be done by hand with approved type of polishing stone. A smooth and even polished surface shall be obtained to match the finished surface of the flooring.
- e. **CURING :** The dado or skirting shall be kept wet for 14 days.

8.9 RATES TO INCLUDE :

Apart from other factors mentioned elsewhere in this contract the rate for the item of dado or skirting shall include the following :-

- i. Backing mortar.
- ii. Providing and fixing the tiles including all special tiles and finishing the edges with plaster.
- iii. Joints of the tiles filled with coloured cement slurry to match the tiles.
- iv. Curing.
- v. Polishing and cleaning the dado and skirting.
- vi. All labour, material, use of tools and equipments for carrying out the items as specified above.

8.10 MODE OF MEASUREMENT :

- a. Dado shall be measured in Square metre.
- b. The height of skirting shall be specified in the item and shall be measured in R.M. (Skirting up to 30 cm. in height shall be measured in running meter.

9. MARBLE FLOORING**9.1 MARBLE SLABS :**

The marble shall be of approved shade and sources as mentioned in the Schedule of Quantities and their size and the thickness shall be as shown on the drawings and as approved by the Executive Engineer. They shall be of selected quality, dense, uniform and homogeneous in texture and free from cracks or other structural defects. It shall have even and crystalline grains. The surface shall be machine polished to an even and perfectly plain surface and edges machine cut true and square. The rear face shall

be rough enough to provide a key for the mortar. No slab shall be thinner than the specified thickness at its thinnest part. The dimension of slabs shall be as specified. A few approved samples of finished slabs to be used shall be deposited by the Contractor in the office of the Corporation's Engineer. Unless otherwise mentioned, the thickness of the marble shall be minimum 20 mm.

9.2 CONCRETE BASE AND MORTAR BEDDING :

The base of cement or lime concrete shall be laid and compacted to a reasonably true plain surface and to the required slopes and allow the level of the finished floor to the extent of the thickness of the slabs and mortar bedding. Cement concrete or lime concrete base shall be paid under a separate item. Cement concrete for bedding may be mixed manually or by a mechanical mixer as directed. Lime mortar shall be prepared in a mortar mill. The amount of water added shall be the minimum necessary to give just sufficient plasticity for laying and satisfactory bedding. Care shall be taken in preparing the mortar to ensure that there are no hard lumps that would interfere with the even bedding of the stones. Before spreading the mortar, sub-floor or base shall be cleaned of all dirt, scum or laitance and of loose materials and then well wetted without forming any pools of water on the surface. In case of R.C.C. floors, the top shall be left a little rough. All points of level for the finished paving surface shall be marked out. The mortar shall then be evenly and smoothly spread over the base by the use of screed battens only over so much area as will be covered with slabs within half an hour. The thickness of the mortar bedding shall not be less than 12mm (about 1/2") not more than 25mm (about 1").

9.3 LAYING MARBLE SLABS :

Before laying, the marble shall be thoroughly wetted with clean water. Neat cement grout of honey like consistency shall be spread on the mortar bed cover as much area as could be covered with the slab within 1/2 an hour. The specified type of marble slabs shall be laid to pattern as directed on the neat cement float and shall be evenly and firmly bedded to the required level and slope in the mortar bed. Each slab shall be gently tapped with a wooden mallet till it is firmly and properly bedded. There shall be no hollows left. If there is a hollow sound on gentle tapping on the slabs such slabs shall be removed and reset properly. The joints shall be hair fine width and in straight line grouted with neat coloured cement slurry to match the colour of the marble. The joints shall be struck smooth but there shall be no smearing over the mortar of the slabs. The edges of the adjoining slabs shall be in one plane.

- 9.4** The flooring shall be kept undisturbed at least seven days and wet for fourteen days. Marble flooring shall be given a final coat of wax polish of approved make. Polishing and cleaning of marble flooring shall be done according to I.S. No. 1443-1959.

9.5 RATES TO INCLUDE:

Apart from other factors mentioned elsewhere in this contract, the rate for item of marble flooring shall include for the following :-

- a. All labour, materials and equipments, cleaning the sub-base, laying mortar bed and cement grout and fixing marble slabs as specified above and making up the joints and wax polishing.
- b. Any cutting and waste if required.
- c. Curing.
- d. Cleaning the floor from all stains etc.

9.6 MODE OF MEASUREMENT :

The measurement shall be in Sq. metre for the actual marble flooring provided.

10. CEMENT POINTING RECESSED/FLUSH RECESSED POINTING :

10.1 PREPARATION OF SURFACE :

The joints in the masonry shall be raked out to a depth not less than the width of the joint as directed, when the mortar is green. The joints are to be brushed clean of dust and loose particles, with stiff brush. The Area shall then be washed and the joints thoroughly wetted before pointing is commenced. All dust and oily matters if any, shall be removed.

10.2 PROPORTION OF MORTAR :

The proportion of cement mortar shall be as described in item. The sand shall be from approved source free from foreign matter, washed clean if necessary and shall conform to I.S. 1542-1977. No more cement mortar shall be prepared than that can be used within half an hour. The mortar may be hand mixed or machine mixed. In hand mixed mortar, cement and sand in the specified proportion shall be thoroughly mixed dry on a clean impervious platform by turning over at least 3 times or more till a homogeneous mixture of uniform colour is obtained. Fresh and clean water shall be added gradually through a rose and thoroughly mixed so that mix becomes homogeneous and each particle of sand shall be completely covered with a film of wet cement. Mixing platform shall be so arranged that no deleterious extraneous material shall get mixed with mortar, not the mixing water of the mortar shall flow out.

10.3 APPLICATION :

Waterproofing compound of approved make, shall be added according to manufacturer's specifications to make the mortar waterproof. The raked out joints shall be filled with mortar of the specified mix and the required consistency and well pressed and rubbed smooth. A

semi-circular depression 3 mm dia shall be made in the joint by pressing clean string with trowel keeping the string exactly horizontal and on the centre line of the joint. The vertical joints shall be similarly marked. These depressed lines will then be immediately rubbed with a nayla till they become uniformly 5 mm deep and 6mm wide and assumed fairly blackish colour intersections of the horizontal and vertical shall be finished neatly with the vertical line just touching the horizontal line but not crossing it. All superfluous mortar shall be removed with the trowel. The brick surface shall be cleaned and no stain shall be allowed to remain.

When joints are not horizontal or vertical as in the case of uncoursed rubble masonry, the pointing shall be made along the centre line of joints to uniform width and depth as directed and junctions of pointing made nearly. The pointing mortar shall not spread over the adjoining stones. Mortar pointing shall be restricted to the width of the joints and all superfluous mortar shall be removed with a trowel.

10.4 CURING :

All pointing work shall be kept damp, continuously for a period of 14 days.

10.5 RATES TO INCLUDE :

Apart from other factors mentioned elsewhere in this contract rates for the item of pointing shall include for the following :-

- i. Erecting, dismantling and removing scaffolding.
- ii. Preparing the surface and watering.
- iii. Providing and filling in the joints with cement mortar, including approved waterproofing compound.
- iv. Curing and cleaning the surface.
- v. All labour, materials, use of tools and equipments to complete the work as per specification.

10.6 MODE OF MEASUREMENT :

Pointing shall be measured in square metres as in the case of plaster.

10.7 FLUSH POINTING :

This item shall be carried out, when joints are not struck, while the masonry is being laid. All the specifications of recessed pointing shall apply to this as well except that instead of making the lines with string and forming groove etc., the joints shall be kept flush with face of joints in the masonry.

11. INTERNAL CEMENT PLASTER WITH / WITHOUT NEERU FINISH :

11.1 REPARATION OF SURFACE :

The walls to be plastered to have all joints raked out to a depth of 10 mm if not already done. R.C.C. surface shall be properly backed to get good key to the plaster. All dust and oily

matter, if any, shall be brushed and cleaned and the surface to be plastered shall be kept wet for 6 hours before plastering is commenced.

11.2 PROPORTION OF MORTAR :

Unless otherwise mentioned, the proportion of internal cement plasters for walls and ceiling shall be 1:4 (1 cement: 4 sand). Sand shall be from approved source, free from foreign matter and shall be as per I.S. 1548-1960 as applicable to internal wall and ceiling plastering. No more cement mortar shall be prepared than that can be used within half an hour.

11.3 APPLICATION OF PLASTER :

The mortar shall be applied evenly with force on the surface to be plastered. The mortar surface shall be finished at once by being rubbed over with a trowel till the cement appears on the surface. All corners, angles and junctions shall be truly vertical and horizontal as the case may be, carefully and neatly finished. Rounding of corners and junction where required shall be done without extra charge. The mortar shall adhere to the surface intimately when set and there should be no hollow sound when struck. The thickness of plaster shall be minimum 12mm over the proudest part of the surface of brick wall and R.C.C. surfaces and 20mm over stone walls. Plaster for ceiling shall not be more than 12mm.

11.4 NEERU FINISH :

If the plaster surface is to be given neeru finish, the surface shall be combed slightly with wire brushes or nails before it is completely set to form key for neeru. The under coat shall be only damped but not soaked before the application of neeru. The lime for preparing neeru shall be fat lime and shall be of approved quality and source. Lime shall be slaked and mixed with sufficient water to form a thick paste. It shall be reduced to a fine paste by grinding. It shall then be passed through a fine sieve (3 mm mesh) to remove all unslaked particles and foreign matter and allow to mellow under water for at least 10 days in large slaking tanks. The surplus water on the top shall be allowed to run off. The slaked lime paste thus formed shall be used for preparing neeru. The neeru shall be prepared by mixing together 4 parts of this lime paste and 1 part of approved fine sieved sand by volume. Jute fibres finely chopped shall be added to the above mortar at the rate of 4 Kg. of jute to every Cubic Metre of lime sand mixture. The mixture shall then be properly ground to a fine paste between two stones or a mill. The neeru thus prepared shall be kept moist until used and no more than what can be consumed in 15 days shall be prepared at time.

Neeru shall be applied to the prepared and partially set but somewhat plaster surface with steel trowel to a thickness slightly exceeding 1.5 mm (About 1/16") and rubbed down to 1.5 mm (1/16") thickness and polished to a perfectly smooth and even finish, working from top to

bottom. While trowelling is going on soap stone powder contained in thin muslin bags shall be dusted over the surface and worked in.

Moisturing shall be commenced as soon as the plaster has hardened sufficiently and is not susceptible to injury. Soaking of wall shall be avoided and only as much water as can be readily absorbed shall be used. The surface shall be kept sprinkled with water for 14 days.

11.5 NEAT CEMENT FINISH:

When neat cement finish is specified over the plaster surface, a coat of pure Portland cement slurry 1.5mm thick shall be applied and well rubbed to the plaster surface while the plaster surface itself fresh.

11.6 TROWEL FINISH :

When no finish is specified, the plastered surface shall be rubbed well to an even plane with wooden flat for external surface and finished smooth with a steel trowel for internal surface.

11.7 RATES TO INCLUDE :

Apart from other factors mentioned elsewhere to this contract, rates for the item of plaster shall include for the following :-

- i. Erecting, dismantling and removing the scaffolding.
- ii. Providing the surface to receive the plaster.
- iii. Providing cement plaster of specified average thickness.
- iv. All labour, materials, use of tools and equipment to complete the plastering as per specification.
- v. Curing for 14 days.
- vi. Any moulding work if shown on the drawings or as specified unless separately provided in the tender.
- vi. Plaster work in hands, arises, rounded angles, fair edges, narrow returns, quirks, 'V' joints, splays, drip mouldings, making good to metal frames, junctions with skirting or dados, narrow widths and small quantities making good around pipes, conduits, timbers, sills, brackets, railings etc., and making good after all the sub-contractors or nominated sub-contractors have done their work.
- vii. Neeru or cement finish when specified in the item.
- viii.

11.8 MODE OF MEASUREMENT :

Plaster shall be measured in square metres.

a. WALLS :

- i. The measurements of wall plastering shall be taken between the walls or partitions (the dimensions before plastering shall be taken) for the length, and from the top of floor/skirting/dado (As the case may be) to the ceiling for the height.

ii. **DEDUCTIONS :**

A. For jambs, soffits, sills, etc., for openings not exceeding 0.5 m² each in area and opening not exceeding 3 m² each, deductions and additions shall be made in the following manner :-

- a. No deduction shall be made for ends of joists, beams, posts, etc., and openings not exceeding 0.5 m² each and no addition shall be made for reveals, jambs, soffits, sills etc., of these openings nor for finishing the plaster around ends of joists, beams, posts etc.
- b. Deductions for openings exceeding 0.5 m² but not exceeding 3 m² each shall be made as follows and no addition shall be made for reveals, jambs, soffits, sills etc., of these openings :-

1. When both faces of wall are plastered with the same plaster, deduction shall be made for one face only.
2. When two faces of wall are plastered with different plasters or if one face is plastered and the other pointed, deduction shall be made from the plaster or pointing out the side of frames for doors, windows, etc., on which the width of reveals, is less than that on the other side, but no deduction shall be made on the other side.

B. In case of openings of area above 3 m² each, deductions shall be made for the openings but jambs, soffits and sills shall be measured.

b. **CEILINGS :**

- i. Ceilings shall be measured between the walls or partitions and the dimensions before plastering shall be taken.
- ii. Ceilings with projected beams shall be measured over beams and the plastered sides of beams shall be measured and added to plastering on ceilings.

12. EXTERNAL CEMENT PLASTER WITH SAND FACED/COMBED /ROUGHCAST FINISH

12.1 PREPARATION OF SURFACE

The walls to be plastered to have all joints raked out to a depth of 10mm, if not already done, R.C.C. surface shall be properly hacked to get good key to the plaster. Any unevenness shall be leveled before the plastering is applied. All dust and oil matter if any, shall be brushed and cleaned with a stiff bristle or wire brush, and the surface to be plastered shall be kept wet for 6 hours before plastering is commenced. If the surface becomes dry in spots such areas shall be moistured again to restore uniform surface.

12.2 PROPORTION OF MORTAR :

Unless otherwise mentioned, the proportion of external cement plaster for brick or concrete surface shall be 1:4 (1 cement : 4 sand). Sand shall be from approved source free from foreign matter, washed clean if necessary and shall be as per I.S. 1542-

1977. No more cement mortar shall be prepared than that can be used within half an hour. The mortar may be hand mixed or machine mixed. In hand mixed mortar, cement and sand in the specified proportion shall be thoroughly mixed dry on a clean impervious platform by turning over at least 3 times or more till a homogeneous and mixture of uniform colour is obtained. Fresh and clean water shall be added gradually through a rose and thoroughly mixed so that mix becomes homogeneous and each particle of sand shall be completely covered with a film of wet cement. Mixing platform shall be so arranged that no deleterious, extraneous material shall get mixed with mortar not the mixing water of the mortar shall flow out.

12.3 APPLICATION OF PLASTER :

The plastering shall be done in two coats namely under coat and finishing coat.

UNDER COAT :

The under coat shall be of cement mortar 1:4. Water proofing compound of approved make shall be added according to manufacturer's specifications to make the mortar waterproof. Patches of plaster 15 cm x 15 cm shall be put on about 3 m apart as gauges to ensure even plastering in one plane. The thickness of the under coat in any part shall not be less than 8 mm and more than 12mm. The mortar shall be firmly applied with somewhat more than the required thickness and well pressed into the joints and on the surface and rubbed and leveled with a flat wooden rules to give required thickness. Long straight edges shall be freely used to ensure perfectly plane and even surface. All corners must be finished to their true angles or rounded as directed. Plastering shall be done from top downward. Keys shall be formed on the surface by thoroughly combing it with wavy horizontal lines about 12mm apart and 3mm deep when the mortar is still plastic. Under coat shall be cured for not less than 2 days before finishing coat is applied.

FINISHING COAT :

Cement mortar for finishing coat shall have washed approved sand with slightly larger proportion of coarse material. The proportion of cement to sand shall be 1:4. The finishing coat shall be of such thickness as to make total average finish to thickness equal to the required plaster thickness as described. The finishing coat shall be not less than 4mm or not more than 8mm thick. The finished surface shall be true and even and shall be present uniform texture throughout and all joining mark shall be eliminated. After application the surface should be finished with a wooden float lying with cork and tapped gently to retain coarse surface texture. A steel trowel shall not be used and overworking shall be avoided. Water shall not be applied to the surface of the finishing coat while working up, but patches showing signs of premature drying may be patted with a damp float. When the finishing coat has hardened, the surface shall be kept moist continuously for 14 days. In any continuously and day to day breaks made to coincide with Architectural breaks in order to avoid unsightly junctions. All mouldings shall be worked true to template and drawn neat clean and level. All exposed angles and junctions with door frames etc. shall be carefully finished as directed.

- 12.4** All plaster work shall be kept most continuously for a period of 14 days. To prevent excessive evaporation on the sunny or windward side of the buildings in hot dry weather, matting or gunny bags may be hung over on the outside of the plaster in the beginning and kept moist.

12.5 RATES TO INCLUDE :

Apart from other factors mentioned elsewhere in the contract, rates for the item of plaster shall include for the following :

- i. Erecting, dismantling and removing scaffolding.
- ii. Preparing the surface to receive the plaster.
- iii. Providing cement plaster of the specified average thickness, in two coats, including waterproofing compound.
- iv. All labour, materials, use of tools and equipment to complete the plastering as per specifications.
- v. Curing 14 days.
- vi. Any moulding work if shown on the drawings or as specified unless separately provided in the tender.
- vi. Plaster work in hands, arises, rounded angles, fair edges narrow returns, quirks, 'V' joints, splays, drip mouldings, making good to metal frames, junctions with skirting or dados, narrow widths and shall quantities, making good and pipes, conduits, timbers, sills, brackets railings, etc. and making good after all the subcontractors or nominated sub-contractors have done their work.

12.6. MODE OF MEASUREMENT :

All plastering work shall be measured in square metres. Dimensions shall be measured and quantity worked out correct upto two places of decimals in metre and square metre respectively. If the average thickness of plaster provided by the contractor is more than what is specified on any account, no extra payment will be made. For jambs, soffits, sills, etc. for openings not exceeding 0.5m² each in area ends of joists, beams posts, etc. not exceeding 0.5m² each in area and openings not exceeding 3m each deductions and additions shall be made in the following manner :

- a. No deduction shall be made for ends of joints, beams, posts, etc. and opening not exceeding 0.5 m² each , and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings nor for finishing the plaster around ends of joists, beams, posts etc.
- b. Deductions for openings exceeding 0.5m² but not exceeding 3m² each shall be made as followed and no addition shall made for reveal, jambs, soffits, sills, etc. of these openings :
 - i. When both faces of wall are plastered with the same plaster, deduction shall be made for one face only.

- ii. When two faces of wall are plastered with different plasters or if one face is plastered and the other pointed, deduction shall be made from the plaster or pointing on the side of frames for doors, windows, etc. on which the width of reveals is less than that on the other side, but no deduction shall be made on the other side.

In case of openings of area above 3m² each, deductions shall be made for the openings but jambs, soffits and sills shall be measured.

12.7 COMBED FINISH :

All the specification given above for sand finish shall apply to this as well except that in the case of combed finish, the finishing coat will be treated to have combed texture of approved pattern.

12.8 ROUGH CAST FINISH :

- a. All the specifications given above for sand faced finish shall apply to this as well except for the application of plaster which is described below.

b. APPLICATION OF PLASTER :

The plastering shall be done in two coats namely under coat and finishing coat. The under coat shall be done same as in case of sand faced finish. The finishing coat shall contain a fairly coarse aggregate and shall be thrown on as wet mix and shall be left in rough condition. The mortar of the finishing coat shall consist of coarse aggregates of crushed stone or fine gravel of size generally 6 to 12 mm as approved by Executive Engineer and specially graded mixture, mixed with approved sand and cement. The proportion of cement to sand and aggregate/gravel shall be generally 1: 1½ : 3. The mortar shall be flung upon the under coat with large trowels to form an even protection coat. The finishing coat must be applied while the under coat is still soft and plastic. The thickness of the finishing coat shall be about 12mm unless otherwise specified.

13. WHITE WASHING, COLOUR WASHING AND DISTEMPERING:

13.1 WHITE WASHING :

A. MATERIALS :

White wash shall be prepared from fresh burnt fat lime. The lime shall be dissolved in a tub with sufficient quantity of water (about 4/5 litres/kg. of lime) and the whole thoroughly mixed and stirred until it attains the consistency cream. The wash shall be taken out in small quantities and strained through a clean coarse cloth. Clean gum dissolved in hot water shall then be added in suitable proportion of two grams of gum arabic to a litre of lime to prevent the white wash coming off easily when rubbed. Rice seize may also be used instead of gum., gum Regd. Neel colour added for whiteness .

B. SCAFFOLDING :

This shall be double or single according to requirements and as directed. If ladders are used pieces of old gunny bags or cloth bags shall be tied on their tops to avoid damage or scratches to the plastered surfaces, etc. proper stage scaffolding shall be erected when white washing the ceiling.

C. PREPARATION OF SURFACE :

The surface shall be prepared by removing all mortar droppings and foreign matter other means as may be ordered by the corporation's Engineers to produce an approved clean and an even surface. All loose pieces and scales shall be scraped of and holes, cracks etc. stopped with mortar to match with the surrounding finish. In case where the surfaces have been previously white washed or colour washed, the old white or colour wash shall be entirely removed and surfaces broomed down before the new white wash is applied. In case the old white wash cannot be removed by brooming, the surfaces shall be cleaned by scraping.

D. APPLICATION OF WHITE WASH :

On the surface so prepared, the white wash shall be laid on with a brush. The first stroke of the brush shall be from top downwards, another from bottom upwards over the first stroke and similarly one stroke from the right and another from the left over the first brush before it dries. This will form one coat. each coat must be allowed dry and shall be subject to inspection and approval before the next coat is applied. When dry, the surface shall show no signs of cracking. It shall present a smooth and uniform finish free from brush marks and it should not come off easily when rubbed with a finger. Minimum 3 coats of white wash shall be applied.

No portions in the surface shall be left out initially to be patched up later on. For old work, patches and repairs shall be white washed first. Thereafter, the whole surface shall be white washed with the required number of coats. For new work, the white washed surface shall present a smooth and uniform finish. Doors, windows, floors and other articles of furniture, etc shall be protected from being splashed upon. Splashing, droppings, if any, shall be removed and the surfaces cleaned.

E. RATES TO INCLUDE :

Apart from other factors mentioned elsewhere in this contract, the rates for white wash shall include for the following.

- i. All labour material, equipment required for white washing.
- ii. The surface for white wash including the scaffolding. Scaffolding including erection and removal.
- iii. Providing and preparing the white wash.
- iv. Preparing
- v. Applying the white wash in three coats minimum. If a proper even surface is not obtained to the satisfaction of the Executive Engineer in 3 coats, contractor shall carry out additional coats of white wash to approval at Contractor's expenses.

F. MODE OF MEASUREMENT :

The measurement shall be in sq. metre. The mode of measurement shall be as applicable to that for plaster.

13.2 COLOUR WASH :

MATERIAL :

This shall be prepared by adding approved colouring matter to the white wash (prepared for white washing) according to that required. In all other respects the same conditions and specification as applicable to white wash shall also be applicable to colour wash.

13.3 DISTEMPERING : POWDERED/DRY DISTEMPER :

a. MATERIAL :

The powdered/dry distemper shall be of approved colour and shade manufactured by M/s Blundell Eomite or other equivalent and approved.

b. SCAFFOLDING :

This shall be double or single as required and directed.

c. PREPARING THE SURFACE :

The surface to be distempered shall be cleaned and all cracks, holes and surfaces defects shall be repaired with gypsum and allowed to set hard. All irregularities shall be sand prepared smooth and wiped clean. The surface so prepared must be completely dry and free from dust before distempering is commenced. In the case for walls newly plastered, special care shall be taken to see that it is completely dry before any treatment is attempted. For the old surface which had earlier been distempered, the surface shall be cleaned of grease dust etc. the flaking of previous coatings, if any, shall be taken off. all cracks, holes, and surface defects shall be repaired with gypsum and allowed to set hard and then sand prepared smooth and wiped clean. But in case the surfaces are coloured or white washed, the wash must be removed thoroughly first.

d. PRIMING COAT:

The priming coat shall be applied over the completely dry surface in the manner recommended by the makers in the case of patent distempers. When no priming coat is specified by the manufacturer a finely powdered chalk mixed with a thin solution of glue shall be applied to prepare a good, hard background the coating when dry being sand prepared as clean and smooth as possible.

e. APPLICATION OF DISTEMPER :

The instructions of the makers shall be followed regarding the preparation of the surface and application of priming and finishing coats. Distemper shall not be mixed in a larger quantity than is actually required for a day's work. Hot water should be used to prepare the mixture. Distempers shall be applied in dry weather with a broad stiff brush in long parallel strokes. The treated surface shall be allowed to dry and harden. Second or succeeding coats shall not be applied until the proceeding coat has been passed by the Executive Engineer. Two more coats of distemper shall be given in exactly the same manner as the first one but only after the earlier coat laid has thoroughly dried.

f. RATED INCLUDES :

The rate shall include all labour, materials, equipment and tools for carrying out the following operations:

- i. Providing the primer and distemper and mixing the distemper.
- ii. Scaffolding.
- iii. Preparing the surface to receive the priming and finishing coats.
- iv. Applying the priming coat.
- v. Applying the distemper in 3 coats minimum. If a proper even surface is not obtained to the satisfaction of the Executive Engineer in 3 coats, Contractor shall carry out additional coats of distemper to approval at contractor's expense.

g. MODE OF MEASUREMENT :

Similar to that for white washing.

13.4 OIL BOUND DISTEMPER :

The specification and conditions for this shall be the same as that applicable for dry distemper above except that oil bound distemper or approved make, shade and colour shall be used after applying priming coat of petrifying liquid or other primer as may be recommended by the manufacturers of distemper or as directed.

14.0 PLASTIC EMULSION PAINT :**14.1 MATERIAL :**

The emulsion paint and primers in general shall be of approved quality colour and shade as manufactured by M/s Goodlass Nerolac or other equal and approved.

14.2 SCAFFOLDING :

This shall be double or single as required and directed. If ladder are used, pieces of old gunny bags or cloth rags shall be tied on their tops to avoid damage of scratches to the plaster surfaces and flooring, etc. Proper stage scaffolding shall be erected when painting the ceiling.

14.3 PREPARATION OF THE SURFACE :

- a. New surface:

The surface to be painted shall be cleaned and all cracks, holes and surface defects shall be repaired with plaster of Paris for spot filling and with filler prepared with whiting, water and little quantity of paint for filling and leveling the wider areas.

14.4 PRIMING COAT :

The priming coat of the approved shade shall be applied over the completely dry surface in the manner as recommended by the paint manufacturers. The emulsion paint, in the priming coat, may be thinned down with 20% water or as recommended by the paint manufacturer. Turpentine or any other solvent shall not be used for thinning the paint.

14.5 APPLICATION OF EMULSION PAINT :

The recommendation of approved paint manufacturers, whose product is used shall be followed regarding the preparation of the surface and the application of the priming and finishing coats. The contractor shall arrange for technical assistance and supervision from the paint manufacturer, during the execution of the painting work. After the priming coat has been applied and is perfectly dried all holes scratches if any, shall be repaired as mentioned in "preparation of surface" and then the second coat of approved shade and manufacture shall be evenly applied and allowed to dry. The third coat shall be carefully applied to achieve smooth and even surface after the previous coat has dried up. Minimum 3 coats of paint shall be applied inclusive of primer coat. If a proper and even surface is not obtained to the satisfaction of the Executive Engineer in 3 coats, contractor shall carry out additional coats of painting to approval, at contractor's expense. care shall be taken that dust or other foreign materials do not settle or disfigure the various coats.

14.6 RATES TO INCLUDE :

Apart from other factors mentioned elsewhere in this contract, the rate for the item of plastic emulsion paint shall include for the following :

- i. All labour, materials and equipment necessary to carry out the work.
- ii. Supplying the approved emulsion paint for priming and finishing coats.
- iii. Preparing the surfaces for receiving the primer and finishing coats.
- iv. Scaffolding including its erection and dismantling.
- v. Application of one primer coat and minimum two coats of finishing. If a proper and even surface is not obtained to the satisfaction of the Executive Engineer, in 3 coats, contractor shall carry out additional coats of painting to approval at Contractor's expense.
- vi. Protection to painted surface till dried and handed over.

- ix. Expenses, if any, for supervision and technical assistance supplied by the approved paint manufacturer.

14.7 MODE OF MEASUREMENT :

The measurement shall be in square metre. The mode of measurement shall be as applicable to that for white washing.

15. PAINTING FRENCH POLISHING, WAX POLISHING :

15.1 POLISHING :

15.2 MATERIAL :

Ready mixed oil paints and primers, in general shall be of approved quality, colour and of approved manufacturer. These materials shall be in sealed tins and shall be opened in the presence of the Corporation's Engineer on site.

15.3 PREPARATION OF SURFACE :

a. **IRON AND STEEL WORK :** Surface to be painted shall be thoroughly cleaned and sand papered and/or rubbed with Emery cloth, if necessary, to remove grease, mortar or anything foreign material. In case of rusted surface, it shall be first cleaned with wire brush till the corroded rust is removed. The prepared surface shall be shiny and free from brush marks, patches, blisters and other irregularities. The surface thus finished shall be got approved for painting.

b. **WOOD WORK :**

All surfaces to be painted shall be thoroughly cleaned, sand papered and removed of all foreign materials. In case of surfaces having knot and nail holes, the same shall be filled with knotting and stopping materials. The knotting material shall consist of pure shellac dissolved in methylated spirit. Stopping materials shall consist of putty. The surfaces thus treated shall be allowed to dry and then sand papered smooth.

15.4 APPLICATION :

After preparing the surface a primer coat shall be applied. The primer coat should be ready mixed of approved make and manufacturer. After the primer coat is applied and perfectly dried, all holes, cracks etc, if still remaining, shall be filled in with putty and the surfaces sand papered smooth. Then a second coat of paint of approved shade and manufacture shall be evenly applied and allowed to dry. The third coat shall be carefully applied to achieve smooth and even surface after the previous coat has dried up. Minimum 3 coats of paint shall be applied to inclusive of a primer coat. If a proper and even surface is not obtained to the satisfaction of the Executive Engineer in 3 coats, Contractor shall carry out additional coats of painting to approval, at Contractor's expense. Care shall be taken that dust or other foreign material do not settle or otherwise disfigure the various coats.

15.5 RATES TO INCLUDE :

Apart from other factors mentioned elsewhere in this contract, the rate for the item of painting shall include for the following:

- i. All labour, materials, and equipment necessary to carry out the work.
- ii. Supplying the approved paint for priming and finishing coats.
- iii. Preparing the surfaces including knotting and stopping for receiving the primer and finishing coats.
- iv. Scaffolding including its erection and dismantling.
- v. Application of one primer, coat and two coats of finishing minimum. If a proper and even surface is not obtained to the satisfaction of the Executive Engineer in 3 coats. Contractor shall carry out additional coats of painting to approval at Contractor's expense.
- vi. Protection to painted surface till dried and handed over.

Mode of measurement:

Normally painting to wood work and steel shall be included in the concerned items of work and shall not be measured separately. If painting is to be measured separately the same will be as per I.S.:1200-1964. part –15

15.6 FRENCH POLISHING :

French polish to be used shall comply with I.S. 348-1952 in the requirements of quality and methods of test. Before French polish is applied, the surface of wood work shall be prepared in the same manner as for painting. The wood to be polished should be first painted with a filler composed of 1 part of whiting mixed with 0.53 part of methylated spirit. After drying, it should be finely sand papered. On the wood work thus treated a thin coat of French polish shall be applied and allowed to dry. After drying the surface shall be lightly rubbed with a lime sand paper prior to the second and third coat. The surface shall show an even polished surface and be approved by the Executive Engineer (Corporation's Engineer).

15.7 RATES TO INCLUDE :

Similar to that of painting.

15.8 MODE OF MEASUREMENT :

Similar to that of painting.

15.9 WAX POLISHING :

- a. The polish shall be of approved manufacture (e.g., Mansion Brand) or shall be prepared as under :
- b. A mixture of Bee's wax and turpentine in proportion of 2:1 by weight shall be used. The wax is melted and added to the turpentine, mixed well and allowed to cool.
- c. The surface of wood work shall be prepared as for oil painting before mixing. The wood work shall be measured with the mixture and allowed to remain overnight so that the mixture may soak into the pores of the wood. In the morning the superfluous wax shall be wiped off and the surface rubbed up with a soft flannel to a fine polish.

15.10 RATES TO INCLUDE : Similar to that of painting.

15. 11 MODE OF MEASUREMENT : Similar to that of painting.

16. CEMENT PAINTING :

16.1 MATERIAL :

External waterproof painting shall be of approved colour. Manufacture - Snowcem/ Durocem or other equivalent and approved quality.

16.2 PREPARATION OF SURFACE :

Before painting is commenced on surface, all dirt, oil, grease, efflorescence and organic material shall be completely removed. The surface shall be wetted by sprinkling of water with fine spray. The surface shall be sprayed several times with a few minutes intervals between each spraying to allow the moisture to soak into the surface.

16.3 APPLICATION :

Cement paint solution shall be applied to the surface with hair brushes in a number of coats to get uniform finish. After the first coat of paint is hardened, it shall be cured with water at least for 24 hours, before the application of the second coat. At least 24 hours should elapse between the two coats, similarly, 3rd coat shall be given to get uniform colour.

16.4 CURING :

Cement paint work shall be kept damp at least for 7 days.

16.5 RATES TO INCLUDE :

Apart from other factors mentioned elsewhere in this contract, the rate of providing cement paint shall include for the following :

- a. All labour, materials and equipment to provide cement paint.
- b. Scaffolding including erecting and removing.
- c. Preparing the surface as stated above.
- d. Applying 3 coats of approved Snowcem paint. If a proper and even surface is not obtained to the satisfaction of the Executive Engineer in the 3 coats applied, the Contractor shall provide additional coats painting to approval, at Contractor's expense.
- e. Curing as stated above.

16.6 MODE OF MEASUREMENT :

Measurement shall be in Square Metre and as applicable to white wash. Nothing extra shall be allowed for painting the rough surface, for example, external sand faced plaster rough cast plaster etc.

17.0 TECHNICAL SPECIFICATIONS FOR INTERIOR WORKS**Material and Workmanship**

1. All materials brought on the site of works and meant to be used for the said project site, shall be the best of their respective kinds and to the approval of the Employer. The Employer or his Representative will accept that the materials are really the best of their kinds, when it is proved beyond doubt that no better materials of the particular kind in question are available in the market.
2. The workmanship is to be the best available and of a high standard, use must be made of a special tradesman in all aspects of the work and allowances must be made in the rates for so doing.
3. Samples of all materials shall be got approved from the Employer and shall be deposited with them before the order for the materials are placed with the suppliers/manufacturers. The materials brought for the works shall conform in every respect with approved samples.
4. Workmanship: All works shall be to true line, level, plumb and square corners, edges and arises in all cases shall be unbroken and finished neat. Only first class workmanship will be accepted. Contractor shall maintain uniform quality and consistency in workmanship throughout the execution of the work.
5. Skilled Mistries / tradesman for the respective trades shall be employed by the Contractors to check the work in progress and to instruct and extract the right kind of workmanship from the men employed on the works. Instructions given to such Mistries by the Employer shall be carried out with a view to get the work executed in a neat and workman like manner, according to the specifications.
6. The Employer may order the inspection of any finished work as he chooses and in a manner he decides, and the Contractors shall bear all expenses in this connection. If the results of such inspection prove that the material used and/or workmanship is not of the standard required, the work will be rejected and removed forthwith and be replaced by works of the accepted standard of quality and material.
7. The materials and items to be provided by the Contractor shall be approved by the Employer in accordance with any samples, which will be submitted for approval by the Contractor and generally in accordance with the specifications. Also if products are specified in the specification and/or bill of brand, trade name or catalogue reference, the Contractor will be required to obtain the approval of the Employer before using a material. The Contractor shall produce all invoices vouchers or receipts for any materials if called upon to do so by the Employer.
8. Samples of all materials are to be submitted to the Employer for approval before the Contractor orders or deliver the materials at site. Samples together with their packing are to be provided free of charge by the Contractor and should any materials be rejected, they will be removed from the site at the Contractor's expense. All samples will be retained by the Employer for comparison with materials, which will be required to submit specimen finishes of colours, fabrics, etc. for the approval of the Employer before proceeding with the work.

All ends of plywood/Block board/particle board/MDF/HDF shall be fitted with minimum 6 mm T.W. lipping strips.

All internal surfaces of furniture shall be finished with French polish wherever any finishes not specified.

Joinery in Woodwork

Joinery is to be prepared immediately after the placing of the contact framed up, bonded and wedged up. Any portions that are warped or found with other defects are to be replaced before wedging up. The whole of the work is to be framed and finished in a proper workman like manner in accordance with the detailed drawings, wrought and whenever required fitted with all necessary metal ties, straps, belts, screws, glue, etc., running beaded joints are to be cross-tongued. Joiners work generally to be finished with the sand/glass paper.

All joints will be standard mortise and tenon, dowl, dovetail and cross-halved. Nailed or glued butt joints will not be permitted. Screws, nail etc., will be stated, from or wire of oxidized "Nettle Fold" make unless specified where mortise and tenon joints are used, tenons should fit the mortises exactly.

Nailed or glued butt joints will not be permitted, except in exceptional cases with approval of the Employer.

Where screws shown on a finished surface, these will be sunk and the hole plugged with wood plug of the same wood and grains of the finished surfaces unless detailed otherwise. Nail on finished surfaces will be neatly punched and the hole filled with wood filer to match the colour.

Should joints in joiner's work open, or other defects arise within the period stated for defect liability in the contract and the cause thereof be deemed by the Employer to be due to such defective joinery shall be taken down, and refilled, redecorated and/or replaced if necessary and any work disturbed shall be made good at the Contractor's expense.

Nails, spikes and bolts shall be of lengths and weights approved by the Employer. Nails shall comply with IS 1959-1960 or approved equivalent quality sample. Brass headed nails are to comply with B.S. 1210. Wire staples shall comply with B.S. 1994 or equivalent.

The contact surfaces of dowel, tennons, wedges, etc., shall be glued with an approved adhesive.

Where glued joinery and carpentry work is likely to come into contact with moisture, the glue shall be waterproof.

All dovetail joints shall be further strengthened with M.S. cleats for cabinet furniture like tables, storage units, etc.

Hardware

The hardware throughout shall be of approved manufacturer or supplier well made and equal to in every respect to the samples deposited with the Employer. The Contractor may be required to produce and provide samples from many different sources before the Employer takes decision and nothing extra shall be paid for this.

Fitting generally shall be brass oxidized, unless otherwise specified and shall be suitable for their intended purpose. In any case, it will have to be approved by the Employer before the Contractor procures it at the site of work.

Screws are to match the finish of the article to be fixed, and to be round or flat headed or counter sunk as required.

The Contractor should cover up and protect the metal surfaces such as brass, bronze, SS etc. with a thick grease or other suitable protective material, renew as necessary and subsequently clean off and clear away on completion.

Aluminum and stainless steel shall be of approved manufacture and suitable for its particular application. Generally the surface of aluminum shall have an anodized finish and both shall comply

with the samples approved by the Employer. All stainless steel sheets shall be 304 S. S. Japan or equivalent with gauge as specified but not thinner than 16G.

All steel, brass, bronze, aluminum and stainless steel articles shall be subjected to a reasonable test for strength, if so required by the Employer at the Contractor's expense.

All brazing and welds are to be executed in a clean and smooth manner rubbed down and left in the flattest and tidiest way, particularly where exposed.

Chromium plating shall be in accordance with I. S. standard or as per approved specifications for normal outdoor conditions and shall be on a base material of copper or brass.

Glazier

All glass to be of approved manufacturer complying with IS 1548-1966 as per approved quality and sample to be of the selective qualities specified and free from bubbles, smoke, wanes, waves, air holes and any other defects.

Polished plate glass shall be "glazing glass" (G.G.) quality and that for mirrors shall be "silvering quality" (S.Q.) confirming to I.S.3438 – 1965 or as per approved sample and quantity.

The compound for glazing to metal is to be a special non-hardening compound manufactured for the purpose and of a brand and quality approved by the Employer.

While cutting glass, proper allowance is to be made for expansion. Each square of glazing to be on whole sheet. On completion of work clean all glass inside and outside, replace all cracked scratched and broken panes and leave in good condition.

Paint and Polishes

All material required for the works shall be of specified and approved manufacturer, delivered to the site in the manufacturer's containers with the seals, etc., unbroken and clearly marked with the manufacturer's name or trade mark with a description of the contents and colour. All materials are to be stored on the site of work.

Spray painting with approved machines will be permitted only if written approval has been obtained from the Employer prior to painting. No spraying will be permitted in the case of priming coats where the soiling of adjacent surfaces is likely to occur. The nozzle and pressure to be so operated as to give an even coating throughout to the satisfaction of the Employer. The paint used for sprayings is to comply generally with the specifications concerned and is to be specially prepared by the manufacturer for spraying. Thinning of paint made for brushing will not be allowed.

Wood preservative shall be Solignum or other equal and approved impregnating wood preservative and all concealed woodwork shall be treated with wood preservative.

All brushes, tools, pots, kettles, etc., used in carrying out the work shall be clean and free from foreign matter and are to be thoroughly cleaned out before used with a different type of class of material.

All iron or steel surfaces shall be thoroughly scraped and rubbed with wire brushes and shall be entirely free from rust, mill scale, etc., before applying the priming coat.

Surfaces of new woodwork, which are to be painted, are to be rubbed down, cleaned down to the approval of the Employer.

Surfaces of previously painted wood work which are to be painted are to be cleaned down with soap and water detergent solution or approved solvent to remove dirt, grease, etc. Whilst wet the surface

shall be flattened down with a suitable abrasive and then rinsed down and allowed to dry. Minor areas of defective paint shall be removed by scraping back to a firm edge and the exposed surface touched in with the primer as described and stopped with putty. Where woodwork has been previously painted or polished and is to be newly polished, scraping, burning off or rubbing down, should be carried out properly.

Surfaces of previously painted metal which shall be painted are to be cleaned down and flattened down as described in surfaces of any rust and loose scale shall be removed completely by chipping, scraping and wire brushing back to the bare metal touched in with primer as described.

Upholstery

This will be of first class standard workmanship with webbing, no sag springs, coiled springs, padding and as specified on drawing. Covering fabrics will be soon tufted and corded as shown on drawing and as approved by the Employer.

“Cushion Vents” should be installed at the back or under side of seat cushions (especially those covered in leather, vinyl plastic or very tightly woven fabric) to allow air to escape and to prevent torn steel.

Finished timber shall be of the type specified, furnishing fabrics, colour, pattern, substance to be as specified and manufactured or supplied by the Company specified, no variations of this will be permitted unless with prior approval of the Employer.

Polish

French polish: The basic material shall be shellac dissolved in methylated spirit.

Preparation: The timber must be well sanded and cleaned and the grain filled with grain filler. Any staining must be done before applying the polish.

Equipment: The polishing rubber, the most important implement in French polish shall consist of a pad of cotton wool, which acts as a reservoir for the polish, and a cover of a soft white linen or cotton fabric similar to a well worn handkerchief, which acts as filler. The rubber must never be dipped into the polish on to the pad with the cover removed.

Application: Work evenly over the surface with a slow figure of eight motion until the timber is coated with a thin layer of polish. The object is to apply a series of thin coats, allowing only a few minutes for drying between the coats. When a level and even bodied surface is obtained the work is ready for the second stage i.e., spiriting off.

Allowing the work to stand for at least eight hours, then take a fresh rubber with double thickness of cover materials and charge it with methylated spirit. The object of spiriting off is to and remove the rubber marks and to give the brilliance of finish.

Finally, work in the direction of the grain and continue until the surface is free from smears and rubber marks then leave to harden off.

Wax polish: Wax polish shall contain silicones and driers. A good silicon wax is to be used, not a creamy or spray. The timber shall be sealed first with another finish such as Ronseal, before applying the wax.

Application: Apply a light coat of the sealer by brush or cloth direct to the unfilled timber, working it well in and finishing evenly with the grain. Allow to dry thoroughly then sand lightly with fine abrasive paper. Apply a heavy coat of wax by cloth or on flat surfaces, with a stiff brush. Work well into the timber and finish off by stroking with the grain before leaving to harden. Leave for several hours before rubbing up with a soft brush. Finally, buff the grain with a soft cloth.

Melamine:

This shall be applied where natural grain of the wood is required to be shown. Melamine gives uniform surface, which resists boiling water.

Application: Clean off all grease and wax with an abrasive and white spirit, this should not be applied in humid conditions.

Apply the same coat, preferably of clear hard glaze with a cloth pad. Leave this is to dry for at least six hours, then applied for the coat with paint brush-off you wait for longer than 24 hours between coats, rubbed down the previous coats with fine glass paper or medium grade of steel wool. Obtain a matt finish, if required, by giving a final coat of clear Ronseal Matt Coat.

Timber

Wherever specified internal frame works shall be of central province teak wood (C.P.T.W.) unless otherwise specified.

All exposed woodwork shall be of first quality B.T.C. grade teak only or as specified.

All the wood shall be properly seasoned, natural growth and shall be free from worm holes, loose or dead knots or other defects, saw die square and shall not suffer warping, spitting or other defects.

The moisture content shall not exceed 12%.

All internal frameworks shall be treated with approved wood preservative.

All wood brought to site shall be clean, should not have any preservative or Other coating/covering.

All rejected, decayed bad quality wood shall be immediately removed from site.

All wood brought to site must be stacked stored properly as per instruction.

PLYWOOD

Fire Retardant Plywood/medium density fiber board/block board/teak particleboard/veneered board, etc., as specified in the approval list of manufacturers shall only be used. Fire Retardant Plywood shall confirm to I.S. 5509

Marine plywood shall generally confirm to I.S. 710-1980 and also to Defense/Navy specification, bonded with phenol formaldehyde treated with Wood preservative.

Only teak wood particle board shall be used, particle board shall be phenol formaldehyde and generally confirm to I.S. 3087-1965.

Only 3mm to 4mm thick straight grained group matching approved veneers shall be used. Only veneers laminated from species like teak, maple white cedar, rosewood, white cedar, walnut, mahogany shall be considered for approval and use.

Block board shall be equal or superior quality to that laid down in B.S. 3444 with one of the following I.S. Specifications or such approved adhesives;

I.S.I. 851-1957: Synthetic resin adhesive for construction works in wood.

I.S.I. 849-1957: Cold setting case in glue for wood.

Block board shall be generally conforming to I.S.I. 1659-1960 or as per approved sample.

Laminates

High Pressured Laminates where specified shall be of approved brand, type, texture and thickness and manufactured as per IS:2046-1969. Fixing of laminates shall be done as per best trade practices and strictly as per printed instructions of the manufacturers using Phenol Formaldehyde Synthetic Resin Adhesive of approved make. Unless otherwise indicated laminates shall be 1.5 mm thick for horizontal surfaces, 1.0 mm thick for vertical surfaces and 0.8 mm thick on internal surface.

G.I. Frame Work for Partitions:

G.I. frame work shall be made of special section power pressed /roll from G.I. Sheet with Zinc coating of 120 gms/Sqm (both side inclusive) of 0.5 mm thick section.

Iron Mongery

All finish hardware shall be well made, reasonably smooth and free from sharp edges and corners flaws and other defects and shall be as per relevant Indian Standard Code. Unless otherwise required, all finish hardware shall be polished brass.

All hardware shall be of approved make and shall be specifically got approved by the Employer before ordering. No fittings and fixtures shall be fixed before all major work is over. While fixing correct handling of fixtures shall be ensured.

All finish hardware shall be fixed by skilled Carpenters experienced in this work. Work shall be done as per manufacturers printed instructions and to the satisfaction of the Employer.

All hardware fixed to respective locations shall be adequately protected from damage and splashes of mortars and paints by covering suitable with Jute Cloths/Black PVC sheet till handing over the work to the Employer to his satisfaction. The finished hardware shall be absolutely clean without any foreign materials and fully showing the original finish in its best condition.

SPECIFICATIONS , APPROVED MAKE & SPECIAL CONDITIONS FOR CHAIRS AND MODULAR FURNITURES**CONDITIONS:-**

1. All quantities in the schedule are provisional. Payment will be made at the accepted percentage rate for the material actually supplied and ascertained by actual measurements at site.
2. The percentage quoted by the contractor shall include all the materials, all lead and lifts, labour, equipment, all accessories including all taxes etc. needed for the job unless otherwise stated.
3. Before executing the supply order, the contractor is required to produce sample of all different items of Chairs and Modular Furniture to be provided for the above work for which they have quoted, without any additional cost, for Chief Engineer's approval.
4. In case of any dispute, the decision of Chief Engineer shall be final and the same shall be binding on the contractor.
5. Sample of chairs made shall have to be got inspected either at vendor's show room / manufacturer's assembly place before taking up manufacturing of entire lot. If any correction or amendment in type / design is required, the same shall be incorporated without any extra cost.
6. The department shall be at liberty to dismantle any part / component or to cut sample at any place for checking / verification of quality of material used. The sample may be sent for testing in the laboratory to confirm the quality. The expenditure on this account should be borne by supplier / manufacturer.
7. All the Chairs and Modular Furniture supplied shall be got approved by LIC and the contractor shall replace the defective Chairs and Modular Furniture immediately.
8. The quantities shown in the schedule are provisional and are likely to increase or decrease. Some of the items may be omitted altogether. No claim whatsoever shall be entertained on this account.
9. **The Chairs and Modular Furniture to be manufactured and supplied by one of the registered manufactures with "Business and Institutional Furniture Manufacturer's Association" (BIFMA) India and having valid registration certificates. In addition to manufactures registered with BIFMA, the contractor may place the order with following manufactures:**

APPROVED LIST OF MANUFACTURERS & SUPPLIERS:-

MODULAR FURNITURE

- 1) M/s. De Bono Flexcom (India) Ltd., Kukreja House, First Floor, 46, Rani Jhansi Road, New Delhi – 55
- 2) Email:tenders@debonoindia.com
- 3) M/s Mansarover Industrial Corporation Ltd., 70, Rama Road, Industrial Area, New Delhi – 15
- 4) Email:-mansarover.industry@rediffmail.com
- 5) M/s Crystal Furniture Industries, 3, Ground floor, Umiya Chambers, Darodkar Square, Central Avenue, Nagpur, (Maharashtra).
- 6)
- 7) M/s AFC Systems, B-112, Sector-65, Noida.
- 8) M/s Methodex Systems Ltd, 3/4-A, Asaf Ali Road, New Delhi.
- 9) M/s. Ganpati Furniture Systems Pvt. Ltd., F-63, Mansarover Garden, New Delhi-110015
- 10) M/s Superq System Pvt. Ltd., S- 524-second floor, School Block, Vikash Marg, Delhi.
- 11) United Concept & Solution Pvt. Ltd., C-34, Sec-57, Noida-201301
- 12) M/s Durian Industries Ltd., 2/69, W.H.S., Kireti Nagar, New Delhi -110015
- 13) M/s. BP Ergo Ltd., K-52, MIDC Hingna Road, Nagpur-440016
- 14) M/s. Monalisa Interior Decorators Pvt. Ltd., 132/1, Monalisa Garden, Horamavu Railway Gate, Horamavu, Bangalore-560043 Email:-jyothi@monalisagroup.net
- 15) M/s. Delite Com Ltd, Kukreja House, second Floor, 46, Rani Jhansi Road, New Delhi - 55
- 16) M/s Modern Steels (India) Corporation Ltd, 487 / 35A, Outer Ring Road, Paschim Vihar, New Delhi – 87
- 17) M/s Shapoorji Pallonji Pvt. Ltd. Mumbai, New India Centre, 10th floor, 17, Cooperage Road, Mumbai-400001 Email:-rj@spcmg.co.in PH- 022-22819359
- 18) M/S Featherlite Collection, 16/A, Miller Tank, Bund Road, behind Ambedkar Bhavan, vasant nagar, Bangalore-560052 Email:-ansari@featherlite India.Com
- 19) M/S Eurocoustic Products Ltd., (PSL Modular office system), PSL Tower, 615, Makwana Road, marol, Andheri (E), Mumbai-400059 Tel No.:- 022-66447777 E-mail:- info@pslmodular.com, aditya@pslmodular.com, snehdeep.sagar@eplmodular.com
- 20) M/S Godrej & Boyce Mfg. Co. Ltd. Plant 4, Mumbai Branch, Pirojshaha Nagar, Vikroli, Mumbai-400079 E-mail:-rsshukla@godrej.com, Fax-022-67961701
- 21) M/S V3 Engineers Pvt. Limited, 1/2, 3rd Floor, Janashree, Serpentine Road kumar Park(W), Bangalore-560020, e-mail:- vinay.jha@v3_india.com, Mob-09930667020

CHAIRS:-

- 1) M/s. De Bono Flexcom (India) Ltd., Kukreja House, First Floor, 46, Rani Jhansi Road, New Delhi – 55
- 2) M/s Mansarover Industrial Corporation Ltd., 70, Rama Road, Industrial Area, New Delhi - 15
- 3) M/s Crystal Furniture Industries, 3, Ground floor, Umiya Chambers, Darodkar Square, Central Avenue, Nagpur, (Maharashtra).
- 4) M/s AFC Systems, B-112, Sector-65, Noida.
- 5) M/s Methodex Systems Ltd, 3/4-A, Asaf Ali Road, New Delhi.
- 6) M/s Fairdeal Furnishing Company, Plot No. - 6, Blind Colony, Near Metro Pillar No. - 431, Tatarpur, New Delhi - 110027.
- 7) M/s Superq System Pvt. Ltd., S- 524-second floor, School Block, Vikash Marg, Delhi.
- 8) M/s. Sterling Enterprises, 194-J, Gaiwadi, Girgaum, Mumbai- 400004
- 9) M/s Durian Industries Ltd., 2/69, W.H.S., Kireti Nagar, New Delhi -110015
- 10) M/s Geeken Seating Collection Pvt. Ltd, Plot no. - 07, Sector - 06, I.M.T. MANESAR, Gurgaon.
- 11) M/s Modtech Interiors pvt. Ltd., B-202, Mansrover Garden, Main Road, Kirti Nagar, New Delhi-15.
- 12) M/s. Delite Com Ltd, Kukreja House, second Floor, 46, Rani Jhansi Road, New Delhi - 55
- 13) M/s Modern Steels (India) Corporation Ltd, 487 / 35A, Outer Ring Road, Paschim Vihar, New Delhi – 87

Before placing order for chair and Modular Furniture, the contractor has to get approval of the manufacturer along with sample from the Chief Engineer of LIC of India.

10. All furniture /chairs shall display the “Logo” / “Monogram” of the Manufacturer / Supplier.

11. Purchase bills to be submitted for Leatherette tapestry where Basic rates are specified.

12. SPECIFICATION FOR CHAIRS

1. The contractor shall inspect the site to ascertain the nature and scope of work.
 - a) The quantities given are provisional and likely to vary up to any extent.
 - b) The guarantee period shall be **ONE YEARS** after the date of supply of chairs. Guarantee shall cover all parts. In case of defects during the guarantee period the defects shall be rectified free of cost. Guarantee shall be on stamp paper by the contractor and manufacturer jointly.
 - c) Welding done for stand and other parts shall be done by electric welding with approved welding rods of 12 gauge.

- d) Unless otherwise mentioned, handles shall be of Injection Moulded Polypropylene (PP handles)/.
- e) **Foam:** Unless otherwise mentioned, chair cushion for seat and back shall be made up of flexible polyurethane foam Moulded to have consistent density of around $45 \pm 2 \text{ kg/m}^3$.
- f) **Castor:** Heavy duty, non skid, twin wheel, swivel P.P.C.P. (Poly Propylene Co-Polymer) or Nylon (snap type).
- g) **Revolving & Tilting:** Gas lift with 100mm adjustment of seat height along with a 360 degree swivel mechanism with tilting mechanism. The pneumatic operated mechanisms are mild steel powder coated with an additional M.S. galvanized rod.
- h) PVC profile shall be provided by stapling for seat and back rest.
- i) **Hardware:** All hardware should be of ISI quality.
- j) **Upholstery:** The approved colour, texture, design and manufacturer of leatherette shall be used.
- k) **Stand:** Unless otherwise mentioned, stand shall be of 10 to 12 gauge M.S. sheet, properly welded with powder coating of minimum 50 microns.
- l) **Adhesive:** Fevicol SR – 505, synthetic rubber adhesive shall be used for fixing of various items for chairs.
- m) **Flame Retardant Leatherette :** Flame Retardant Leatherette shall be at a cost of **Rs 350/- to Rs.400/- per meter minimum (purchase bill to be submitted)**
- n) 12 mm thick hot pressed ply shall be used for seat and back rest.
- o) Minimum 10-14 no Tee nuts shall be provided per chair for 12 mm thick ply for back rest.
- p) Spring shall be of 7 mm dia “C” class spring quality wire with minimum 5 spiral rings.
- q) Pipes for S type/C type chairs shall be ERW pipes of 16 gauge with reinforcement.
- r) One sample of each chair shall be delivered after taking the acceptance letter.

Specifications for modular furniture :-

1. GENERAL:

The hardware shall be of approved manufacturer or supplier well made and equal to in every respect to the samples deposited with LIC Of India.

Screws shall match the finish of the article to be fixed and to be round or flat headed or counter sunk as required.

The contractor should cover up and protect all surfaces with suitable protective material, renew as necessary and subsequently clean off and clear away on completion.

Aluminum, CRC steel and stainless steel shall be of approved manufacture and suitable for its particular application. Generally the surface of Aluminum shall have an anodized finish and both shall comply with samples approved by the LIC Of India. The surface of A11, MS/CRCA components shall undergo 7 stage pre- treatments.

All Steel, brass, bronze, Aluminum and stainless steel articles shall be subjected to a test for strength, if so required by the LIC of India.

The modular furniture shall be manufactured as per manufacturing process as per ISO Standards for repeatability.

2 The Work Station Components shall be of following Specifications.

Low height Partition Panels:

Height: 1200 mm approximately.

Thickness: 65mm minimum (Overall)

Finish: Part Laminate and part fabric finish.

- Shall be tile partition system with provision for height enhancement.
- There shall be provision in the partition to allow for passage of wire throughout the length and height of the partitions and switches /sockets could be incorporated at any location within the panel. This is to allow separation of data and power cables by a minimum specified distance of 300 mm.
- Shall have 100% wire management through framework.

2.1 FRAME WORK:

- The framework shall be made from 16 gauge thick roll- framed MS sections for core frame & for intermediate members. The core frame consist of a welded rectangular frame made of vertical roll- framed sections (max spacing 150mm) welded to a horizontal sections to form a rigid structure with a hinged raceway at the base & below worktop level. The intermediate horizontal members shall fit into slots on the vertical members of the frame to accommodate the tiles of different sizes. The members shall have slots at regular interval. The slots should serve the double purpose of horizontal modularity as well as allowances for passing the cables throughout the height of partition. These slots shall be provided with plastic rings for a softer edge where wires are being passed.
- Pre-treatment: All MS and CRC components shall undergo 7 stage pre treatments.
- Powder Coating: Shall have Electrostatic powder painting with epoxy polyester powder having minimum thickness of 50 microns. Powder painted surface shall be free of blisters and should be tested for impact resistance, Hardness against scratch as per relevant IS standards.
- In Case of Aluminum framework, it shall be of minimum 2mm thick (14gauge), duly powder coated as mentioned above.
- Stability: Stability of the partition shall be independent worktops, etc. cantilevered to it. A stable configuration shall be confirmed with layout. The partition configurations are to be free standing and not require any indentation to be done in the floor, walls or ceiling. The extruded frame should be sufficiently rigid such that worktops and other accessories can be cantilevered at any desired point without affecting the overall stability.
- The partition panes shall have levelers in the bottom with a allowance for adjustment of up to +/- 25mm.

2.2 End Trims / Top Cap/ Exposed Corners:

- End trims/ Top Cap/ Exposed Corners shall be of extruded sections of Aluminum (2.0 mm thk) with epoxy powder coating finish of thickness not less than 50 microns. These shall be accurately fixed by means of hidden connections.

Intermediate Raceways / Bottom facias for Electrical Wiring & Wire Management:

- All partition panels shall be provided with hinge type bottom raceway (100 mm high) & intermediate raceway below work top level. The bottom raceway accessible from both side & intermediate raceway shall be accessible from inner side only. The cover plate shall be of 1mm th MS sheet duly powder coated of thickness not less than 50 microns. Necessary slots shall be provided on the facia / cover plate as per the sample provided for fixing switches. Provision shall be made for fixing the sockets on the inside of the frame with plastic snap off strips on the hinged raceways to allow wires to pass through. The ends of raceways shall be slotted for incoming & outgoing.

2.3 Fascia Tiles:

a) Pre- laminated Tiles:

The laminated tiles shall be of 12mm th Pre-laminated particle board (interior grade) of approved shade, fitted with clips on rear side. The pre-laminated particle board shall be OSL of interior grade bonded with BWR grade phenol formaldehyde synthetic resin, confirming to IS:12823. The edges of the tiles shall be lipped with PVC edge lipping. All tiles should be gasketed to their frames to minimize sound and dust transmission.

b) Tackable tiles / Pinup board.

The tackable, tile shall be made up of 0.6mm th GI sheet with an inlay of 6mm th cross link foam having density of 50-60 Kg/m³. Fabric shall be with fire retardant coating and scotch guard for strain resistance, glued to the GI sheet.

c) Fabric finish panel/ Non tackable Tiles:

The tackable tiles shall be made up of 0.6mm th GI sheet with an inlay of 8mm th. poly urethane foam having density of 20 Kg/m³. Fabric shall be with fire retardant coating and scotch guard for strain resistance, glued to the GI sheet.

2.4 Work Top

- Work top shall be of 25mm thick plain particle board interior grade confirming to IS: The front edge with PVC flat lipping. Bottom shall have baker lamination of 0.6mm thickness.
- Non Working edges of the work surface shall be provided with machine pressed 2mm thick PVC lipping.
- Work tops shall be mounted onto the partition panels for workstations by means of cantilever brackets made from minimum 18 gauge CRCA steel duly powder coated or by powder coated MS brackets or by any other means as per manufacturer's specifications. The worktops shall be sufficiently supported / reinforced to take weights of computers, printers, person etc...
- Work surfaces shall be provided with circular cut outs as per the requirement. These cutouts shall be provided with ABS covers.
- Vertical supports shall be gable end finished same as tops in post formed laminations particle board.

2.5 Key board pullout tray:

- Key board shall be made from 1.2 mm thick CRCA steel duly powder coated with in built LHS/RHS mouse pad as per approved sample. The dimensions shall be as per specifications/ drawing. The tray shall have facia of laminated particle board. The key board tray shall have locking as well as tilting arrangement.
- It shall be mounted on MS powder coated telescopic channels for noiseless and smooth sliding.

2.6 Pedestal Drawer Unit:

- The carcass shall be made from 0.8 mm thick Galvanized MS sheet & drawers shall be made from 0.6 mm thick Galvanized MS sheet duly powder coated. The drawer unit shall have two drawers at top & one filing drawer.
- Pre treatment: All MS components shall undergo 7 stage pre- treatment & powder coating.
- Drawers shall be mounted on GI telescopic channels for noiseless and smooth sliding.
- Shall be provided with anti tilt mechanism with the help of counter weight to avoid the unit from tilting when drawers are in use.
- Shall be provided with master key/ lock with minimum 2 set of keys.
- Shall be stationary and necessary rubber bushing at bottom/ glide screws with height adjustment upto +/- 10 mm.
- On completion of the project, the contractors shall have to hand over all the keys with individual key chain bearing respective key number and work stations number.

2.7 CPU shelf:

Movable type MS powder coated adjustable CPU trolley of size as specified in drawing for placing any size of CPU unit, made out of 16 swg powder coated MS sheet with 4 nos lockable type castors etc... complete.

2.8 Power Strips:

Cutouts shall be provided for electrical sockets above/below table tops as per drawings.

2.9 Connectors:

Aluminum / CRCA steel/ MS connectors shall be supplied along with the frame.

3 FREESTANDING TABLES:

The various components of freestanding table shall be connected with concealed type knockout fittings suitable for particleboards.

3.1 TOP:

Tops shall be of 25mm thick plain particle board interior grade confirming to IS:. in one Piece with Front Edge with PVC flat lipping including MS Powder Coated Brackets to Fix With Gable Ends. Bottom shall have a baker lamination of 0.6mm thickness. Non working edges of the work surface shall be provided with machine pressed 2 mm thick PVC lipping.

3.2 Gable End:

Shall be made out of 25mm thick plain particle board interior grade confirming to IS. All edges shall have 2mm th PVC lipping, with leveling bolts. The gable end shall have in the bottom with a allowance for adjustment of upto +/- 25 mm.

3.3 Modesty Panel:

Modesty panel/Apron shall be made out of 18mm thick particle board in one piece interior grade confirming to IS :. The Particle board shall be laminated with laminate of 1 mm thickness of approved shade. The edges shall have 2mm thick Hot Pressed PVC lipping of Matching Color.

4 Side Board/ Credenza.

The various components of side credenza shall be connected with concealed type knockout fittings.

4.1 Top:

Tops shall be of 25 mm thick plain particle board in One Piece Interior grade confirming to IS. The front edges of work surfaces shall be with PVC flat lipping including MS Powder Coated Brackets to fix with Gable Ends. Bottom shall have a baker lamination of 0.6mm thickness. Other edges of the work surface shall be provided with machine pressed 2 mm thick PVC lipping.

4.2 Carcass:

The carcass & one shelf at middle shall be of 18 mm th. Pre laminated particle board(OSL) interior grade. The edges shall be finished with 2mm th PVC lipping.

4.3 Shutter:

The shutters shall be made up of 18 mm thick Pre laminated particle board (OSL) interior grade with sliding channel with double ball bearing for smooth operation. The edges shall be finished with 2 mm th PVC lipping.

4.4 Locks/ Hardware:

The unit shall be provided with 7 lever central lock, one tower bolt & Two handles of approved make & type.

5 Notes;

- a. Wherever laminate, fabric, powder coated metal sections are mounted it shall be of approved shade and make.
- b. The physical parameters and the functional requirements are indicated in the drawings.
- c. In each wing there are different combinations of partition to any desired configuration such as straight T,L,U,C,+ etc. The tender is instructed to carefully go through the layouts and provide the same.
- d. Minor layout modifications if required should be allowed at no additional cost, after placement of order.
- e. The contractor shall furnish shop drawings for the entire scope including sample to be used for various material within seven days of the receipt of instruction.
- f. Dimensional accuracy and discrepancy in the fit out of the work station shall be highlighted immediately.
- g. The contractor shall make necessary arrangement and erect Mockup Configuration for at least two alternatives at site at his own cost. Same shall be dismantled on receiving of instruction.
- h. Necessary As built drawing shall be furnished indicating workstation with its designated number.
- i. Necessary list shall be furnished in a tabular form indicating workstation numbers with respective key Nos.
- j. All the workstations should have provision for fixing master switch and one socket for telephone line on top of table for control of switches provided below table top.

TECHNICAL SPECIFICATION FOR ELECTRICAL WORKS**(A) GENERAL**

1. The installations shall generally be carried out in conformity with the Code of Practice for electrical wiring installation. The system voltage not exceeding 650 V. viz I.S. 730. 1963 or the latest revision thereof.
2. **Definition:**
As given in I.S. Code of Practice shall apply.
3. **Pressure and frequency of supply :**
All current consuming devices shall be suitable for 415 V., 3phase, 50cycle A.C. supply.
4. **System of wiring:**
 - i) The wiring shall be carried out as per schedule. Power wiring must be in separate FRLS conduit and shall be kept separate and distinct from lighting wiring. All wiring must be done on the distribution system with main and branch distribution board at convenient centers. All conductors shall run as far as possible along the walls and ceilings so as to be easily accessible and capable of being thoroughly inspected. The contractor shall arrange balancing of circuits before hand over the electrical installation in consultation with Electrical Engineer of L.I.C.I.
 - ii) Within one month of taking over of the installation, the contractor shall submit to L.I.C.I. 3sets of completion drawings of the Electrical Installation in incorporating all modifications made from time to time including cable & conduit lay-outs to the satisfaction of the Electrical Engineer of L.I.C.I. & the wiring plans shall be deemed to be "Drawings" within the meaning of the term as used in the general conditions of contract.
5. **Conductor:**
The conductors shall be of copper or otherwise stated in tender and shall be either FRLS insulated or FRLS insulated FRLS sheathed. The minimum sections of conductors used for wiring of light and plug points shall be 1.5 sq mm. Single core wires shall only be used.
6. **Cables:**
 - i) All cables including flexible cables used shall be ISI approved and confirming the ISI specifications.
 - ii) Twin flexible cable shall be of minimum section area of 14/0.0076 and PVC insulated.
 - iii) Wires as per specification of materials.

7. Fall of Potential:

The cross sectional area of all conductors inside buildings shall be so proportioned to their lengths that the drop in pressure between the main fuses and their furthest point shall not exceed two percent, with all the consuming devices in use.

8. Rating of Lamps and Fans:

As per the power rating of the equipment's as mentioned in Schedule of quantity.

9. Test :

The installation with fittings complete shall before current is switched on satisfactorily pass the following tests:

The whole of the lamps and appliance having been connected to the conductors and all switches and fuses being 'on', a pressure not less than twice the intended working pressure subject to a limit of 500 volts shall be applied and the insulation resistance of the whole or any part of the installation to earth must not be less in Mega ohms than 25 divided by the number of points as defined above. With all lamps and appliance removed from the circuits a similar test between poles may be demanded, provided that during the rainy season half the above test value will be accepted. Where any appliance referred to is a motor larger than one-half B.H.P. the insulation resistance of that particular circuit must be greater than one Meg ohm.

10. Joints and Looping Back :

No joints shall be allowed in conductors. Neutral shall be looped from point to point whereas the live wires shall be looped in the switch board only from switch to switch.

11. Switches:

- i) All main switches (other than those of iron clad pattern) carrying over ten amperes shall be fitted for back connections.
- ii) All switches and circuit breakers shall be constructed in accordance with the I.E.E. 'wiring rules' 8th, edition no 67, or its latest version, provided also that springs shall be either of phosphor bronze, or if of steel, shall be copper or nickel plated; & that handles shall be so fastened that do not tend to unscrew or become loose (see clause 16)

12. Control at point of Entry of Supply:

There shall be one MCB for each main circuit (other than the neutral conductor of a 3-wire circuit) at the point of entry of the supply.

13. Distribution Boards:

- i) Main distribution board shall be metal clad and shall be provided with an iron clad switch and fuse on each pole of the circuit (MCCB / Switches).
- ii) Branch distribution board shall be provided with one fuse/ MCB for each circuit and one common neutral bar. Maximum number of points to be wired on each circuit shall be 6.
- iii) Switches and fuses of opposite polarity shall be mounted on separate bases with a shield of non-ignitable insulating material between the bases when placed one above the other.
- iv) In wiring a branch distribution board the total number of points shall be divided as far as possible evenly between the numbers of ways of the board. A spare circuit shall be left for future extensions.
- v) MCB / Fuses shall be of approved materials and each circuit shall be clearly numbered from left to right in conspicuous figures to correspond with the wiring plans.
- vi) Two spare fuse carriers / MCB per main branch board shall be supplied for replacements.

14. Passing through the walls

- i) Except as laid down in clause 87 where conductors pass the walls, one of the following alternative methods shall be used.

A hole of suitable area shall be made in the wall through which the casing or conductor shall be carried so as to allow of an air-space of not less than one inch on three sides of the casing or conductors as the case may be or the conductors shall be carried in approved heavy gauge solid drawn or lap welded conduit tube on porcelain ducts. Where the supply is alternating current, the conductors of the circuit must be bunched.
- iii) Where a wall tube passes outside a building so as to be exposed to the weather, the outer end shall be bell mounted and turned downwards.

15. Branch Switches (see clause – 11)

In installation supplied from a three wire system, all branch switches shall be placed on the outer wires, switches (Other than those for multiple control) controlling not more than 10 amperes shall be of the Modular type switches shall be 'ON' when knob is down. Where the specified position of branch switches is altered, any such alterations of position after fixing will be paid for.

16. Ceiling Rose and Wall Sockets

Three pins Ceiling roses, and wall sockets shall not contain fuse terminals. Wall sockets shall comply with the requirements of the Bureau of Indian Standards.

17. Fittings.

Where conductors are required to be threaded through tubes or channels formed in the metal work of fittings, these must be free from sharp angles or projecting edges and of such a size as will enable them to be wired with the conductors used for the final sub-circuits without removing the braiding taping or outer covering. As far as possible all tubes or channels should be for sufficient size to permit of 'looking back'. Where with approval of the Electrical Engineer of L.I.C. 'Electrolytic copper' wire is used for wiring fittings. The sub-circuit leads must terminate in a ceiling rose or connector from which this wire will be carried into the fittings. Flexible wire must not be used for wiring fittings, except portable fittings. All fittings must have not less than a half inch male nipple. Fittings and lamp holders for gas fitted lamps shall be adequately ventilated.

18. External and Road lamps ;

External and Road Lamps shall have weather proof fittings of approved design so as to effectually prevent the admission of moisture. An insulating distance piece of moisture proof materials must be inserted between the lamp holder nipple and that of the fitting. Flexible cord conductors and cord grip lamp holders must not be used where exposed to the weather. In verandahs and similar exposed situations rod pendants or ceiling plates shall be used.

19. Fans and Regulators

- (i) (a) All ceiling fans shall be suspended from a hook or shackle and insulated from the same. All joints in the suspension rod shall be screwed and all joints or bolts in connection therewith shall be additionally secured by means of split pins.
- (b) The canopy and wood block at the top of the suspension rod shall effectually hide the suspension.
- (c) The leading in wire shall be not smaller than 3/22 S.W. G. and shall be protected from being cut.
- (d) All fans shall be free from sparking, noise oil throwing and excessive heating.
- (ii) (a) All fans shall be hung nine and half feet above the floor or as directed by the Engineer In charge.
- (b) All fans shall be capable of running at full speed for one month without additional oiling and shall not overheat after eight hours continuous run at full speed.
- (c) Each fan shall have a speed regulator of Electronic type.

B. CONDUIT SYSTEM

1) Conduit to be continuous

Conduit shall be of approved pattern and manufacture and in accordance with the specification of the Bureau of Indian Standards & relevant IE rules.

2) Bunching of Wires

The wires of a circuit may be bunched together in a conduit, and if the supply is alternating current, they must be bunched.

3) Junction in Conduit

The lengths of conduit shall be joined by means of push fit joints or other approved joints. The greatest care shall be taken in preparing the conduit that no sharp edges or burrs are left which could damage the Insulation. The Elec. Engineer with a view to ensuring that the above provision has been carried out, may require (if he should consider if necessary) that the separate lengths of conduit etc. after they have been prepared shall be submitted for inspection before being fixed.

4) Fixing of Conduit

The FRLS conduit shall be fixed to the surface of walls, secured to plugs, arranged as in clause 15 by saddles and round-headed screws. No conduit shall be buried beneath the surface of the masonry unless so specified or approved by the Electrical Engineer, L.I.C.

5) Bends of Conduit

The conduits shall be brought round the angles of walls by means of bends or elbows as may be directed.

6) Outlets

All outlets for fittings, switches, etc. shall be equipped with an approved outlet box.

7) Conductors

All conductors used in conduit wiring shall be stranded

8) Erection and Earthing of conduit

The whole system of conduit shall be erected and completed before the conductors are drawn in. In conduit system, the pipe must be continuous when passing through walls or floors, and no other form of insulating or protecting tube is required.

Section-I**Specifications for LT (1.1 KV Grade) Cables****1 Scope:**

This specification covers supply, testing at works, supply at site, installation, termination, jointing, connection, testing at site, commissioning and handing over of 1.1 KV grade Cables.

2 System :

The 1.1 KV grade cables are to be used in under ground distribution system with normal system voltage of 415 V, 50 Hz, 3 phases, 4 wire systems.

3 Applicable standards:

Cables to be supplied under this specifications shall be with Copper or Aluminum conductor as specified, in drawings or Bill of Quantities, PVC insulated and PVC sheathed, armored and with an outer PVC protective sheath, heavy duty type and shall confirm to,

IS 1554 (Part I) 1976: PVC insulated electric cables.

IS 1753: Aluminum conductors for insulated cables.

IS 3961: Recommended current ratings for cables.

4 General requirements:

- 4.1 All cables shall be new without any kinks or visible damage. The manufacturers name, insulating material, conductor size and voltage class shall be marked on surface of the cable at distance not exceeding 1 M.
- 4.2 Procurement of cables shall be on the basis of the actual site measurements and the quantities given shall be regarded as a guide. Before procurement of the cables, the contractor shall submit the detailed measurement sheet, based on site measurement showing the various cable lengths and after approval of the same place orders for the cables.
- 4.3 Cables shall be tested at factory as per IS requirement. The tests shall incorporate routine tests, type tests and acceptance test. The Contractor shall produce the certificate for type test.
- 4.4 The cables shall be of one of the makes mentioned in the list of approved materials and with ISI mark.
- 4.5 The cables shall be supplied and delivered at site in original cable drums with manufacturer's name, cable size, type and length all clearly indicated on each drum.
- 4.6 The unit rate shall include loading, unloading, transport, storage, handling, unwinding the cable from cable drums and laying in the cable trench or erected on cable trays etc.
- 4.7 The cables shall be laid by skilled and experienced labour.
- 4.8 Where the cable route intersects roads, streets or pathways, RCC spun pipes shall be laid in the trenches to serve as cable ducts. The pipes shall be joined by RCC spun collars. The RCC pipes shall project at least 150 mm on either side of road crossing.
- 4.9 The cable loops shall be kept at both ends of the cable length. Minimum 3 meters long loop shall be provided.

- 4.10 The contractor shall take care to see that the cables received at site are apportioned to various locations to ensure maximum utilization and cable joints are avoided. This apportioning shall be got approved before the cables are cut to lengths. Straight joints are permitted only under exceptional circumstances.

5 Storage and loading, unloading of cables. :

- 5.1 Cable drums shall not be stored one above the other. Sufficient space between cable drums shall be left for air circulation and the drums shall stand on battens placed directly under the flanges.
- 5.2 Cable drums shall be stored preferably on a plain ground without having any hard stones or any other sharp materials projecting above the ground surface. The drums shall be stored preferably in the shed or otherwise they shall be covered by tarpaulin.
- 5.3 Drums shall be stored and kept in such a way that bottom cable end does not get damaged.
- 5.4 Drums shall be rotated only in the direction marked on the drum.
- 5.5 Loading and unloading shall be done with material handling equipments only.

6 Erection and laying of cables:

6.1 General:

- 6.1.1 All cables shall be adequately protected against any risk of mechanical damage to which they may be liable in normal conditions of service.
- 6.1.2 When cables pass through holes in metal work, precautions shall be taken to prevent abrasion of the cables on any sharp edge. Cables passing through walls, ceiling or floor shall run through sleeves of Hume pipes of adequate dia. & after pulling of the cables both ends of the sleeve shall be sealed with fire resistance material to prevent spread of fire.
- 6.1.3 In every vertical channel, duct, trucking or cable trench, containing cables and exceeding three meters in length, internal barriers shall be provided so as to avoid heating of the air at the top of the unit.
- 6.1.4 In every vertical cable shaft, cable trench or any passage of cable through wall, ceiling, floor etc. Barriers against spread of fire and smoke shall be provided.
- 6.1.5 In fire hazard areas extra care shall be taken to prevent spreading of fire in case of cable failure. Cables in these areas shall be covered by glass wool or embedded in sand in appropriate trenches. The cabling in such areas shall be done as per FIA approval and IEE regulations.

- 6.1.6 Communication cables should be laid away from the power cables to avoid electromagnetic interference. Minimum clearance of 300 mm shall be maintained.
- 6.1.7 Control and power cables shall be laid on separate trays.
- 6.1.8 The maximum number of power cables on a tray should be limited to six.
- 6.1.9 Every cable shall be installed where it will not be exposed to direct sunlight, rain, dripping water, oil or any corrosive substance.
- 6.1.10 The cables shall be erected and laid by either of the following methods and as specified in Bill of Quantities or specifications or drawings.

6.2 Cables laid in excavated trenches:

- 6.2.1 The cables for external electrification work shall be laid in specially prepared cable trenches as specified under the section for cable trenches.
- 6.2.2 While laying cable in the trench the cable end shall be pulled with pulling eye only after mounting the drum on the jacks.
- 6.2.3 Care shall be taken in laying cables to avoid forming kinks. The drums shall be unrolled and cables run over wooden rollers, placed at intervals not exceeding 2 Mts.
- 6.2.4 High voltage cables are to be laid separately from other cables. HV, MV cables shall not be laid in the same trench and /or alongside of water main.
- 6.2.5 The cables shall not be laid directly in such soil, which is corrosive, and having components, which react with the insulating layer or amount of the cable. In such case it should be laid in pipes or concrete trenches.

6.3 Cables laid in built-up trenches:

- 6.3.1 For the cable route passing through the area which is proposed to be covered with concrete/tiles etc. the cables shall be laid in the R.C.C./brick masonry cable trenches as specified in the items. This arrangement shall be generally inside the building.
- 6.3.2 For the area outside the building but covered with concrete /tiles etc. the cables shall be laid through R.C.C. pipes laid in ground with brick chambers at both ends. The chambers shall be covered with C.I. heavy-duty covers if the area is prone for vehicular traffic otherwise medium duty C.I. covers should be provided.
- 6.3.3 Cables laid in the built-up cable trenches within the building shall be raised so as not to lay at the trench bottom. Cables shall be either secured to the wall by saddles or laid on hot dip galvanized angle iron brackets or cable trays, ladder, rack, trough etc.
- 6.3.4 Where cables are clamped to the wall a minimum clearance of 100 mm shall be maintained between wall and cable and minimum 150 mm vertical clearance shall be maintained

between two cables. Where cables are laid on cable brackets, the brackets shall not be fixed more than 500 mm apart to avoid sag in the cables. Where cables are laid on cable tray /ladder /troughs /racks, minimum 300 mm distance shall be observed between adjacent tier of tray/ladder /troughs /racks, and cable shall be fixed minimum 25 mm away from wall and minimum 150 mm distance shall be observed between two adjacent cables. Cable shall be properly fixed with the tray /ladder /troughs /racks with cable tie or saddles.

- 6.3.5 The dimensions of the trenches shall be determined depending upon the maximum number of cables that is expected to be accommodated. Wherever specified, trenches shall be filled with fine sand and covered with RCC or steel chequered trench covers.
- 6.3.6 Where cables are to be installed under floors or above suspended ceilings or below ceiling, they shall be laid on a cable tray and shall be run in such positions that they are not liable to be damaged by contact with the floor or the ceiling or their fixture. The cable tray shall be properly fixed with tie rod to the ceiling. The concrete inserts for fixing the tie rod shall be put in place while casting the slab. The cable tray route shall be co-coordinated with other services. While laying the cables on the tray minimum 150 mm distance shall be observed between two adjacent cables. At least 25 % space shall be kept spare for any future installation.
- 6.3.7 The cable reaching for the motors in the mechanical room or plant room or machine room or service area shall be laid on cable tray. The cable reaching to motors shall be protected by rigid galvanized conduits up to a height of 300 mm above the floor. Above that height, the cable shall be protected by means of oil tight flexible metallic conduits fixed to the terminal box of the motor. The connection between the rigid conduit and the flexible conduit shall be done by a screwed coupling of an approved type. The flexible conduit shall be properly fixed with the terminal box of the motor by means of double hexagonal check nut.

6.4 Duct System:

Wherever specified cables shall be laid in underground ducts. The duct system shall consist of a required number of reinforced Hume pipes with simplex joints. Wherever asbestos cement pipes are used, the pipes shall be encased in concrete of 75 mm thick. The ducts shall be properly anchored to prevent any movement. The top surface of the cable ducts shall not be less than 60 cm below the ground level. The duct shall be at a gradient of at least 1:300.

The ducts shall be provided with inspection manholes at all direction changes and at required regular intervals for drawing the cables. The manholes shall be of reinforced concrete either cast-in-situ or precast. The manhole covers shall be cast iron and machine

finished to ensure a perfect joint. The manhole covers shall be installed flush with the ground or paved surface. The ducts shall be properly plugged at the ends to prevent entry of water, rodents etc. Suitable duct markers shall be placed along the run of the cable ducts. The duct markers shall at least be 15 cm square embedded in concrete, indicating the voltage, number of ducts and the direction of run of the cable duct. Suitable cable supports made of angle iron shall be provided in the manholes for supporting the cables. Proper identification tags shall be provided for each cable in the manholes.

6.5 Cables on Trays / Racks:

6.5.1 Cable shall be laid on cable trays/racks wherever specified. Cable racks/trays shall be of ladder, trough or channel design suitable for the purpose. The nominal depth of the trays/racks shall be 150 mm. The width of the trays shall be as per the design shown on drawing.

The cable trays shall be made of steel or Aluminum as specified. The trays/racks shall be completed with end plates, tees, elbows, risers, and all necessary hardware. Steel trays shall be hot dip galvanized. Cable trays shall be erected properly to present a neat and clean appearance. Suitable cleats or saddles made of Aluminum strips with PVC covering shall be used for securing the cables to the cable trays. The cable trays shall comply with the following requirements.

- a. The tray shall have suitable strength and rigidity to provide adequate support for all contained cables.
- b. It shall not present sharp edges, burrs or projections injurious to the insulation of the wiring/cables.
- c. If made of metal, it shall be adequately protected against corrosion or shall be made of corrosion resistant material.
- d. It shall have side rails or equivalent structural members.
- e. It shall include fittings or other suitable means for changes in direction and elevation of runs.

6.5.2 Installation of cable trays/racks:

- a. Cable trays shall be installed as a complete system. Trays shall be supported properly from the building structure. The entire cable tray system shall be rigid.
- b. Each run of the cable tray shall be completed before the installation of cables.
- c. In portions where additional protection is required, non-combustible enclosures to be used.
- d. Cable trays shall be exposed and accessible.
- e. Where cables of different system are installed on the same cable tray, non-combustible, solid barriers shall be used for segregating the cables.

- f. Cable trays shall be grounded by two nos. earth continuity wires. Cable trays shall not be used as equipment grounding conductors.

7 Cable trenches (excavated):

- 7.1 The cable trenches shall be excavated 60 cms below the finished ground level and shall have a minimum width of 300 mm for laying of single cable. When more than one cable are laid in the same trench, the width of the trench shall be increased such that the spacing between the cables is 200 mm and the end cables are at minimum 100 mm from the side of the trench. At the turning of the cable route the trench shall be dug with radius equal to 15 times the cable diameter.
- 7.2 The trenches shall be cut square with vertical sidewalls and with uniform depth. Suitable shoring and propping may be done to avoid caving in of trench walls. The floor of the trench shall be rammed and leveled. The bottom of the cable trench shall be prepared with 100 mm sand bed for laying the cables.
- 7.3 The cables shall be laid in trenches over the rollers. After the cable is laid and straightened it shall be covered with sand, and bricks shall be placed on top and at the side of the cable.
- 7.4 Wherever specified, half round RCC pipes shall be placed above the cables.
- 7.5 The cable trench then shall be refilled with excavated materials after removing the stones and other sharp materials and the refilled materials shall be compacted with light ramming.
- 7.6 Approved Cable markers made of Aluminum or CI with 15 cms crown shall be provided along the route of cables at a spacing of 25 - 30 meters and also at both ends of crossings or at the cable turning point. The class, type, No. of cables shall be indicated on markers.
- 7.7 Cable shall be laid in Hume pipes at all road crossings and in GI pipes at the wall entries or at the crossing of the drains/gutters.

8. Cable jointing:

- 8.1 The straight joint in cable shall be avoided as far as possible by correctly apportioning the cable lengths. If unavoidable following precautions shall be taken while jointing.
- 8.2 Cable jointing shall be done as per the recommendations of the cable manufacturer. Jointing shall be done by qualified cable jointer. The location of the cable joint shall not be where the cable takes a bend also where the soil is loose and shows signs of subsidence.
- 8.3 Cable jointing boxes shall be of appropriate size suitable for PVC insulated cables of particular voltage ratings and shall be of approved make.

- 8.4 Jointing of cables in the joint boxes and the filling of the compound shall be done in accordance with the manufacturer instructions and in an approved manner. All straight or T joints shall be done in epoxy mould boxes. All terminal leads of conductors shall be heavily soldered up to at least 50 mm length.
- 8.5 All cables shall be joined colour-to-colour and tested for insulation resistance and continuity before commencing the jointing. The seals of cables shall not be removed until preparations for jointing are completed. Joints shall be finished on the same day, as commenced and sufficient protection from the weather shall be arranged.
- 8.6 Joints shall be made by means of suitable solder for conductor, the conductors being firmly bolted into the connections or ferrule and the whole end soldered with proper solder and flux or resin. Conductors shall be properly insulated with high voltage insulating tape and by using separators of approved size and pattern. The joints shall be completely filled with epoxy compound (with necessary tapping) to ensure proper filling of the box.
- 8.7 Epoxy compound shall be prepared as per manufacturer instructions. Oil, water or any other liquid shall not be added to the mixture and which shall be used within 30 minutes of mixing. The surface on which epoxy is to be used shall be free from dust, rust, oil, grease and shall be dry. Joint shall not be moved or disturbed until the epoxy has completely hardened.

9 Cable Termination. :

- 9.1 All cable terminations for conductors' upto 4 sq.mm may be insertion type and all higher sizes shall have tinned copper compression lugs.
- 9.2 Cable termination shall be done in cable end box or in terminal box or in pillars etc. The end terminations shall be insulated with a minimum of six half lapped layers of PVC tape.
- 9.3 Cable terminations are to be made with flange type brass cable glands so as to grip inner and outer PVC sheaths and also the cable armour. Cable gland shall be bonded to earth.
- 9.4 The cable conductor ends are to be connected by crimping tinned heavy-duty copper lugs. Hydraulic crimping tool shall be used.
- 9.5 Every connection at a cable termination shall be mechanically and electrically sound and protected against mechanical damage and any vibration liable to occur shall not impose any harmful mechanical damage to the cable conductor

10 Testing of cable before laying and commissioning:

All tests shall be carried out in accordance with relevant IS codes of practice, IE rules and specifications.

- 10.1 100% cable drums shall be checked for continuity and cross continuity tests to ensure that there is no internal damage to the cable during transportation.

- 10.2 Prior to burying of cables, insulation resistance shall be measured with 500 V megger between the cores and all the cores to earth (amour) and results shall be recorded.
- 10.3 On completion of cable laying work, all the tests such as insulation resistance test, continuity test, sheathing continuity test, earth test etc. shall be conducted in the presence of the Architects.
- 10.4 After the cables are installed, before commissioning it shall be tested for high DC voltage test. The recommended volts and duration of the test between each core and metallic amour (earth) at 3 KV DC is for 5 minutes. During high voltage test all electrical equipments related to the cable installation must be earthed and adequate clearance shall be maintained from the other equipments and from work to prevent flash over.

SECTION – II

Specifications for Earthing and Lightning Protection

1 Scope:

This specification covers supply of necessary materials, and erection at site, of complete earthing system including earth pits at the locations indicated, earth conductors from earth pit to the respective equipments, switchgears, pillars etc. and making connections, testing at site, commissioning and handing over.

2 Applicable standards:

The entire work of earthing system, shall conform to IS 3043, Indian Electricity Act and Rules and relevant regulations. The work of Lightning protection shall conform to IS 2309.

3 General requirements:

- 3.1 The earthing shall generally be carried out in accordance with the requirements of Indian Electricity Rules 1956 as amended from time to time and relevant regulations. Following IE rules are particularly applicable. IE Rule Nos. 32, 51, 61, 62, 67, 69, 88(2) & 90.
- 3.2 All earth connections shall be carefully made, visible for inspection, and the testing of individual earth electrode shall be possible.
- 3.3 All materials, fittings etc. used in earthing shall conform to IS specifications and in the absence of which the approval of competent authority shall be obtained.
- 3.4 The earthing electrode shall be at a minimum distance of 2 metres away from the outer face of the building wall. A minimum clearance of twice the depth of the electrode shall be maintained between two earthing stations.
- 3.5 A brick masonry chamber to facilitate easy identification and for carrying out periodical tests and inspection shall be constructed on top of the earth pit.
- 3.6 All metal conduits, trunkings, cable sheaths, HT and MV switchgears, Transformers, distribution boards, meters, light fixtures, fans, and all other metal parts forming part of the work shall be bonded together and connected to earthing network as specified.

- 3.7 Earthing system shall be mechanically robust and the joints shall be capable of retaining low resistance even after passage of fault currents.
- 3.8 Joints shall be soldered, tinned and double riveted. All the joints shall be mechanically, electrically continuous and effective. Joints shall be provided against corrosion.

4 Earth Electrodes:

- 4.1 The materials of earth electrode and earth conductors shall be galvanised iron unless specified otherwise in Bill of Quantities, specifications or drawings.
- 4.2 The earth electrodes shall be free from paint, enamel, grease etc.
- 4.3 The earth electrode shall be embedded as far as practicable in a moist soil and below permanent moist level.
- 4.4 The earth electrode shall not be installed in the proximity of a metal fence.

5 Types of earth electrodes:

The earth electrodes shall be either a pipe electrode or plate electrode, the details of which are as given in the following sections of specifications, drawings and BOQ.

6 Pipe electrode:

- 6.1 Pipe electrode shall consist of 2.5 meter long single piece G.I. pipe of min. 40 mm dia. as specified and shall be cut tapered at the bottom. 12 mm dia. holes shall be drilled with 75 mm spacing between the holes and in a staggered manner as indicated in IS 3043.
- 6.2 The electrode shall be buried vertically in a specially prepared earth pit of size 35 cm x 35 cm and the earth pit shall be filled with alternate layers of charcoal, salt and fine washed sand for a minimum thickness of 150 mm. A funnel with wire mesh inside shall be fixed to the top of the GI pipe for watering purpose.
- 6.3 The earth conductor of 25 x 3 mm GI strip shall be connected to the electrode just below the funnel with proper terminal lugs and check nuts and the other end of earth conductor shall be connected to the equipotential bus of the equipments.
- 6.4 A masonry chamber with a cast iron cover hinged to the cast iron frame embedded in the top portion of the masonry shall be constructed on top of the GI pipe to house the funnel and the earth connection. The approximate size of the chamber shall be 300 mm x 300 mm and 300 mm deep.
- 6.5 The earth conductor from electrode shall be taken out of the masonry chamber through a protecting pipe embedded in the masonry.
- 6.6 The top of the masonry chamber shall be 50 mm above the finished ground level.

7 Plate Electrode:

- 7.1 The plate electrode shall consist of either copper plate of size 60cm x 60 cm x 3.15 mm or GI plate of size 60 cm x 60 cm x 6.3 mm, and as specified in the BOQ or drawings.
- 7.2 The electrode shall be buried vertically in a specially prepared earth pit, which shall be dug up to required depth, from the ground level. The earth plate shall be placed in the earth pit with its face vertical and embedded in the alternate layers of coal and salt for a minimum thickness of 15 cms.
- 7.3 The earth conductor shall of same material as of the earth electrode. For copper earth electrode copper strips shall be provided as conductor and for GI earth electrode GI strips shall be used as earth conductor. The size and material of the earth conductor shall be as specified separately in the Bill of Quantities or drawings. The earth conductors shall be connected to the earth electrode (plate) with G.I. nut bolts, check nuts and washers and welded at the edges and shall be brought up in the masonry chamber at the ground level.
- 7.4 The earth conductor shall be extended via the earth link provided in the masonry chamber. This link shall be connected to earth conductors from the earth plate and earth conductor going to equipments with two Nos. of nut bolts, check nuts and washers (all of GI) to make secured connections. This link can be removed for testing the earthing.
- 7.5 A 20 mm dia. G.I. pipe shall be provided from the masonry chamber to the top of the earth plate for watering purpose. The G.I. pipe shall be provided with a funnel at the top with wire mesh inside.
- 7.6 A masonry chamber with a cast iron cover hinged to the cast iron frame embedded in the top portion of masonry shall be constructed on top of GI pipe to house the funnel & the earth connection. The approx. size of the chamber shall be 300mmx300mmx300mm deep.
- 7.7 The earth conductor from electrode shall be taken out of the masonry chamber through a protecting pipe embedded in the masonry.
- 7.8 The top of the masonry chamber shall be 50 mm above the finished ground level.

8 Earth conductor:

All earthing conductors shall be of high conductivity copper and or GI as specified and shall be protected against mechanical injury or corrosion. The connection of earth continuity conductors of earth bus and earth electrodes shall be strong and sound and shall be rigidly fixed to the walls, cable trenches, cable trays or conduits and cables by using suitable clamps made of non ferrous metals.

- 8.1 The cross-sectional area of earthing conductor shall not be smaller than half that of the largest current carrying conductor, subject to the minimum size being not less than 1.5 sq.mm for copper and 2.5 sq.mm for Aluminium conductors and the upper limit being 70 sq.mm for copper and 120 sq.mm for Aluminium. The size of the galvanised iron earth

continuity conductors may be equal to the size of the current carrying conductors with which they are to be used.

8.2 As a guideline the following sizes of earth continuity conductors shall be used for earthing installation

8.2.1 Size of earth conductors for lighting and power circuits.

Cross sectional area of current carrying Cu conductor	cross sectional area of earth continuity Cu conductor
Size in sq.mm	Size in Sq.mm
1.5	1.5
2.5	2.5
4.0	4.0
6.0	6.0

8.2.2 Size of earth conductors from main switchboard to sub main switches or distribution boards.

Cross sectional area of current carrying conductor Copper/Alum.	Cross sectional area of earth continuity conductor Copper/Alum.
Size in sq.mm	Size in sq.mm
4	4.0
6	6.0
10	6.0
16	10
25	16
35	16
50	25
70	35
95	50
120	70

The size of an earth continuity conductor contained in a flexible cable or flexible cord shall be equal to that of the current carrying conductor.

9 Earth connection:

- 9.1 All metal clad switches and other equipment carrying single-phase current shall be connected to earth by a single connection. All metal clad switches carrying three-phase medium voltage and high voltage shall be connected with earth by two separate and distinct connections.
- 9.2 The earthing conductors inside the building, wherever exposed shall be properly protected from mechanical injury by running the same in G.I. pipe of adequate size. Earthing conductors outside the building shall be laid 600 mm below the finished ground level.
- 9.3 The over lapping of strips at joints where required shall be minimum 75 mm. The joints shall be revetted in an approved manner. Lugs of adequate capacity and size shall be used for all termination of wires above 6 sq.mm size and bare copper wire above 2.5 mm dia. 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.

10 Connection of earthing conductor:

The earthing conductors are broadly divided in the following categories:

- 10.1 Main earthing conductor shall be taken from the earth electrode to the earth bus/connection at the main switchboard.
- 10.2 Sub-main earthing conductor shall run from the main switchboard to the sub-distribution boards.
- 10.3 Final earthing conductor shall run from the sub distribution boards to the final distribution boards.
- 10.4 Circuit earthing conductor shall run from the final distribution board to the exposed metal of the equipment to be earthed. This may run directly from final distribution boards or through earth leakage circuit breaker.
- 10.5 Metal conduits, cable sheathing and armouring shall be earthed at the ends adjacent to switch boards at which they originate or at the commencement of the run by an earthing conductor.
- 10.6 Earthing conductor enclosed with the current carrying conductors within the flexible cord shall be used only in case of equipments connected by flexible cord.
- 10.7 Lighting fittings, switches and accessories shall also be provided with an earthing conductor even though they may be rigidly secured / fixed with metallic conduit.
- 10.8 The electrical resistance of earthing conductors shall be low enough to permit passage of fault current necessary to operate a fuse, protective device or a circuit breaker.

11 Prohibited Connection:

Use of following as earth conductor is not recommended, and strictly prohibited for earthing an installation or even as a link in an earthing system. Neutral conductor, sprinkler pipes or pipes conveying gas, water or inflammable liquid, structural steel work, metallic enclosures or amour of cables and conductors, metallic conduits and lightning protection system conductors are all prohibited to be used as earth conductor.

12 Earth Resistance:

The earth resistivity of the soil where the earthing stations are located shall be submitted to the Architect before the earthing work starts and the approval shall be taken. If the earth resistance is too high and multiple electrode earthing does not give adequate low resistance to earth, then the soil resistivity immediately surrounding the earth electrodes shall be

reduced by adding sodium chloride, calcium chloride, sodium carbonate, copper sulphate, salt and soft coke or charcoal in suitable proportions.

13 Testing:

On completion of the entire installation, the earthing network shall be tested for their resistance to earth in accordance with IS 3043. The contractor shall provide all meters, instruments & labour required for the test. The test results shall be submitted in triplicate to the Architects for approval. The following tests shall be conducted.

- a. Earth resistance of electrodes
- b. Impedance of earth continuity conductors.
- c. Effectiveness of earthing.

14 Lightning Protection:

Lightning protection network shall be provided for the specified buildings and locations for protection against lightning strikes. The network shall essentially consist of Air-termination units, down conductors, roof conductors, test terminals and earth electrodes etc. The entire system shall conform to IS requirements.

14.1 Air-terminations:

- a) An air-termination shall consist of a 1200 mm long, 25 mm dia 14 SWG Cu tube with 100 mm dia Cu sphere fixed at the top of the tube. The Cu sphere shall be fixed with 5 nos. 125 mm long and 12.5 mm dia threaded Cu spikes.
- b) The complete assembly shall be fixed at a highest possible location and shall project at least 1500 mm above the network on which it is fixed.
- c) All air termination shall be effectively secured against overturning by means of rod brackets and additional supports as required, which shall be permanently and rightly attached to the building. The method and nature of fixing should be simple, solid and permanent.

14.2 Down Conductors and Roof Conductors:

- a) GI strip of specified size shall be used as down / roof conductors and the conductors shall be without sharp bends, upturns and kinks.
- b) As far as possible, the joints shall be avoided in down/roof conductors. In down conductor below ground level there shall be no joint. However in a total system where joints are unavoidable, the jointing shall be with approved method only. The joints shall be mechanically and electrically effective. The joints may be clamped, screwed, bolted, but preferably welded. The length of overlap at the joints shall not be less than 200 mm.

Contact surface at joint shall be cleaned and then inhibited from oxidation with suitable non corrosive compound.

- c) The conductors shall be adequately protected against mechanical damage but for which metal pipes shall not be used.

14.3 Test Links and Testing:

Each down conductor will be provided with a testing point in a position convenient for testing but inaccessible for interference. No connection other than one direct to an earth electrode shall be made below a testing point. Testing points shall be with Copper. The ohmic resistance of the lightning protective system with air termination but without earth connection shall be measured and should be a fraction of an ohm. Earth resistance shall be measured in accordance with IS: 3043.

14.4 Earth Terminations and Electrodes:

Each down conductor shall have an independent earth termination. It should be capable of isolation for testing purposes. Earth electrodes shall be constructed and installed in accordance with IS: 3043.

SECTION – III

Specifications for MCB DB, MCB and RCCB

1 Miniature Circuit Breaker Distribution boards:

- 1.1 Miniature circuit breaker distribution boards shall conform to IS 2675, IS 8623 and shall be suitable for operation on three phase, 4 wire, 415 V, 50 Hz, AC supply or single phase, 2 wire, 230 V, 50 Hz, AC supply.
- 1.2 The MCB distribution board shall be in sheet steel enclosures with removable type cover with additional door for protecting accidental operation.
- 1.3 Enclosure and door shall be made out of 16 SWG CRCA sheet steel and powder coated and of approved shade. The interior shall be off white finish. The DB shall be totally enclosed with dust and vermin proof construction and shall be of double door type. The DB boxes shall be as supplied by the original manufacturer.
- 1.4 Where distribution boards are specified to be complete with an isolator as incomer, the isolator shall be double pole for SP and N distribution boards and 4 pole for TP and N distribution boards.

- 1.5 Where distribution boards are specified to be complete with MCB + ELCB as incomer, the MCB + ELCB shall be double pole for SP and N distribution boards and 4 pole for TP and N distribution boards.
- 1.6 Bus bars shall be tinned copper. The internal connections in the DB shall be by using stranded copper conductor, FRLS insulated wire with copper lugs crimped at both ends. Neutral busbar and earth busbars shall also be provided in the enclosure. Neutral busbar shall have equal rating of phase busbars.
- 1.7 Distribution boards shall be provided with circuit identification by means of directory on the front cover. Upon completion of the works, the contractor shall provide and fix accurate framed circuit lists for all distribution boards. These shall consist of perspex envelopes, fixed securely by an approved method on the inside face of each distribution board front cover into which shall be inserted a neatly typed list of circuits, indicating the number of circuits, phase, cable, size, number of points connected, circuit rating and the loading. The contractor, shall also provide and fix by means of brass screws tapped into the D.B. cover, labels, with black letter on a white background for all distribution boards, MCB + ELCB, Isolators etc. The engraving on the labels and the inscription on the circuit lists shall be approved by the Architects before the work is carried out.
- 1.8 All incoming terminals shall be fully shrouded.
- 1.9 The conduit entry plates shall be removable type and shall be provided at top and bottom. All the conduits shall be properly terminated using glands, grips, check nuts, female adapters with bush etc.
- 1.10 Wiring shall be terminated properly using crimping type copper lugs/sockets. Identification ferrules shall be provided on all wires. Each circuit shall have an independent neutral.
- 1.11 Two No. Earth terminals shall be provided on each Distribution Board.
- 1.12 Distribution boards shall be installed surface mounted or recessed mounted as specified and erected at the locations shown.

Surface mounted DB shall be mounted on a suitable size frame made out of GI ZED section. The hole fasts of the frame shall be grouted in the wall with cement mortar and the frame shall be painted with two coats of red oxide and two coats of enamel paint of approved shade. The DB shall be mounted on this frame with proper size nut bolts.

Recessed mounted DB shall be erected in the chase/cut portion of the wall. The cutting of the walls shall be done while constructing the wall and shall be of adequate size to

comfortably accommodate the DB. The cut portion shall be smoothened and made plain and shall be fine finished. The DB shall be fixed in this chased portion with suitable clamps and bolts. The top cover of the DB cabinet shall be projecting out of the wall surface and free from any obstruction so as to open the same smoothly.

2 Miniature Circuit Breakers:

- 2.1 MCB's shall be manufactured in accordance with IS 8828 having a short circuit breaking capacity category 10 kA at both 240 volts 50 Hz. and 240/415 V, 50 Hz and complying with the test requirements for both reference calibration temperatures of 20 degree C and 40 degree C.
- 2.2 All miniature circuit breakers shall be rated to withstand the fault currents of the circuits they protect without causing any interference in any other protective device associated with the distribution system. At the same time the design of the circuit breakers shall be such that, it will protect the circuit for which it is intended and not cause or allow other protective devices to operate when fault conditions apply.
- 2.3 Miniature circuit breakers shall be capable of carrying its full rated current continuously without tripping out.
- 2.4 All the miniature circuit breakers shall be fitted with a magnetic undelayed tripping mechanism. These shall have overload and short circuit elements.
- 2.5 Time current characteristic of the MCB shall match with that of HRC fuses..

3 Residual current operated circuit breakers (RCCB)

- 3.1 RCCB's shall be manufactured in accordance with IS 12640 and IS 8828 having a short circuit breaking and earth fault protection up to 9 KA at both 240 Volts 50 Hz and 240/415 V, 50 Hz and complying with the test requirements as per IS 2640.
- 3.2 RCCB shall be designed to interrupt the circuit during an earth fault, overload or short circuit. All RCCB shall be high sensitive and calibrated to trip the power supply when the residual current is more than 50 % of its calibrated rating. This means that a 30 mA sensitivity RCCB should trip when the residual current is in the range of 15 to 30 mA and a 300 mA RCCB should trip when the residual current is in the range of 150 to 300 mA.
- 3.3 The RCCB's shall be truly current operated, which means that it shall be totally independent of the main voltage for tripping. RCCB must operate for nominal voltage well below the

maximum safe value of 10 volts. RCCB shall interrupt the circuit within 30 milisec at a leakage current of 30 mA.

- 3.4 RCCB shall be provided with a neutral advance mechanism. RCCB shall be functioning even in the event of failure of neutral and/or any one or two of phase supply conductor. RCCB shall be provided with trip free mechanism ensuring that the device cannot be reclosed / reset if the fault persists. RCCB shall be functioning even in the case of interchange of load and supply side connections.
- 3.5 Test button shall be provided to check the correct operation of the unit.
- 3.6 RCCB shall be designed for a very long life of a minimum of 20,000 operations and shall be capable of withstanding inrush current of 4 to 8 times the rated current. For the proper functioning the RCCB should not require any connection of earthing on the device.
- 3.7 The device should have high tripping accuracy of less than 5% of rated tripping current. The RCCB shall be provided with clear indication to show whether the tripping is due to current leakage or overload/short circuit.
- 3.8 The MCB section of RCCB shall be provided with arc chambers and vents are also to be provided to release the arcing products in the atmosphere, so as to increase contact lift and to prevent damage to the insulation. The self-extinguishing thermoset plastic material shall be used for body and shall have a modular construction. The device should be vibration proof.

4 Moulded Case Circuit Breakers (MCCB)

MCCB's used shall be suitable for 440 V, AC, 50 Hz supply and shall be capable of withstanding electrical and mechanical stress due to short circuit capacity as specified for individual requirement. The MCCB shall be compact in size, dust and vermin proof with quick make and break operating mechanism. The construction shall be such as to ensure maintenance and current setting adjustment without removing the MCCB from the panel. The MCCB shall be suitable for interlock with panel door on which it is mounted.

SECTION - IV

Specifications for Medium Voltage Distribution Panel Boards

1 Scope:

This section shall cover supply, assembly, installation, connection, testing and commissioning of medium voltage distribution panel boards as described in this specifications, drawings and schedule of quantities.

2 System:

All the medium voltage distribution panel boards shall be suitable for operation on three phase, 4 wire or single phase, 2 wire with normal system voltage of 415/240 volts, 50 Hz, A.C. supply with solidly grounded neutral system.

3 Weather condition at site:

The panel boards shall be suitable for continuous operation and designed to withstand heaviest conditions at site.

- a) Temperature range: 40 to 45 ° C
- b) Relative humidity: 50 to 80 %
- c) Weather: Dusty

4 Applicable IS Standards:

The panel boards to be supplied under this specification shall confirm to latest editions of relevant Indian Standards and Indian Electricity rules and regulations. The following Indian Standards shall be complied with.

IS 4237: General requirements for switch gear and control gear for voltage not exceeding 1000 V.

IS 2208: HRC cartridge fuse links upto 610 V.

IS 2705: Current transformers

IS 1248: Electrical Indicating Instruments.

IS 375: Switch gear bus-bars, main connection and auxiliary wiring, marking and arrangement for.

IS 2147: Degree of protection provided by enclosures for low voltage switchgear and control gear.

IS 2675: Enclosed distribution fuse boards and cutouts.

IS 2557: Danger notice plates.

IS 1567/4047: Specifications for switch fuse units.

IS 3072 (I): Installation and maintenance of switchgears.

TECHNICAL CONDITIONS ELECTRICAL**5 General:****5.1 Shop drawing:**

Prior to fabrication of the panel boards, the contractor shall submit for the approval of Engineer In-charge, the shop / vendor drawing and design calculations indicating type, size,

short circuit rating of all the electrical components used, busbar size, internal wiring size, panel board dimension, colour, mounting detail etc. The contractor shall submit manufacturer's catalogues of the electrical components installed in the panel boards.

5.2 **Inspection:**

At all reasonable times during production and prior to transport of the panel boards to site, the contractor shall arrange and provide all the facilities at manufacturer's plant for inspection and testing and any stage inspection agreed upon.

5.3 **Test certificates:**

Testing of panel boards shall be carried out at factory or at site as specified in Indian Standards in the presence of LIC Representative. The test results shall be recorded on prescribed forms. The test certificates for the test carried out at factory or at site shall be submitted in duplicate to the Engineer-Incharge for approval.

6 **Cubical type Panel boards:**

6.1 **Construction:**

6.1.1 **Structure**

The panel board shall be metal enclosed sheet cubical, compartmentalized suitable for indoor or outdoor installation having dead front, floor mounting type. All M.S. sheets used in the construction of panel boards shall be 16 SWG (1.6 mm) thick unless specified otherwise in the item and shall be folded and braced as necessary to provide a rigid support for all components. Joints of any kind in sheet steel shall be seam welded, all welding slag ground off and welding pits wiped smooth with plumber metal.

The panel boards shall be totally enclosed, completely dust and vermin proof. Gaskets between all adjacent units and beneath all covers shall be provided to render the joints dust proof. All doors and covers shall be lockable and fully gasketed with foam rubber or neoprene rubber strips.

All panels and covers shall be properly fitted and secured with the frame, and holes in the panel correctly positioned. Fixing screws shall enter into holes tapped into an adequate thickness of metal or provided with bolt and nuts. Self-threading screws shall not be used in the construction of panel boards. Suitable base channels (min size 75 mm x 75 mm x 5 mm thick) shall be provided at the bottom. A Clearance of 300 mm between the floor of the panel board and the bottom of the lower most units shall be provision Panel boards, if necessary shall be preferably arranged in multitier formation. The panel boards shall be of adequate size with a provision of spare space (as jointly decided with the Architect) to accommodate possible future additional switchgear. The size of the panel boards shall be designed in such a way that the internal space is sufficient for hot air movement, and the electrical component

does not attain temperature more than 40 degree Celsius. Opening for natural ventilation shall be provided and shall have screens or grills made of brass or stainless steel wire mesh.

The panel boards shall be provided with removable sheet steel plates at top and bottom with knockout holes of appropriate size and number in conformity with the number, and size of incoming and outgoing conduits /cables.

The panel boards shall be designed to ensure maximum safety during operation, inspection, connection of cables, maintenance and repairs etc. with busbar system energised. Means shall be provided to prevent shorting of power and /or control terminals due to accidental drop of maintenance tools etc. inside the panel board. Partitions between feeder compartments, busbar chamber, cable alleys, vertical panels etc. shall be provided to take care of this aspect. The panel boards shall be sufficiently rigid to support the equipment without distortion under normal and short circuit condition; they shall be suitably braced for short circuit duty.

For buses and cables, access shall be limited from front and top only. All other equipment shall be mounted on the front side, (unless specified otherwise for any specific panel) and shall be accessible from the front. All joints and connections shall be made by cadmium plated high tensile steel bolts, nuts and washers secured against loosening.

It shall be possible to insert any new cable and to connect all load side wiring with the busbar energized, without any special precautions. Opening of the busbar chamber shall be possible with special tools only.

6.1.2 **Protection clause:**

All the outdoor panel boards shall have protection clause of IP 55. The complete board shall be double jacketed with insulation material to withstand outdoor temperature. All the indoor panel boards shall have protection clause IP 52.

6.1.3 **Powder coating:**

All sheet steel work shall undergo a seven tank process of degreasing pickling in acid, cold rinsing, phosphatising, passivating and then treated with powder coating treatment. The finishing shall be of shade as approved by the Architect. The interior surface shall have similar finish.

6.1.4 **Circuit compartments:**

Each switch fuse units and meters shall be housed in a separate compartment and shall be enclosed on all sides. Sheet steel hinged lockable door shall be duly inter locked with the

breaker/switch fuse units in "ON" and "OFF" position. However it shall be possible to bypass this interlock for inspection purpose.

6.1.5 Instrument compartment:

Separate and adequate compartment shall be provided for accommodating instruments, indicating lamps, control contactors /relays, and control fuses etc. These components shall be accessible for testing and maintenance without any danger of accidental contact with live parts of the circuit breaker/switch fuse units busbar and connections.

6.1.6 Busbars and wiring:

The busbars shall be of three-phase four wire system with separate neutral and earth bar. The busbar and interconnection between busbars and various components shall be with high conductivity, hard drawn, electrolytic copper strips.

The busbar shall be of rectangular cross section designed to withstand full load current for phase busbars and full rated current for neutral busbars and shall be extensible on either side. The busbar shall have uniform cross-section through out the length. The rating of the busbars shall be as specified in BOQ and/or drawings.

The busbars and interconnections shall be insulated with color coded insulation tapes/covers. The busbars shall be supported on unbreakable, non-hygroscopic insulated supports at sufficiently close intervals to prevent sagging and shall effectively withstand electromagnetic stresses in the event of short circuit. The busbars shall be housed in a separate compartment. The busbar shall be isolated with 3 mm thick hylum sheet to avoid any accidental contact. All busbars connection shall be done by drilling holes in busbars & connecting by chromium plated brass bolt and nuts. Additional cross section of bus bars shall be provided in all distribution boards to cover up the holes drilled in the busbars. Spring and flat washers shall be used for tightening the bolts. All interconnections between busbars and circuit breakers/switches and between circuit breakers/switches and cable terminals shall be through solid copper strips of proper size to carry full rated current. These strips shall be insulated with insulating tapes/covers.

All interconnections in the panel shall be with Cu busbars for switchgears of ratings 63 A and above. For switch gears below 63 A, flameproof Cu wires to be used with lugs crimped at both ends.

All busbars shall be tinned copper strips of the given cross section. Unless otherwise specified all bus bars are to be designed taking maximum current density of 800 Amp per sq inch.

All busbars are to be covered with heat shrinkable PVC sleeves of red, yellow, blue and black colours to indicate various phases and neutral bar clearly.

6.1.7 **Terminals:**

The outgoing terminals and neutral link shall be brought out to a cable alley suitably located and accessible from the panel front. The current transformers for instruments metering shall be mounted on the terminal blocks. No direct connection of incoming or outgoing cables to internal components of the panel board is permitted. Only one conductor may be connected in one terminal. Adequate no of spare terminals of required size shall be left in each compartment.

6.1.8 **Wire ways:**

A horizontal wire way with screwed covers shall be provided at the top to take interconnecting control wiring between different vertical sections.

6.1.9 **Cable compartments:**

Cable compartments of adequate size shall be provided for easy termination of all incoming and outgoing cables entering from bottom or top. Adequate proper supports shall be provided in the cable compartments to support cables. All outgoing and incoming feeder terminals shall be brought out to terminal blocks in the cable compartment.

6.1.10 **Earthing:**

Tinned copper earth bars of suitable size shall be provided for the entire length of the panel. Provision shall be made for connection from this horizontal earth bar to the earth pit on both side of panel board. The earth continuity conductor of each incoming and outgoing feeder shall be connected to the vertical earth bar.

All non-current carrying parts and the framework of panel board shall be connected to this earth bar. All doors and movable parts shall be connected to earth bus with flexible copper connections. Armour of the cable shall be properly connected with earthing clamp, and the clamp shall be bonded with the earth bar.

6.1.11 **Name plate, labels and directory:**

A nameplate with switchgear designation shall be fixed at the top of the panel board. A separate nameplate giving feeder details shall be provided for each panel.

Engraved nameplates shall be of 3-ply (red-white-red or black-white-black) lamincoid sheets. Size of the letters shall be 5 mm. Nameplates shall be fastened by screws and not by adhesive. Size of letter for Main nameplate shall not be less than 20 mm.

Engraved PVC labels shall be provided on all incoming and outgoing feeders. Single line circuit diagram showing the arrangements of circuit inside the panel board shall be pasted on inside of the panel door and covered with transparent laminated plastic sheet. PVC labels shall be provided for spare circuits also.

Panel boards shall be provided with a directory indicating the area or loads served by each circuit breaker, the rating of breakers, size of conductors, etc. The directory shall be mounted in metal holder with a clear plastic sheet on inside surface of the front door.

6.1.12 Danger notice plates:

Danger notice plates with symbol as per IS shall be provided on panel boards.

6.1.13 Internal components:

The panel boards shall be equipped complete with all type of required number of circuit breakers, switch fuse units, contactors, relays, fuses, meters, instruments, indicating lamps, push buttons, equipment, fittings, busbars, cable boxes, cable glands etc., and all the necessary internal connections/wiring as required and as indicated on relevant drawings.

Components necessary for proper complete functioning of the panel boards, but not indicated on the drawings and specifications shall be supplied and installed.

All part of the panel board carrying current including the components, connections, joints and instruments shall be capable of carrying their specified rated current continuously, without temperature rise exceeding the acceptable values of the relevant specifications at any part of the panel boards.

The derating of the different items resulting from the prevailing conditions like room temperature shall be allowed for while selecting the components.

All units of the same rating and specifications shall be fully interchangeable.

1. Switches:

Switches shall be air break type as per IS 4047. The switch operating handle shall be front mounted and interlocked with the door when the switch is in ON position. The live parts shall be shrouded with suitable insulating barrier so as to prevent accidental contact with the live parts after opening the cubicle front door.

3. Control switches:

Ammeter selector switches shall have make before break feature on its contacts. The selector switches shall generally have four positions for reading three phase currents and

neutral. The voltmeter selector switch shall also have four positions and the fourth shall be OFF position. Remote trip /off selector switch shall be lockable in OFF position.

4. **Indicating lamps:**

The indicating lamps shall be LED type.

5. **Measuring and Indicating instruments:**

All measuring and indicating instruments shall be Digital type, in square pattern moving from 90 deg. scale, 96mm x 96mm, flush mounting type. Instrument shall be of accuracy class 1 as per IS 1248. Ammeters for motor and other feeders shall be graduated for full load current of motor with a compressed scale at the end for at least 6 times full load current. The KW meter and PF meter shall be suitable to measure unbalanced loads on 3-phase 4 wire system. PF meter shall be in 0.5 - 1 - 0.5 range. CT's shall be resin cast, with class 1 accuracy and 15 VA burden. The energy meters shall be CT operated electrolytic type.

6. **Push buttons:**

Push buttons shall be suitable for panel mounting type and comprise of a contact element and an actuator. The contacts shall be of silver alloy and of 10 A continuous current rating. Each push button shall be provided with 1 NO + 1 NC contacts, but if required 2 NO + 2 NC contacts be provided. Colour of the knob shall be as per IS.

7. **Packing and transport:**

The bigger size panel boards shall be shipped to site in wooden crates. They shall be wrapped with polythene sheets before being placed in crates to prevent damage to the finish. Crates shall have skid bottoms for handling. All panels shall have one set of two silica gel bags, which shall be checked periodically both while in storage and while in service. The smaller size panel boards shall be transported to site with polythene sheets wrapped all along and wooden frame to cover the same.

8 **Storage at site:**

The panels shall be stored in a well ventilated, dry place and suitable polythene covers shall be provided for necessary protection against moisture.

9 **Installation:**

The panel boards shall be installed at the location as indicated in the drawings. The contractor shall submit for approval a shop drawing indicating room size, panel size and method of installation prior to installation. The cubicle type panel board shall be installed on suitable foundation. Foundation shall be as per the dimensions supplied by the panel

manufacturer. The foundation shall be flat and level. Suitable grouting holes shall be provided in the foundation. Suitable MS base channel shall be embedded in foundation on which the panel can be directly installed. If the panel is provided with an angle iron pedestal or base plate the same shall be grouted firmly in the floor. The panel boards shall be properly aligned and erected in plumb and bolted to the foundation by bolt parallel to the walls.

After installation of the panel boards, various components of the boards shall be checked and be put in working order. The cables laid through cable trench or on cable trays/racks etc. shall be terminated on the bottom plate or top plate as the case may be, by using siemens type brass compression glands. The individual cables shall then be led through the panels to the required feeder compartments for necessary terminations. The cables shall be clamped to the supporting arrangement. The switchboard earth bus shall be connected to the local earth grid. Connection of cables shall be by crimping type Cu lugs using hand operated or hydraulic crimping tool as per cable sizes.

10 Testing:

1) Testing at factory:

Panel boards shall be inspected at factory at pre-assembly stage and any modifications or changes as suggested shall be incorporated. The panel boards shall be again inspected and tested at the factory after assembly of all components and completion of all inter-connections and wiring. The tests shall include all routine and type tests as per relevant ISS.

2) Testing and pre-commissioning checks at site:

Panels shall be commissioned only after the successful completion of the following tests. The tests shall be carried out in the presence of the Architect.

2.1 Pre-commissioning checks:

- 1) Check all panels are aligned in line and properly erected in plumb.
- 2) All withdrawals portions shall be capable of smooth extraction and isolation.
- 3) All main and auxiliary bus bar connections shall be checked and tightened.
- 4) All wiring terminations and bus bar joints shall be checked and tightened.
- 5) Wiring shall be checked to ensure that it is according to the drawing.
- 6) Before fitting the covers, all chambers, compartments, cable alleys etc. shall be checked for complete cleanliness and removal of foreign matter if any, particularly the tools used for erection, cut pieces of cable armour etc. Covers shall be properly fixed with all fixing screws in places.
- 7) All mechanical interlocks shall be checked and all fuses and links shall be inserted.
- 8) Earthing connections shall be checked.

- 9) Operational checks on all circuit breakers or switchgear shall be carried out, both mechanically and electrically to check that correct indications are provided for closed and open positions.
- 10) The panels shall be checked to ensure that moisture ingress has not taken place during transit and storage.

2.2 Testing at site:

- 1) Insulation of the main circuit, that is, the insulation resistance of each pole to the earth and that between the poles shall be measured.
- 2) All wiring shall be tested for insulation resistance by a 1000 volts megger.
- 3) All relays and protective devices shall be tested for correctness of settings and operation by introducing a current generator and an ammeter in the circuit.
- 4) Insulation test shall be carried out both before and after high voltage test.
- 5) A high voltage test with 2.5 KV for one minute shall be applied between the poles and earth. Test shall be carried out on each pole in turn with the remaining poles earthed, all units racked in position and the breakers closed. Original test certificate shall be submitted along with panel.

FIRE ALARM SYSTEM

1. Manual Call Points (MCPs)

It shall be of 'break glass' type, and 1.5mm thick welded sheet steel or 3 mm thick cast aluminium. The front glass shall be breakable. The MCPs shall be recess mounted suitable to support the fire panel. It shall form an integral part of the fire detector system. The housing shall be dust/vermin proof properly sealed with rubber lining. The glass frangible element shall keep a push button pressed inside such that in the event of breaking the glass, the push button is released to actuate an alarm in the control panel.

Where sheet steel is used for, this shall be thoroughly cleaned off dust, dirt, grease and rust if any and two coats of anti rust primer shall be given both inside and outside. This shall be followed by two coats of synthetic enamel paint in fire red colour on the external surface that will be visible on installation. In the case of cast aluminium body for a call box, the surface shall be neatly finished with red colour paint. The following words shall be painted on the front of the call box in contrasting colour with a letter size of not less than 5mm.

"BREAK GLASS IN CASE OF FIRE"

Installation requirement:-

Manual call points shall be located at exit space and shall be installed at a height of 1.4 m above the floor at an easily accessible position. They shall be installed at easily accessible, well illuminated positions, preferably in a contrasting background so that they are easily noticeable from either direction. They may be semi-recessed so as to project by 10mm. They shall be installed free from obstructions.

2. **Hooters**

The loop hooters shall be so arranged that when any alarm operates all the hooters through out the premises shall be activated. The hooters at the fire alarm shall be electronic type having frequency of suitable frequency range. The hooters shall be capable to produce a sound output of 90 db at 1 m. Hooters shall be of loop powered and no separate power is required.

Fire alarm hooters shall not be used for any purpose other than for fire operations. When installed flush with a false ceiling these shall match the ceiling surface. Necessary provisions such as metal/ wooden boxing or frame work, if required, to accommodate the hooters shall be provided in the ceiling. It shall be installed at a height not lower than 2.4 m, except when recessed in a false ceiling of lower height, in such cases the hooters shall be recessed at false ceiling level.

The panel hooters in the respective panels shall be actuated automatically as soon as fire alarm signal is initiated from any trigger device connected to them. These shall also be sounded when there is a fault alarm signal within their areas of control. The sound shall be continuous and of the same characteristics from all fire alarm hooters in a building.

The isolator module shall mount in a standard suitable size electrical box or in a surface mounted back box. It shall provide a single LED that shall flash to indicate that the isolator is operational and shall illuminate steadily to indicate that a short circuit condition has been detected and isolated.

3. **Fire Alarm Control Panel**

The fire alarm control panel shall be designed to give reliable and continuous operation for long time with several advantages features. The panel shall be conventional type suitable for 2 wire loops system. Being modular in design, it shall be very easy for maintenance

and testing of the system. Fire Alarm panel consists of following plug in type modules

1. Power module.
2. Charger module.
3. Control module.
4. Loop modules.

The fire alarm control panel shall be housed in a steel enclosure. It shall also be finished with hard wear textured epoxy paint/ powder coated. Cable entries shall be provided on the top and bottom of the panel.

The system capacity shall be based on the number of devices and control modules. Each devices in the system shall be identified by its unique address position on the two wire loop. The panel retains command over the alarm process, LED indicators, automatic test feature and loop hooters.

a. **Basic system Functional Operations**

When a fire alarm/trouble condition is detected and reported by one of the system initiating devices or appliances, the following functions shall immediately occur:

The system Alarm LED shall flash or the system trouble LED shall flash.
A local piezo-electric signal in the control panel shall sound.

The LCD display shall indicate all information associated with the fire alarm/trouble condition, including the type of alarm point and its location within the protected premises.

b. Enclosures

The control panels shall be housed in cabinets suitable for surface or semi-flush mounting. Cabinets shall be corrosion protected, given a rust-resistant prime coat, and manufacturer's standard finish.

The back box and door shall be constructed of min. 16 gauge sheet steel with provisions for electrical conduit connections into the sides and top. The door shall provide a key lock and include a transparent opening for viewing all indicators. For convenience, the door shall have the ability to be hinged on either the right or left-hand side.

The control unit shall be modular in structure for ease of installation, maintenance, and future expansion.

c. Power supply

The power supply units shall operate on 240 Volts AC, 50Hz, and shall provide all necessary power for the smooth operation of system. In case of failure of main power supply the power supply unit shall draw power from a set of standby batteries. The capacity of the battery set shall be sufficient to meet the required hours full functioning of the complete system under alarm conditions. It shall provide a battery charger using dual-rate-charging techniques for fast battery recharge. It shall charge completely discharged batteries within a 12-hour period. It should provide meters to indicate battery voltage and charging current.

d. Batteries and External Charger

Battery

Battery shall have sufficient capacity to power the fire alarm system for not less than two hours in alarm condition and at least 8 hours in normal condition. The batteries are to be completely maintenance free.

External Battery Charger

Shall be completely automatic, with constant potential charger maintaining the battery fully charged under all service conditions. Charger shall operate from a 230 volt 50 hertz source. It shall be rated for fully charging a completely discharged battery within 12 hours while simultaneously supplying any loads connected to the battery. It shall have protection to prevent discharge through the charger. It shall also have protection for overloads and short circuits on both AC and DC sides.

4. Control Cable

The control cable for wiring fire alarm system shall be 3 x 1.5 sq.mm PVC Copper cable. Cables shall be laid as per relevant installation standards. The size of these cables are specified in schedule of requirements.

5. Conventional Detectors

All types of detectors shall be of manually programmable type using dip-switches or handheld programmer or from fire control panel. The detector shall have no moving parts of components subject to wear. It shall be possible to test the detector in the field. The response of a detector shall always be clearly visible from outside by a flashing light on the base. The detector shall connect to the control unit via a fully

supervised two-wire circuit. A built barrier shall prevent entry of insects into the sensor. The detector shall be designed for fast and simple cleaning.

All electronic circuits must be solid state devices and virtually hermetically sealed to prevent their operation from being impaired by dust dirt or humidity. All circuitry must be protected against usual electrical transients and electromagnetic interference. All radioactive parts of the source, if any, shall be fully gold plated. The detector shall be inserted into or removed from the base by a simple push-twist mechanism to facilitate easy exchange for cleaning and maintenance.

The smoke & heat detectors shall fit into a common type standard base. The standard base shall be supplied with a seal plate, preventing dirt, dust, condensation or water reaching the wire terminals or the detector points. Detectors shall be provided with a MS box for entry and termination of armoured cable and to protect detectors terminals.

At the time of installation and prior to commissioning, every detector shall be allotted an identification number. Detectors shall not be either partially or totally recessed in ceiling or wall. Detectors shall be suitably protected where they are liable to be subjected to mechanical damage. Detectors shall not be painted or coated or covered in any manner after installation as this will adversely affect the sensitive of operation.

Smoke detectors

It shall be of optical type. Smoke detectors shall quickly respond to smoke containing small particles normally produced and automatically adjusts sensitivity without needing operator intervention.

TECHNICAL SPECIFICATIONS FOR STRUCTURED CABLING & ALLIED WORKS

GENERAL INSTRUCTIONS TO TENDERERS

The tenderers are required to quote for the items mentioned in the schedule of quantities as per relevant specifications. The final price should be inclusive of all the components mentioned in the said configuration.

The latest versions of the operating and the applications software whichever are available at the time of delivery, should be supplied and pre-loaded, if applicable.

The tenderers are required to provide the technical literature of the equipment listed in the schedule of requirements such as data sheets, etc..

SUPPLY OF EQUIPMENT / MATERIALS:

The equipments / materials shall fully meet the requirements of relevant parts of this specification

DOCUMENTS:

Documentation shall be of such quality and detail that competent telecommunication personnel are able to maintain the equipment.

All documents shall be in English / Hindi language.

SCOPE OF WORK:

A Local Area Network is to be set-up using structured cabling with required connections at site.

The scope of the project includes laying-out the cables. The structured cabling between the "Information Outlet" and Jack Panel / hub / Switches as per schedule of quantities suitably wired either on the ground, false ceiling or on the wall surface in a manner that is safe as well as aesthetically acceptable to LIC. PVC conduits / Channels/MS pipes would be used for wiring wherever necessary.

Supply, Installation of Passive Components (and Active components, if required) as detailed out in the Schedule read in conjunction with the Technical specifications, to make the installation fully functional. This shall be done in consultation with the LIC.

Testing & Commissioning of the Network after completion of the entire installation work (or specified area if required).

Testing, Configuring servers & Clients for Network Management and commissioning of Network Management System if applicable.

The supplier has to provide requisite training about System Administration, Configuration & Network Management to LIC notified two personnel in case the active components are supplied by him.

Should be in a position to Provide Resident Engineer/ Network Administrator for Managing the Network or if required at additional Man Month Rates.

LOCAL AREA NETWORK SETUP:

A Local Area Network is to be set-up using structured cabling with required connections at various Departments. This has to be done in close coordination with the Engineering Department and IT Department of LIC to ensure the network provides proper connectivity and design requirements and compatibility with the existing network set-up of LIC. Structured Cabling work should include information on horizontal, backbone and campus cabling.

Structured cabling solution shall consist of any or all of the following subsystems:

Work location subsystem

Horizontal subsystem

Administration subsystem

Backbone subsystem

Equipment room subsystem

Campus subsystem, if applicable

The final Engineering diagrams and documentation shall include the following

Layout of all distributed Frames

Cable Tray, conduit and Raceway Plans

Campus Distribution Plan, if applicable

Equipment room plans as applicable

Work Area Floor plans

Building Control Plans, if applicable

Cable records and Assignments

It is not the intention of this Tender for the supply of Active components which is proposed to be done by the IT Department of LIC. However, in case, it is required to provide Active components, should such a situation arise, the contractor shall provide the same in consultation with the Department and complete the requisite work. Local Area Network Setup Active components will involve :

Supply & Installation of Floor switches and Backbone Switches Suppliers will be completing Local Area Network. Setup of Active components which will involve

Supply, installation, Commissioning and Warranty services In case the active components are supplied by LIC the same shall be installed and all necessary cooperation must be extended for testing and commissioning of the network

6 Post Implementation Support

The Tenderer shall give adequate support and manpower as required by the Department till the work is fully commissioned and properly configured to make it compatible with the existing network and all end user devices connected to it.

GENERAL NETWORKING PARAMETERS

The general networking parameters should conform to the standard parameters for the structured cabling which provides a single network infrastructure with a high degree of future expansion inherent in the design. The cabling system should be able to support full range of IT requirements including Voice, Data, Video & Security systems. The floor cabling to be of Cat-6 cable to ensure data frequencies should be up to 350 MHz. (Performance tested at 600 MHz frequency). The main Back Bone cabling and the network components should cater for supporting the full range of IT requirements of the Zonal office.

CABLING PHILOSOPHY

The cabling should cater for the whole Network in the respective floor (as also with the existing network if applicable) and offer the following :

Ability to move from system to system without changing the cable network.
Flexibility for moves and changes.

A versatile cable system capable of handling video, audio, security & control in addition to data and voice.

Reduced network management overhead.

Enhanced vendor independent hardware choice.

Independently isolating certain areas from the Network, when required, due to faults.

CABLING LAYOUT

A structured cabling system must be built according to **ANSI / TIA / EIA-568-A / 568-B** standards. Accordingly there shall be six functional sub systems as follows.

Entrance Facility :

The entrance facility introduces cables and associated hardware into the building. It is the demarcation point between carrier and the organization. The over-voltage protection devices are located here. Entrance facilities could be used for public network services, private network services or both.

Backbone Cabling :

Backbone cabling provides interconnections between telecommunications closets, equipment rooms and entrance facilities. It consists of the backbone cables main and intermediate cross-connects, mechanical terminations and patch cords or jumpers used for cross-connection. Backbones may connect closets within a building or between buildings.

Telecommunication closet

The telecommunications closet is where the horizontal distribution cables are terminated. All recognized types or horizontal cabling are terminated on compatible connecting hardware. Similarly, recognized backbone cables are also

terminated in the closet. Cross-connection is done with jumpers or patch cords to provide flexible connectivity for extending various services to users at the telecommunications outlets.

Horizontal Cabling

Horizontal Cabling consists of the physical media used to connect each outlet to a closet.

Work area

Work area components extend the telecommunications outlet / connector end of the horizontal cabling system to the station equipment. All adapters, filters or converters that are used to adapt the electronic equipment to the structured cabling system must be external to the telecommunications outlet.

Topology

The proposed structured cabling system shall use star topology. Each work area telecommunications outlet must be connected to a cross-connect in a telecommunications closet. All cables from an area in the respective floor, therefore, run back to one central point for administration. Each telecommunications closets must be star-wired back to the equipment room for the building. In a campus environment, where the cabling extends to two or more buildings, each building is star-wired back to one main administration area.

Unshielded Twisted Pair (UTP) Cables

Cat 6 Product Specifications:

The CAT- 6 cable is envisaged to be used for Data in the horizontal cabling (i.e between Rack to respective Information Outlets). The cable shall meet / supported by the ANSI / TIA / EIA-568-A (568-B) standard.

Cat 5e Product Specifications:

The CAT- 6 cable is envisaged to be used for voice in the horizontal cabling (i.e between Rack to respective Information Outlets). The cable shall meet / supported by the ANSI / TIA / EIA-568-A (568-B) standard.

FIBRE OPTIC CABLE :

The fibre optic cable is envisaged to be used as back bone for the racks. Hence the cabling between HC in the Telecommunications Closet (TC) and the TC at 2nd floor west wing (or 3rd floor East Wing in case L3 switch is housed at that location shall be of Multimode Fibre optic cable (MMOFC). The MMOFC intended is a 6 core cable. The cable shall meet the ANSI / TIA / EIA-568-A (568-B) standard.

Installation

Proper installation practices are vital for high performance. Installation tasks such as pulling cables or untwisting cables may degrade overall system performance. Extreme tension on the cable could stretch the twists, or untwist the pairs or increase attenuation. The 568-A / 568-B standard specifies that the pairs in a CAT-6 cable should never be twisted more than half-inch from the point of termination. Additional twisting will increase crosstalk and reduce protection from EMI/RFI. The use of proper pull techniques, pull cords and cable lubricants will prevent this type of damage.

The cable is bent as it passes through walls, ceilings, floors, ducts and corners. It is crucial not to exceed the minimum bend radius of the cable being installed.

Terminating the cables involves stripping away some of the protective insulating material and untwisting the conductors. Do not remove more insulation material than necessary.

After terminating the cables, they have to be 'dressed' or managed. This involves arranging the cables in such a way so as to provide strain relief. Thin plastic strips shall be used to bundle the cables.

The labeling and marking will be done on each terminal box and cable to identify the pairs. The labeling & marking shall be done in consultation with LIC

The cables / wires will be run in already laid Raceways / PVC / MS conduits. Special care will be taken to isolate wires/ cables from electrical wires and a minimum separation will be maintained to prevent induction / interferences. The wiring on the terminal boxes and the colour code scheme of the cable pairs will be in accordance with the standard practice used for such installations.

The following cable layout documentation will be prepared :

Main cable distribution layout to the floors with one typical floor distribution layout. Cable distribution layout to include detailed cable and terminal box layout on the Plan of the respective floor.

Layout diagram of main and intermediate cross connects, mechanical terminations and patch cords and jumpers used for cross connection. Lay-out of Telecom Closet.

Cable system measurement report. This should consist the detailed summary of the cable installed giving the quantities, make, size and type.

Detailed cable measurement Sheet Area Wise. This should include the complete record of cable and stores installed in the area giving type, quantities and make.

Cable test report for cable supplied.

Structured Cabling System

The cabling and associated work shall be carried out in accordance with the industry standards.

The cabling solution should be flexible and capable of including new facilities or technologies, as they become required or available.

The Cabling solution should cover its capacity and functionality with minimum components.

The vendor shall label all cables and cords, distribution frames and outlet locations, according to industry standards.

The solution should support analog and digital applications, data, Local Area Net Works and video on a common cabling platform.

The bidder should provide 20 year Passive product Warranty and Application Assurance from the manufacturer. The responsibility of obtaining the certification from the manufacturer, if required, rests with the Contractor.

The vendor shall use the existing trenches, conduits for cabling.

The cabling system proposed by the vendor shall meet the specifications as prescribed in ANSI/EIA/TIA, ISO 11801 and EN 50173 standards.

The actual quantities of the various items shall depend upon their actual consumption at the time of installation.

All the conduits and casing capping used during installation used by Contractor should have the ISI mark certification.

All the cabling components should preferably be from single manufacturer

EQUIPMENT / DATA RACK

The rack shall be of one of the approved makes as listed in the list of approved makes. The rack shall be made out of mild steel of not less than 1.6mm thick and powder coated after due procedures as required. The rack shall be 42U size with suitable cable managers in the sides. The rack shall be provided with coasters for facilitating easy movement and shall have screw type adjustable base.

At the Top and bottom of the rack there shall be removable gland plate with requisite knockouts for entry of cables & conduits. The front door shall be of glass contained in an MS frame. The side doors shall be provided with suitable slots at the bottom half portion to facilitate the entry of air. All the doors shall be lockable preferably with a single key. Further all the doors shall be removable, after opening the locks, to facilitate easy working during maintenance. The racks shall be provided with four fans at the top for forced cooling of the components. (Approx. capacity of each fan shall be 90 CFM).

The profile of the rack shall be got approved before placing the order. Power strip with 5 Nos. of 5A / 6A 3 Pin universal or 5 pin sockets, 2 Nos. 15A sockets, 1 No.

Fuse with base & grip and 1 No. neon indicator shall be provided on one of the sides of the rack at the rear portion. The quoted rate for the rack is deemed to be inclusive of the above strips also.

CAT 6 Specifications

Cat 6 UTP cables :

4 pairs, Unshielded twisted pair solid cable, 23 AWG Cat 6 ratings.
Meets and exceeds EIA/TIA 568-B.2-1 Cat 6 specifications
Centralized separator to reduce the noise level
Performance tested at 600 MHz frequency
Supports Giga applications

2. Cat 6 Information Outlet:

a. Face Plate

High Impact Plastic Body ABS FR Grade
Spring Shuttered Front Access
Flush or Surface mountable with a back mount frame.

b. Keystone Jack Module with bezel

Performance exceeds EIA/TIA 568-B.2-1 Cat 6 specifications
Flame retardant Plastic body UL-94V-0 rated
Spring contact : 50 micron over 100 micron nickel
Current rating : 1.7 Amps
Contact resistance : 15 Ohms max
Insulation resistance: 500M-Ohms min

3. Cat 6 Patch Cords:

a. Patch cable

Multi-strand and highly Flexible 4 pair 100 Ohms patch cables
Should meet and exceed TIA/EIA 568-B.2-1 cat 6 specifications
Pairs separated by PE former to control the noise.
HDPE insulation over the conductors
In different colors (floorwise) .

b. RJ 45 connector

Three piece, two layered design
Gold contacts, 50 micron gold over nickel; polycarbonate housing UL94V
Voltage : 30V Current: 1.5A
Contact Resistance : 20 M –Ohms
Connection : 8P8C
Wiring : 24- 26 AWG

CAT 5e Specifications

4. Cat 5e Information Outlet:

a. Face Plate

High Impact Plastic Body ABS FR Grade
Spring Shuttered Front Access
Flush or Surface mountable with a back mount frame.

b. Keystone Jack Module with bezel

Performance meets or exceeds EIA/TIA 568-B.2-1 Cat 5e specifications
Flame retardant Plastic body UL-94V-0 rated
Spring contact : 50 micron over 100 micron nickel
Current rating : 1.7 Amps
Contact resistance : 15 Ohms max
Insulation resistance:500M-Ohms min

5. Cat 5e patch panel:

Performance should meet or exceed TIA/EIA 568-B.2-1 cat 6 specifications
Aluminum Metal Frame 1.2 mm thick, 82 x 44.5mm, light weight.
Three front bezels of 8 ports each made of high impact FR grade ABS
Two side bezels to give extra grip and elegance.
Cable manager provided with cable tie cutouts for firm grip on the cables. Made up of High Impact FR grade ABS.
Tested by ERTL and UL in channel performance as per the standards.

6. Cat 5e Patch Cords:

a. Patch cable

Multi-strand and highly Flexible 4 pair 100 Ohms patch cables
Should meet and exceed TIA / EIA 568-B.2-1 cat 6 specifications
Pairs separated by PE former to control the noise.
HDPE insulation over the conductors
In different colors (floorwise) .

b. RJ 45 connector

Three piece, two layered design
Gold contacts, 50 micron gold over nickel; polycarbonate housing UL94V
Voltage : 30V Current: 1.5A
Contact Resistance : 20 M –Ohms
Connection : 8P8C

Wiring : 24- 26 AWG

7. LIU : Lightguide Interface Unit :

The OFC shall terminate in a LIU. All the six cores shall be terminated and the balance 6 connectors in the LIU shall be blanked off suitably as per standard practice. The LIU shall meet the requirements of IEEE.

LIU connectors :

The connectors shall be of LC SC type

The Tenderers may note that, for Terminations:

For MMOFC One termination involves termination of all the six cores (or 12 cores if it is a 12 core cable) in LIU or the switch as the case may be. Thus one termination means one end of the cable fully terminated. One cable terminated on both the ends means 2 terminations.

Similarly for 100 pair cable / 50 Pair cable pair cable (for voice) : One termination involves termination of all the 100 pairs / 50 Pairs pairs cable in the krone or equivalent as the case may be. Thus one termination means one end of the cable fully terminated. One cable terminated on both the ends means 2 terminations.

The Tenderer should provide 20 year Passive product Warranty and Application Assurance from the manufacturer. The responsibility of obtaining the certification from the manufacturer rests with the Tenderer and the quoted rates by the tenderer is deemed to be inclusive of the same.

Specification Required for Switches if applicable :

IEEE Standards Compliance

Ethernet: IEEE 802.3, 10BASE-T

Fast Ethernet: IEEE 802.3u, 100BASE-TX

Fast Ethernet: IEEE 802.3, 100BASE-FX

Gigabit Ethernet: IEEE 802.3z, IEEE 802.3x, IEEE 802.3ab

IEEE 802.1D Spanning-Tree Protocol

IEEE 802.1p CoS Prioritization

IEEE 802.1Q VLAN

IEEE 802.1x

IEEE 802.1w,

IEEE 802.3x Flow Control

1000BASE-X (GBIC)

1000BASE-SX

1000BASE-LX/LLX

RMON I and II standards

Cables & Patch Cords

MMOFC 6 core Halogen Free fire Retardant

Cat 5e EIA / TIA 568 A /B

Cat 6 EIA / TIA 568 –B.2-1

Information Outlets

Cat 5e EIA / TIA TSB - 40 A

Cat 6 EIA / TIA 568 –B.2-1

Patch Panels

Cat 5e EIA / TIA TSB - 40 A

Cat 6 EIA / TIA 568 –B.2-1

All features supported must be IEEE standard based features to avoid any interoperability issue with other vendor switch.

**POINTS TO BE TAKEN CARE AT ELECTRICAL INSTALLATION, FIRE ALARM,
DATA CABLING & PUBLIC ADDRESS SYSTEM WORKS :-**

1. The quantities indicated in the schedule of quantities are only provisional and payment will be made only as per actuals as ascertained by joint measurements.
2. Single pole flush type accessories are to be provided for light, fan 6 Amps pin socket and 15A 6 pin socket points and the same is mentioned in the schedule also. For the light and fan points, provision of 3 way plated rose / pattern holder (straight or slant) is included in the specification on the wiring.
3. Earthing from D.B. to switch Board and from thereon to the 5 Amps and 15 Amps pin socket points is to be extended and the same is mentioned the schedule. For light and fan points also earthing has to be extended as indicated in the Schedule and nothing extra will be paid for this work.
4. During execution of the electrical, Fire , Data, AC works like laying the conduit, AC drain pipe, Cables, Distribution board, point wiring, fire alarm & PA work etc, cutting and chasing of wall /flooring is to done carefully and has to be restricted to the minimum and the rates quoted for the respective items of work should include for patch – filling, plastered and finishing, including painting to match the colour of wall & flooring, if required.
5. Jumper holes for taking the wiring from one room to the other are to be made to the exact requirement and FRLS sleeves of required size are to be provided for crossing the brick work and nothing extra will be paid for this work.
6. It is the responsibility of the contractor to prepare the necessary drawings, test reports, etc., that are to be submitted to the Local Electricity Board.
7. The contractor has to sign the declaration given below, agreeing to execute the service connection / enhancement of electrical load with Local Electricity Board. The contractor shall arrange all the documents required for the same and arrange the service connection / enhancement of electrical load with state electricity utility. Any of the amount submitted to state electricity utility shall be reimbursed to contractor on submission of receipt of the same.
8. If the contractors have to offer any suggestion or if their rates are based on any presumption, not spelt out specifically anywhere in the tender documents they should necessarily make a suitable mention about the same, while forwarding the tender. Any such statement, after submission of the tender, will not be entertained.
9. All necessary electrical layout/fitting fixture layout/Telephone & Data cable network,/Fire Alarm layout etc shall be got approved from LIC before execution of work.
10. As built drawing layout of electrical, telephone, data cabling , Fire Alarm shall be submitted to LIC after execution work
11. Manufactures certificate/Guarantee or Warrantee certificate/ Manual of Electrical installation shall be produced as desired by LIC.
12. For structural cabling work, Fire alarm work & Public address system the experienced agency has to be engaged. Approval of agency to be obtained from LIC before execution of work.
13. All items of works are to be carried out strictly as per I.E.rules1958I.S.732,I.S.3043/1966 or their latest version. In case the tenderer observes any deviation in the provision made in the

schedule of works, vis-a-vis provision of the above given publications he is advised to bring it out clearly while making his offer.

14. Main switches beyond 63 amps should be provided with H.R.C. fuse units. Rewirable switch fuse units beyond 63 amps will not be accepted.
15. Rates quoted by the tenderer should include for the following works unless stated otherwise:-
 - i) Installation of switches on slotted angle iron frame work of adequate section. The main panel board is to be installed on the floor with adequate supports from wall at the back to make the entire arrangement adequately sturdy
 - ii) Connecting the main switch with meter, bus bar distribution board with adequate length and section of FRLS insulated leads in MS conduits or flexible conduits as per requirement of site.
 - iii) Labeling of the switches to indicate clearly the areas or the load being controlled by them.
 - iv) Connecting the earth wire run along with mains/cables etc. to the earth link by providing a suitable socket etc.
16. All bus bars are to be made of tinned copper flats of given section.
17. Unless specified otherwise all bus bars are to be designed taking maximum current density as 800 amps. per sq. inch.
18. All bus bars are to be covered with PVC sleeves of red, yellow, blue and black colours etc indicate various phases and neutral bar clearly. Alternatively, PVC insulation tape of the aforementioned colors is to be used for identification of phases and neutral as indicated above and required holes are to be drilled and brass bolts and nuts are to be provided for tapping connections as required.
19. All locally fabricated elements of the main panel boards (such as angle iron frame work, bus bar chamber, distribution board etc) should be provided with the final coat of battleship grey synthetic enamel paint after erection and all switches, busbars, distribution boards provided to main panel boards are to be labelled.
20. Drawing showing details of installation indicating very clearly the sections of slotted angle iron proposed to be used, the depth to which the members are to be grouted inside the wall, mode of their support at the floor level including grouting inside the floor should be got approved by the contractor before actual execution of work.
21. The drawing showing the arrangement of the main distribution board, floor distribution boards showing the actual dimension of switch gears, bus bar chambers, distribution boards etc. should be got approved by the contractor before fabrication.
22. After execution of the work, the contractor has to submit completion reports with drawings of the entire installation showing the manner in which the work has been actually carried out in triplicate to LIC of India. This is in addition to the drawings which the contractor is required to submit with completion report/test reports he has to submit as per the requirement of the local electric supply authority.
23. It is the responsibility of the contractor to attend to the inspection of the installation if carried out by the inspecting authority of the state government as mentioned in TD 1 since the works are to be carried out strictly as per IE rules and relevant Indian Standard specifications,

the defects indicated by the above given inspecting authority will have to be rectified by the contractor at no extra cost to LIC of India.

24. It is responsibility of the contractor to obtain electrical service connection to the premises. In case it is observed that the contractor is lacking in efforts to obtain electrical service to the premises the Chief Engineer at his discretion may recover liquidated damages at the rate as mentioned in the respective clause of the general conditions of contract for delay in availability of electrical service and consequent delay in commissioning of the installation.
25. It will be the contractor's responsibility to check the concealed conduit work carried out by the building's contractor within a period of one month of taking over the site and to certify that the concealed conduit work is in order. In case the contractor fails to point out any defect within this period, it will be taken for granted that the concealed conduit work has been found by the contractor in order and no further complaints in this regard will be entertained. After this, all rectification work will have to be carried out by electrical contractor at his cost.
26. Insulated cables are to be laid on the walls, beams, ceilings etc. by providing plugs of well seasoned wood, cemented into the walls to within 6.5 mm of the surface. Within the electrical shaft, the cables are to be run on MS clamps made out of angle, channel or flat section of required thickness grouted in the wall securely. The cable trenches in the meter room in which the cables have been laid are to be filled up with sand.
27. The underground cables laid in the trenches are to be laid in suitable dia. Hume pipes at all road crossings. The rates quoted should include for providing Hume pipe unless specified otherwise. Cable in underground is to be laid with necessary excavation of trench of size 600 mm deep and 450 mm width and refilling up to 80 mm of the trench with sand, laying the cable and covering the cable with bricks on the three sides and back filling the excavated materials and making good the same and consolidating the excavated area complete in all respects.
28. All cable terminations inside switches, busbars, distribution and switch boards should be made in a workman like manner by providing sockets of suitable amperage, compression glands of suitable dia. porcelain connectors etc. as required. Rate quoted should be inclusive of all these accessories and nothing extra will be considered on this account.
29. Measurements for mains and cables will be taken as per IS 5908-1979 or its latest version.
30. Conduits containing FRLS insulated wires for mains/submains/circuits/point wiring are to be painted with two coats of synthetic enamel paints or British paints/Jenson & Nicholsons / Shalimar / Asian brand to match with the finished wall surface. The rates quoted should be inclusive of the cost of paintings as mentioned here.
31. All rates quoted for point wiring shall be inclusive of necessary circuit wiring with 3 x 2.5 sqmm copper conductor FRLS insulated wires of 600 V grade with distinct colours for phase, neutral and earth in appropriate size 25mm dia FRLS heavy gauge conduit and accessories concealed in beams/column/walls from the distribution board to switch board location as directed.
32. M.S. switch boxes of suitable sizes to accommodate ceiling fan regulators are to be provided on wall in concealed manner and hence the rates quoted should include for the switch boxes provision with adequate size of 3 mm thick laminated sheet cover to be fixed on suitable size concealed M.S box with steel screws and washers.

33. 15 A power plugs are to be directly wired from the DBs and not to be looped under any circumstances.
34. The work of providing earth electrode is to be done strictly according to IS 3043-1966 or its latest version.
35. At G.I. Plate Earthing, G.I. Plate of size 600 x 600 x 6.30 mm is to be buried 2.5 mtrs below ground level. Necessary watering arrangement with suitable size G.I pipe and funnel is to be made. 2 Nos of 25 mm x 6mm G.I flats from the bottom of the plate are to be taken out and terminated to the main panel board.
36. Suitable size G.I protection pipe for GI earth flats is to be provided directly from the earth pit and upto 3 mtrs height on wall and necessary masonry chamber with hinged type lockable cast iron inspection cover of 300 x 300 mm is to be provided. Necessary alternate layers of charcoal/coke and salt are to be provided. The earth stations are to be provided with minimum 4.5 mtrs away from the foundation of the building.
37. At G.I. pipe earthing, Same as above as in G I plate earthing but with 38 mm G.I. pipe of minimum, 2.75 mtr length.
38. At copper plate earthing, Same as above as in GI plate earthing but copper plate of size 600 mm x 600 mm x 3.15 mm is to be used and 1 No of 25mmx3mm thick copper strip from the bottom of the plate to be provided as specified in the schedule.
39. For pump set motors, pipe electrodes are to be provided whereas for other electrical installation plate earthing can be provided unless stated otherwise.
40. The work of provision of earth station should include in addition to provision of earth electrodes bringing the earth leads upto test terminal block installed at a height of 2.75 mts from ground level in case of lightning conductors. The measurement for earth leads if included in the schedule of work and payable separately, the above measurement will be excluded from the separate measurement.
41. The earth resistance is to be tested with suitable earth megger and the earth electrodes are to be installed minimum 4.5 mtrs. away from the premises.
42. Street light lamp posts are to be made of 50 mm dia. G.I Pipe of 'medium' or 'B' Class of specified length with MS base plate of size 300 mm x 300mm x 10 mm welded at the bottom of the lamp post. Street light pole should be painted with two or more coats of Aluminium paint of approved make.
43. Tube light fittings on ceiling are to be fixed with suspension rods not exceeding 750 mm made out of minimum 16 gauge HGBE conduit of suitable size with necessary ball and sockets, chuck nuts etc. Ball and sockets are to be fixed to TW round blocks securely fixed on the ceiling. The down rods are to be painted with two coats of synthetic enamel paint of approved colour.
44. Fittings on the wall are to be directly fixed on the wooden round blocks of suitable size as mentioned above.
45. Ceiling fans supplied by LIC are to be assembled, tested and erected on the ceiling fan hooks already provided. FRLS insulated copper conductor wires of size 1.5 sqmm are to be used for making connection for the ceiling fans. Regulators are to be fixed on the concealed switch boards and connections given as directed.

46. Exhaust fans supplied by LIC are to be fixed at the location as directed and the balance opening if any is to be closed properly with 6 mm thick Teak Wood ply as directed. The exhaust fans are to be provided with necessary mechanical support. When installed on walls directly, the exhaust fans are to be fixed on the four bolts securely grouted on the walls suitably.
47. The open end of the concealed conduit shall be closed with plastic plug and should flush with the plaster surface.
48. Earth studs (screws) are to be provided in switch boxes on either side of the box for earthing.

49. DETAILS FOR FIXING DBs & SWITCH BOXES :

S. No.	Item	Height in mm from F.F.L. to the bottom of the SB/DB (preferably as directed at site)	If wall glazed tiles are used in walls
1.	Distribution works	1800	
2.	Switch Box	1250	
3.	Power Plug box in bath room	1800	Clear 50mm above the wall glazed tiles levels whichever is higher is to be followed.
4.	Power Plug box for water cooler	1200	-do-
5.	Independent Power Plug point box	300	-do-
6.	Power Plug Box in kitchen	1250	-do-
7.	Power Plug Box in Tea Room	1200	-do-

APPENDIX TO GENERAL INSTRUCTIONS TO CONTRACTORS

CLAUSE NO.2 OF CONDITIONS OF CONTRACT:

Name and Location of the proposed work:

NAME OF WORK:- E-Tender for Proposed Modernization works including Interior, Civil, Electrical Installation, Fire Alarm, Air-conditioning, Data cabling, Modular Chairs, Furniture's and Ancillary works at Branch Office building Lakhimpur under Divisional Office – Lucknow.

LOCATION OF BRANCH OFFICE: Avas Vikas Colony, Near Don Bosco School, Lakhimpur (U.P.)

(SIGNATURE OF THE CONTRACTOR)

SPECIAL CONDITIONS:**1. PHOTOGRAPHS OF THE BUILDING**

- 1.1 The contractor shall submit 3 sets of the prints of the photographs size 4"x6" to LIC of India at various stages:
- Before commencement of the work.
 - During progress of work.
 - Completion before handing over the building

The photographs can also be submitted in CD/DVD in lieu of printed photographs.

One or more photographs shall be taken to have complete clear views of the project as directed by Corporation's Engineer.

- 1.2 The quoted **Percentage Rate** shall include for the same and no extra is payable to contractor on this account.
- 2 Contractors shall note that the site is working office/ Under construction building. Hence, contractor shall take into account this aspect and quote their percentage accordingly.
- 3 Contractors are advised to inspect the site before quoting their **RATE**. The contractors shall also note that they have to co-operate with other agencies carrying out the work(s) of LIC of India in the same site.
- 4 All statutory fees to be paid to municipal, water and sewerage authorities, water supply connection, sewerage connection and road cutting etc ., will be paid/reimbursed by LIC against production of receipts towards payments of such fees. No overhead charges shall be paid in this regard.
- 5 The contractors shall not stack building materials on footpath and road margin.
- 6 The contractor shall thoroughly clean all the dust and dirt's, debris etc. and remove all the scaffoldings and other materials used for the works away from the site as and when needed. Disposal of the debris and Surplus Excavated earth should be done in such a way that the site is kept free from such unwanted materials.
- 7 The site is located in commercial area and therefore Contractor shall take all precautions to cause least inconvenience to the neighbors /surroundings during the work.
8. There may be some traffic restrictions with regard to heavy vehicles since the site is located in commercial area. Contractor shall take note of the same and obtain necessary permission from appropriate authorities for transportation of materials required for the construction. In case work is required to be done during the night time, permission from the Employer as well as local/police authorities shall be taken.
- 9 Noise pollution should be kept at minimum tolerance level.

- 10 Contractors to note that if hutments for labour provided at site all the necessary facilities etc., shall be done as per statutory labour laws.

11. OTHER SPECIAL CONDITIONS:

- i) Passenger Lifts of building cannot be spared for lifting materials to work site.
- ii) Laborers may allow at site only after showing photo I-Card issued by the agencies and duplicate of which is to be submitted to Branch office.
- iii) Gate pass for daily labour may be issued by Branch Office.
- iv) Every effort should be made to restrict the movement beyond working area.
- v) Materials can be taken away only after getting gate pass from Branch Office.
- vi) **Well co-ordination should be maintained with all agencies and designated coordinator from LIC side to avoid any kind of disturbances in office working.**
- vii) Every day, before the office starts the common area / working area should be cleaned in all respect if this area is used anyway for the work.
- viii) LIC is no way responsible for issuing way bill or C – form to any agencies.
- ix) During the execution of the work, the cleaning of pavements to be done on day to day basis.
- x) The work is to be carried out in the working office Building with least disturbance to the occupants/staff and therefore the work may have to be carried out in phased manner but entire work is to be completed within stipulated time limit. No consideration shall be given for extension of time limit on account of work taken in phases. Quoted Rate shall also include shifting of existing furniture, storage units etc during execution of work and rearranging at new/old position/place for normal office working.
- xi) All attention is to be paid to avoid any inconvenience of office working. In case of disruption of power or data/telephone cable during working, it shall be set right immediately, failing which the employer shall engage electrician/workmen for restoration and the cost shall be recovered from his payments.
- xii) The contractor has to depute sufficient number of supervisory staff for making all arrangements and to ensure no disturbance to occupants.
- xiii) It is responsibility of the contractor to adhere to all security measures for the workers.
- xiv) The Contractors has to ensure protection to building and other assets including parked vehicles in the campus. In case of any damages caused due to work or due to ignorance of ant worker, contractor has to make good the damages and / or compensate the LIC for the damages done.
- xv) Contractor is advised to inspect the site before submitting the tender and examine all parts of the work.
- xvi) All fabrication works has to be carried out outside the office premises at Contractor's own arrangement and rate quoted shall include for the same.

12. The quantities shown in the schedule i.e. Interior, Civil, Air-conditioning, Modular Furniture, Chairs, Electrical Installation, DATA & Telephone cabling, Fire Alarm and public address system are provisional and are likely to increase or decrease. Some of the items may be omitted altogether. No claim whatsoever shall be entertained on this account.
13. The Clause No 37 of conditions of contract , Clauses no 14 & 20 of General Instruction to Contractors for work and Annexure-D i.e, Form of Bank Guarantee to secure a lump sum advance, shall be treated as deleted.
14. All works in course of execution or after execution in pursuance of the Contract, shall at all times be open to the inspection and supervision of the Executive Director (Engineering) or his authorized representatives and the Contractor or his responsible agent, duly accredited in writing, shall at all such times, be present to receive instructions/orders. The work during the progress or any time before settlement of the final bill, is also liable to be inspected by Chief Technical Examiner of the Central Vigilance Commission, New Delhi, on behalf of the Employer and this shall be also considered as an inspection by the Employer for all purpose.
15. Contractors to note that the quoted rates shall be firm throughout the currency of the contract. The escalation towards materials, labour etc. is not allowed and will not be paid.
16. Price variation of materials shall not be allowed where the basic price of materials is mentioned in the respective items. However, if the purchase price of materials is less than the basic price of materials, the recoveries shall be made from the contractor bills.

17. TESTING OF MATERIALS

During the progress of work, tests as prescribed below for various materials of construction shall be conducted as per the frequency noted in the table below. **Contractor's attention is also drawn to Clause 9 of Conditions of Contract as well as Clause 9 of General Preambles to Schedule of Quantities.**

TESTING OF MATERIALS:

Following charts to be followed for the frequency of tests:

TABLE-A

Sr.No.	Materials	Test	Frequency
1	Flush Door	a) End Immersion b) Knife c) Adhesion	Destructive test based on no. of shutter. 1-100 one test 101-200 two test 201-500 three test 500 & above four test
2	Ceramic Tiles/ Vitrified Tiles	Water absorption Crazing Test	One test for every 5000 nos. or part thereof
Note : i) For small quantities, the manufacturer's test certificate obtained from reputed labs shall also be admissible with due approval of Chief Engineer/ Dy. Chief Engineer (In-charge). ii) All the Rules, Regulations and Provisions of Government of India are applicable in this tender.			

(SIGNATURE OF THE CONTRACTOR)

GENERAL PREAMBLES TO SCHEDULE OF QUANTITIES

These preambles apply to all the sections of the "Schedule of Quantities".

1. RATE TO COVER:

- 1.1 The rates quoted by the Contractor shall be held to include for providing and fixing, all conveyance and delivery, loading & unloading, carrying in, storing, hoisting, all labour, setting, fitting and fixing in position, making straight, cutting, waste, return of packing and all materials and labour and everything else necessary for the proper completion of each item of work to the approval of Corporation's Engineer and for Establishment Charges, overheads and profits. The Contractor shall provide at his expense all labour, materials and things required by the Corporation's Engineer for testing and measuring the work, for weighing, testing the efficiency of any portion of the work, all planking, gangways etc. necessary for affording access to every part of the work except where specifically stated otherwise.
- 1.2 The Contractor should also cover in his rates for the method of work, cost of materials, labour etc., to comply with the "Trade Specifications", General Instructions to Contractor", "Conditions of Contract", "Special Conditions", (if any), and all documents of this contract.
- 1.3 All the materials or procedures or specifications for work, unless otherwise stated, shall conform to the current Indian Standard whether or not specific mention is made thereof. The Contractor shall be responsible for and shall replace or make good at his own expense, any materials lost or damaged, or of quality not approved, temporarily disturbed roads, pavements, approaches, gates, walls or any such dismantling carried out to execute the work.
- 1.4 All rates quoted shall include for Supplying and fixing although the same may not have been mentioned in the item of the Schedule of Quantities. Words "Providing and Fixing where used shall have same meaning as "Supplying and Fixing".
- 1.5 **Rates quoted shall include for hoisting to any height and the work at all levels and lifting of Materials and working at any height shall not form any criterion for any extra claims, except where otherwise specified in Schedule of quantities.**

2. ANCILLARY WORKS:

- 2.1 The Contractor shall have to carry out all ancillary and connected work within and near vicinity of the plot of the proposed work and inside the Building if ordered to do so by the Chief Engineer at the rates quoted in the Schedule of Quantities, at any time during the currency of this Contract including extension of time, if any granted.

3. PRICE FLUCTUATION / VARIATION:

- 3.1 Rates quoted by the Contractor shall be firm throughout the currency of the Contract including extensions of time, if any granted. No price adjustment due to variation in cost of materials or labour or any variation under any State or Central Legislation or any other reason whatsoever shall be allowed, except as stated in relevant clauses below with regard to variation in price on materials & labour and price fluctuation in Cement & Steel.

4. "PRINCIPAL MAKE/S OR OTHER EQUAL AND APPROVED" FOR MATERIALS / PRODUCTS:

- 4.1 The Contractor shall note that materials having "ISI" monogram shall primarily be used in the work. If in the tender "Certain Principal Make / Makes or other equal and approved of any material / Product is mentioned in any item or Trade Preambles relating to the particular items in its respective Trade Schedule, the Contractor shall have to use the Principal Make/Makes specified in the relevant item or the trade Preambles. In case the specified particular Principal make / makes of the materials product is/are not readily available, the Contractor shall take prior permission and approval of the Chief Engineer in writing before use of the alternative equivalent make of the Material / Product.
- 4.2 All principal makes specified for any item shall be treated at par as per the accepted quoted rate.
- 4.3 Use of the make other than the Principal Make/Makes (which shall be treated as an Equivalent make) shall be at the discretion of the Chief Engineer and such Make/Makes shall be used after the approval of the Chief Engineer.
- 4.4 In such cases the Contractor will not be paid any extra payment over the accepted quoted rate in any case. However if it is ascertained that the price of approved Equivalent Make or the Material/product is lower than that for the Principal Make/Makes of the same material / product the difference of the price shall be payable by the contractor to LIC. Such difference of price shall be suitably decided by the Chief Engineer whose decision shall be final and binding to the Contractor in this regard.

LIST OF PRINCIPAL / APPROVED MAKES FOR CIVIL & INTERIOR WORKS

SL. No.	ITEM	MAKES/AGENCIES/BRANDS
1.	GI PIPES	Jindal Zenith Apollo GST Prakash QST
2.	GI PIPES FITTINGS	R-Brand K.S. Brand Zoloto RR SSS NMC
3.	COPPER PIPES /TUBES	Rajco Metal Industries B.P. Conex Comap
4.	MULTI LAYER COMPOSITE PIPES	Ki-TEC Kisan Flowguard CPVC Astral
5.	PVC PIPES AND FITTINGS	Chemplast Prince Supreme Finolex Oriplast
6.	UPVC (UNPLASTICIZED PIPES & FITTINGS)	Prince Supreme Paras
7.	GATE VALVES, GLOBE VALVE	Leader Kirloskar Zoloto Orient
8	FOOT VALVES, CHECK VALVE	Kirloskar Leader Ashoka
9	WATER METERS	Capstan Anandaasahi Dasmesh Remco
10	FERRULES	Leader Hindco Neta Annapurna
11.	BIB COCKS, STOP COCKS, PILLAR TAPS	Jaguar (Continental Series) Marc (Orient Series) Essco ARK GEM
12.	LOW LEVEL FLUSHING CISTERNS (PVC/CERAMIC)	Parryware Cera Hindware Commander

SL. No.	ITEM	MAKES/AGENCIES/BRANDS
13.	VITREOUS SANITARY WARE LIKE WC, WASH BASIN, URINALS, EWC ETC	Parryware Cera Hindware Neycer
14.	PLASTIC SEAT AND COVER	Commander Parryware Bestolite Duroshine
15.	BATH ROOM FITTINGS	Jaguar (Continental Series) Essco GEM ARK Marc (Oriental Series)
16.	C.I. PIPES & FITTINGS	Hind BIS BIC Neco
17.	C.I. NAHANI TRAP	BIC SKF NECO RAJCO
18.	SW PIPES	HIND PERFECT BURNS
19.	PVC CABINET MIRROR	Commander
20.	SLUICE VALVE	Leader Kirloskar
21.	HDPE/LDPE/LLDPE WATER STORAGE TANKS	Sintex Polycon G & P
22.	CERAMIC /GLAZED TILES	Nitco Somany Kajaria Euro H.R. Johnson Orient Bell Ltd
23.	VITRIFIED TILES	Nitco Somany Kajaria RAK EURO Orient Bell Ltd Asian Granito India Ltd(AGL)

SL. No.	ITEM	MAKES/AGENCIES/BRANDS
24.	PLY WOOD (BWR,BLOCK BOARD)	Kitply Archid Green Ply Century Ply Bhutan Ply Sharon Anchor Swastik National Samrat Plywood
24A.	FIRE RETARDANT PLY WOOD AS PER IS 5509/Block Board	Archid Green Ply(Defender Brand)/Block Board Century Ply
25.	FLOAT GLASS	Saint Gobin Modi Guard Triveni Sheet Glass Indo Asahi Glass Co. Tata Atul
26.	PVC DOORS & DOOR FRAMES	Rajshri Sintex Supreme
27.	ALUMINIUM EXTRUDED SECTIONS	Hindal Jindal Indal Hindalco
28.	STAINLESS STEEL KITCHEN SINKS	Nirali Farnkee Jayna Diamond Neelkanth
29.	PRELAMINATED/ VENEERED PARTICLE BOARD	Novopan Green Lam Kitlam Archid Lam Swastik
30.	FLUSH DOOR SHUTTERS	Kutty Flush Door Century Green Ply Shiva Hari Plywood Ltd.(Corbett) Anchor Ply Swastik Ply Western India Parvathi Wood Samrat
31.	HIGH PRESSURED LAMINATES	Green Lam Merino Sunmica/Formica Century Durian Sundek Anchor Decolam , Samrat

SL. No.	ITEM	MAKES/AGENCIES/BRANDS
32.	FLOOR SPRINGS	Everite Hardwyn Efficient Gadgets Garness Dormer
33.	veneers	Decowood Euro Veneers Durian Green Lam
34	MDF BOARDS	Duratuff Nuwud Century Novopan Kitply Green Ply
35	ADHESIVE	Fevicol SH Araldite Ciba Giegy Mowiool HV of Mafatlal
36	WOOD PRESERVATIVES	Bison Godrej Kot
37	HARDWARE FITTINGS	Jyoti Argent C.I.E.F. Classic Everite Metaco India JH Aluminium PV Radhakrishna Etalite Hardwin
38	DOOR CLOSER	Everite Hardwyn Efficient Gadgets Ebco Dorma Garness
39	DRAWER SLIDERS	Efficient Gadgets Ebco Etahoa Sisco
40	LOCK	Godrej Golden Efficient Gadgets Mark Sheet Vision Dorma

SL. No.	ITEM	MAKES/AGENCIES/BRANDS
41	MIRRORS	Atul Sun Commander Modi Guard Saint Gobin Globe
42	WATER PROOFING COMPOUND	Impermo Cico Pidllite Roff Choksey Hindustan –Ciba Gaigey Accoproof Sika Fosroc
43	STEEL WINDOWS AND VENTILATORS	Agew Steel Mfg. Co. Ltd. Sen Harvic Hopes Diana Casement Madhu Industries Bangalore Multiwin Unique Metal Windows Ankur Industries Modern Fabricators
44	AC PIPES/SHEETS	Charminar Everest Visakha Orient Ramson
45	SPECIAL PROTECTIVE & DECORATIVE FINISH	Snowcem Paint Asian Paints Berger Jenson & Nicholson Kansai Nerolac ICI Godawari
46	OIL BOUND DISTEMPER	Asian Berger Jenson & Nicholson ICI Kansai Nerolac Godawari
47	CEMENT PAINT	Snowcem Plus Berger Asian Paints Jenson & Nicholson Kansai Nerolac ICI Godawari
48	SURFACE TEXTURE	Heritage (Bakelite Hylam Ltd.) Spectrum

SL. No.	ITEM	MAKES/AGENCIES/BRANDS
49	TEXTURE PAINT	Snowcem India Ltd. Santex Matt Asian Jenson & Nicholson Berger Kansai Nerolac
50	ENAMEL PAINT PRIMERS/READY MIXED PUTTY FOR WOOD WORK , IRON & STEEL	Asian Berger Jenson & Nicholson Kansai Nerolac ICI MRF Godawari
51	WALL PUTTY	Birla wall Care Snowcem paints JK Asian paints
52	EXTERIOR EMULSION	Asian Paints - Apex Berger Paints Kansai Nerolac MRF Jenson Nicholson ICI Godawari
53	CEMENT CONCRETE PIPE	The Indian Hume Pipe Premier Pre-stressed Co.
54	EXPANSION JOINT BOARD	Shalimar Tar Products Lloyds Insulations Fosroc Shalitex
55	FALSE CEILING	India Gypsum Armstrong Daikin Insula QED Panels
56	VERTICAL BLINDS	Vista Levlor TRAC MAC Marvel
57	ADHESIVE FOR TILE FIXING	Roffe Balendura Cera Bond Fosroc Choskey Chemicals Dr. Fixit Sika Sunanda
58	PAVING TILES	Eurocon Ultra Duracrete
59	PVC FLOORING	Flora Armstrong

SL. No.	ITEM	MAKES/AGENCIES/BRANDS
60	VINYL FLEXIBLE FLOORING	Wonder Floor Armstrong BHOR Rikvin Tusker
61	FIBRE GLASS DOORS	Master Craft
62	SS/CP FRICTION HINGES	Ebco Jyoti Everest Magnum
63	SOFT BOARD	Jolly Board
64	SCREW	Nettelefold GKW
65	FIBRE REINFORCEMENT COMP.DOOR	Loknath Unique

APPROVED MAKES OF MATERIALS FOR ELECTRICAL, FIRE ALARM & STRUCTURAL CABLING WORK

SR. NO.	MATERIAL	MAKES		
1	COPPER CONDUCTOR PVC INSULATED FR GRADE WIRES	(a) FINOLEX	(b) HAVELLS	(c) V GUARD
		(d) RR cables	(e) KEI	
2	PVC INSULATED ARMoured CABLES (LT/HT)	(a)FINOLEX	(b) FORT GLOSTER	(c) CCI
		(d) RR KABLE	(e) DELTON	(f) KEI
3	MAIN SWITCH WITH HRC FUSES	(a) L & T	(b)SIEMENS	(c) GE
		(d) ENGLISH ELECTRIC	(e) STANDARD	(f) HAVELLS
4	MAIN SWITCHES WITH REWIRABLE FUSE	(a) L & T	(b) CROMPTON	(c) STANDARD
		(d) HAVELS		
5	MCCB	(a) SIEMENS	(b) L & T	(c) SCHNIED-ERMJ
		(d) LEGRAND		
6	MCB / ELCB / ELMCB / DB	(a) LEGRAND	(b) SIEMENS	(c) HAGGER
		(d) SCHNEIDER MJ		
7	CHANGE OVER SWITCH / SWITCH FUSE UNIT UPTO 100 AMP	(a) HPL	(b) L & T	(c) HAVELLS
		(d) STANDARD	(e) SIEMENS	
8	CHANGE OVER SWITCH /	(a) HPL	(b) L & T	(c) SIEMENS

	SWITCH FUSE UNIT ABOVE 100 AMP			
9	RISING MAINS	(a) ENGLISH ELECTRIC	(b) GEC	(c) SCHNIEDER
10	PVC CONDUIT (ISI MARK)	(a) PRECISION	(b) AVON PLAST	(c) ESSARKE
		(d) SUDHAKAR	(e) KALINGA	(f) AKG
11	PVC CASING CAPING	(a) PRECISION	(b) KALINGA	(c) AKG
		(d) SUDHAKAR	(e) DIAMOND	
12	M.S. CONDUIT	(a) SUPREME	(b) BEC	(c) NIC
		(d) AKG		
13	FLOOR TRUNKING SYSTEM	(a) LEGRAND	(b) MK ELECTRIC	(c) PRECISION
		(d) MODI		
14	G.I. PIPE	(a) JINDAL	(b) SENITH	(c) PRAKASH
		(d) TATA	(e) GST	(f) APOLLO
15	MODULAR SWITCHES, ACCESSORIES & ELECTRONIC REGULATOR	(a) ANCHOR ROMA	(b) SSK	(c) LEADER
		(d) CRABTREE	(e) MK	(f) L&T
16	NON MODULAR SWITCHES, ACCESSORIES & ELECTRONIC REGULATOR	(a) ANCHOR	(b) LEADER	(c) SSK
		(d) CPL		
17	INDUSTRIAL PLUG & SOCKET	(a) LEGRAND	(b) HAVELLS	(c) CROMPTON
		(d) HAGGER	(e) STANDARD	
18	CEILING / EXHAUST / WALL FAN	(a) USHA	(b) CROMPTON	(c) ORIENT
		(d) BAJAJ	(e) ALMONARD	
19	INDOOR LIGHT FITTINGS	(a) PHILIPS	(b) WIPRO	(c) CROMPTON
		(d) GE		
20	OUTDOOR LIGHT FITTINGS	(a) PHILIPS	(b) WIPRO	(c) CROMPTON
		(d) GE	(e) K – LITE	
21	CABLE GLANDS	(a) COMET	(b) DOWELLS	(c) BRACO
		(d) SIEMENS		
22	LUGS	(a) DOWELLS	(b) COMET	
23	CONNECTORS	(a) ELMEX	(b)	(c) PHOENEX

			CONNECTW ELL	
24	FLUORESCENT LAMP	(a) PHILIPS	(b) OSRAM	(c) CROMPTON
		(d) BAJAJ	(e) GEC	
25	COMPACT FLUORESCENT LAMP	(a) PHILIPS	(b) OSRAM	(c) HAVELLS
		(d) WIPRO		
26	MOTOR STARTER	(a) SIEMENS	(b) L & T	(c) CROMPTON
27	MONOBLOCK PUMP	(a) KIRLOSKAR	(b) CROMPTON	(c) CRI
28	LIGHTENING ARRESTOR	(a) PACTIL	(b) HECO	(c) ATLAS
		(d) G.K. ELECTRICALS		
29	TRANSFORMER			
(i)	UPTO 500 KVA	(a) PACTIL	(b) EMCO	(c) CROMPTON
		(d) KIRLOSKAR	(e) GEC	(f) TESLA
(ii)	ABOVE 500 KVA	(a) KIRLOSKAR	(b) GEC	
30	A.B. SWITCH & D.O. FUSE	(a) PACTIL	(b) JENCO	(c) CROMPTON
		(d) ATLAS		
31	SELECTOR SWITCH	(a) KAYCEE	(b) SIEMENS	(c) C & S
32	INDICATING LAMPS	(a) VAISHNO	(b) ESSEN	(c) PHILIPS
	CONTACTORS	(a) SIEMENS	(b) L & T	(c) ABB
		(d) SCHNIEDER		
33	MEASURING INSTRUMENTS	(a) AMP	(b) MECO	(c) AE
		(d) ENERCON	(e) PROK-DV's	
34	PF IMPROVEMENT CAPACITOR & APFC PANEL	(a) EPCOS	(b) NEPTUNE	(c) L & T
		(d) CROMPTON		
35	RELAY FOR AUTOMATIC PF IMPROVEMENT	(a) EPCOS	(b) CONZERVE	(c) L & T
36	CURRENT TRANSFORMER	(a) AE	(b) RISHABH	(c) KUPPA
		(d) L & T		
37	DATA CABLES & FACTORY	(a) LEGRAND	(b) D LINK	(c) FINOLEX

	MADE PATCH CHORDS			
		(d) MOLEX	(f) AMP	
38	INFORMATION OUTLET / RJ 45 CONNECTORS / RJ – 11 SOCKETS	(a) D LINK	(b) LEGRAND	(c) MOLEX
		(d) SYSTEMAX	(e) AMP	
39	TELEPHONE WIRES	(a) FINOLEX	(b) DELTON	(c) HAVELLS
		(d) RR KABLE		
40	RG 6 CABLE FOR TV	(a) FINOLEX	(b) DELTON	(c) NATIONAL
41	JACK PANEL	(a) D LINK	(b) LEGRAND	(c) MOLEX
		(d) SYSTEMAX	(e) VALRACK	(f) AMP
42	RACK	(a) VALRACK	(b) DIGITRON	(c) HCL
		(d) A LINK		
43	SMOKE / HEAT DETECTOR	(a) APOLLO	(b) MORLEY IAS	(c) EDWARD
		(d) SYSTEM SENSOR	(e) HONEY WELL	(f) MIRCOM/SEC UTRON

Note:

All Switch-gear and the Distribution Boards should be clearly marked with Red, Yellow, Blue and Black colour for phases and neutral. All busbar enclosures Angle iron frame and switch-gears should be painted with battleship grey oil paint. Danger and caution boards at appropriate places on main boards and Distribution Boards should be fixed. All controlling main switches on main boards and distribution boards should clearly indicate with white oil paint lettering the floor and section controlled by it. All equivalent alternative materials used on the job will have to be approved by Chief Engineer of LIC before it is actually used. If any item is installed without prior approval, the contractor will be asked to dismantle the installation and use materials as specified. The insulated wire used for concealed wiring shall be with Red, Yellow, Blue colour for respective phases, Black for neutral & Green for earth wires.

SPECIAL CONDITIONS REGARDING INSPECTION OF WORK**1. INSPECTION OF WORK :**

All works in course of execution or after execution in pursuance of the Contract, shall at all times be open to the inspection and supervision of the Executive Director (Bldg.) or his authorized representatives and the Contractor or his responsible agent, duly accredited in writing, shall at all such times, be present to receive instructions/orders. The work during the progress or any time before settlement of the final bill, is also liable to be inspected by Chief Technical Examiner of the Central Vigilance Commission, New Delhi, on behalf of the Employer and this shall be also considered as an inspection by the Employer for all purpose.

2. PRECEDENCE FOR ACCEPTANCE :

If any contradiction or variance is observed in different components of the tender's the details clearly given in -

- a) "General Preamble" shall have the precedence over the relevant details given in General "Specifications".
- b) "Trade Preambles" shall have the precedence over the relevant details given in "General Specifications"
- c) The description of an item of the "Schedule of Quantities" shall have the precedence over the relevant details given in "General preambles", General "Specification" and "Trade preambles".

APPENDIX TO CONDITIONS OF CONTRACT

NAME OF WORK:- E-Tender for Proposed Modernization works including Interior, Civil, Electrical Installation, Fire Alarm, Air-conditioning, Data cabling, Modular Chairs, Furniture's and Ancillary works at Branch Office building Lakhimpur under Divisional Office – Lucknow.

ESTIMATED COST : Rs 84.35 Lakhs
PERIOD FOR COMPLETION : 90 Days
EARNEST MONEY DEPOSIT : Rs. 42,200/-

Sl.No.	Clause Nos.	Description	Remarks
1	13 & 1 of 'General conditions of CAMC contract for ACs'.	Date of commencement	(i) For Modernization Work: Either 07 (Seven) days from the date of acceptance letter issued to the contractor OR The day on which contractor is instructed to take possession of the site, whichever is earlier. (ii) For AC CAMC work: It will Commence automatically, immediately after the successful completion of defect liability period of one year from the date of completion of work.
2	13 & 26	Time Period	90 (NINETY) days from the date of commencement.
3	Cl. 19 of 'Conditions of Contract' and Cl. 9 of 'Terms & Conditions of Contract for AMC'	Compensation in the form of penalty for delay of the work	i) Clause 19 of 'Conditions of Contract' is not applicable in this work. ii) For Modernization work: Quantum of compensation: 0.5% of contract sum per week of delay to be computed on per day basis subject to maximum 10% of accepted contract sum. iii) For AC CAMC work: (a) Rs.250 for each complaint first day (beyond lead time) thereafter 1.5 times for each day of delay. (b) For non attending the quarterly preventive services (minimum once in each quarter), Proportionate CAMC charges + penalty @ 25%.
4	21	Period of final measurement	60 (Sixty) days from the date of completion of contract
5	22	Interim certificate	28.12 Lakhs
6	22	Period of honouring interim certificate	20 (Twenty) days/ Not Applicable
7	22	Period of honouring final certificate	90 days from the date of submission of final bill with details.
8	27	Defects Liability Period	12 (Twelve) months after virtual completion of the work. All AC machines should have to be serviced quarterly either through OEM/Specialized agency or its dealer during DLP period and servicing records should have to be submitted on expiry of DLP.
9	35 & 2 of 'General conditions of CAMC contract for ACs'.	Security Deposit and Performance Guarantee	i) Modernization work: For works costing up to & including Rs 200 lac :- 5% of accepted tender amount (Rounded off to next Hundred Rupees) as Security Deposit only ii) AC CAMC work: Lump sum security deposit Rs.23100/- (Rs. Twenty Three Thousand One Hundred Only) in the form of crossed DD/Pay order in favour of LIC of India before commencement of contract failing which SD shall be got adjusted from the retention money (i.e. 50% of SD amount retained by LIC till successful completion of DLP of one year period)

Sl.No.	Clause Nos.	Description	Remarks
10 (a)	35	Recovery of Security Deposit	Security Deposit shall be recovered from R.A. Bills at 7.5% of Gross amount of bill till the sum along with sum already deposited as EMD equals the Total Security Deposit. Security Deposit may also be submitted in the form of a single Bank Guarantee of amount equal to total Security Deposit or in the form of two Bank Guarantees each of amount equal to 50% Security Deposit. If the EMD is submitted in the form of Bank Guarantee and the contractor wants to avail the cash option i.e. the deduction of security deposit from the bills, then the contractor has to deposit a demand draft /pay order in the name of Life Insurance Corporation of India payable at Kanpur towards EMD in lieu of Bank Guarantee submitted for EMD. Once this amount is deposited the contractor can avail cash option for security deposit and the bank guarantee submitted towards EMD shall be returned.
10 (b)	35.6, 35.7 & 2 of 'General conditions of CAMC contract for ACs'.	Refund of Security Deposit	i) For Modernization work: (a) 50% of SD (cash option) shall be refunded within 15 days from the date of approval of virtual completion issued to contractor provided that the employer has no claim for forfeiture of part or whole of the said deposit. (b) Balance 50% of SD will be refunded to contractor within 15 days after the successful completion of DLP period, subject to deductions for any appropriations thereof required to be made by the employer and contractor have undertaken the CAMC of AC machines either through OEM/Specialized agency or its dealer with back to back CAMC. <u>In case contractor refuses to execute the AMC contract from date of commencement, the balance 50% of SD deposit shall be forfeited.</u> ii) For AC CAMC work: The SD shall be refunded after successful completion of AMC period of five years and handing over of all AC machines in working condition as per contract provisions.
11	17.5	Contractor's All Risk Policy inclusive of Third Party Liability	Contractor's All Risk (CAR) Policy of full amount of contract value. Third Party Liability Policy Insurance Liability for amount insured not less than 7.5 % of contract value.
12	17.6	Workman's Compensation Policy	As per requirement of prevalent Laws. But the number of workers covered shall not be less than the numbers mentioned in Labour License.
13		Default in renewal of insurance policies by contractor.	The date of renewed insurance policy, if any, will be 15 working days prior to the last date of expiry of the existing policy, failing which LIC may insure/renew insurance and apply penal cost on the contractor i.e. Premium Charges plus Rs. 10,000/- as Admin Charges and Rs.25,000/- as

			penalty
14.	22.6	No Claim Certificate	To be given on Contractors letter head
15	32 of General Instructi--ons To Contract-ors.	Taxes, Duties, Levies And Deduction At Source.	The rates quoted shall be including all statutory taxes / levies but excluding GST. The GST shall be paid separately along with bill payments as per applicable rate, rules & procedures when the invoice is raised & uploaded by the contractors on GST Portal & tax is paid to the credit of the Government.
16.	11	Engineer/Supervisor at site, Diploma Holder with 2 years experience	For not providing, recovery of Rs 20,000/- per month or part thereof.
17		Applicability of MSME Provision on Work Contract	Work contract does not falls within the ambit of Public Procurement Policy-2012 and MSME act. Hence benefits under Public Procurement Policy for MSMEs shall not be extended against tender for "Works Contract".

Note: TAXES, DUTIES, LEVIES AND DEDUCTION AT SOURCE:

- The contractor shall be responsible to pay all statutory taxes & levies imposed by the State and Central Government such as Income Tax, Labour Cess, and any other applicable taxes etc., and the rates quoted in the tender shall allow for the same.
- Liabilities towards GST for Contractor and Employer shall be in accordance with relevant provisions of the **Central Goods and Service Tax Act 2017** or any amendment issued by concerned Authority from time to time.
- Rates are inclusive of all the taxes & levies such as Income Tax & Labour Cess etc. but excluding GST. The payment of GST shall be made separately in part or full to contractor / concerned authority as per the rates, rules & procedure prevailing at the time of bills payment.
- Payment of GST to contractors can be made along with the bills payments after the invoice is raised & uploaded by the contractors on the GST portal & tax is paid to the credit of Government.
- All the participating bidders must have valid GST Registration Certificate of any state/ Union Territory at the time of submission of bid. GST registration should be obtained by a taxable person under GST in each of the state or UNION TERRITORY, from where the taxable supply of goods or services is made. Any vender if making inter-state supplies he shall charge IGST and if making intra-state supplies he shall charge CGST plus SGST/UTGST in his invoice.
- All the bidders are required to submit a copy of the GST Registration number provided by the relevant authority.
- Deduction at source of Income tax and Labour Cess etc. shall be made by LIC of India as per the provisions prevailing from time to time from the Running Account or Final Bills and remitted to the concerned Taxation Authorities/ State Government on behalf of the contractor.
- **The clauses given above will supersede all the provisions given in the tender elsewhere regarding any taxes /levies and GST.**

NO CLAIM CERTIFICATE CUM RECEIPT

(To be given on Contractor's letterhead)

"Received Rupees _____ (Rupees _____)
being the amount against my/our final bill dated _____ for _____ (Name of Work) in full
and final settlement of bill.

Contractor
(Signature of Contractor on Revenue stamp)

Rubber stamp/seal of the contractor /company

APPENDIX TO GENERAL INSTRUCTION TO CONTRACTOR

SI.NO	Clause Nos.	Description	Remarks
1.	12	Recovery of Electricity charges from Contractors bill if used from LIC source	0.25% of the Gross value of work done.
2.	13	Recovery of Water charges from Contractors bill if used from LIC source	0.25% of the Gross value of work done.

In terms of provision of section 33(4) of The insurance law (Amendment) ordinance ,2014 Insurance Regulatory and Development Authority of India (IRDA) ,If It consider expedient to do so may direct any person hereinafter referred to as "Investigation officer " ,to make an investigation as specified under sec 33(1) or carry out an inspection as specified under section 33(2) of The insurance laws (Amendment) Ordinance 2014 who may examine on both any Manager ,Managing Director or other officer of the service provider or contractor where the services are outsourced by LIC OF India

FORFEITURE OF EARNEST MONEY DEPOSIT.

1) If the lowest tender withdraws his tender before the expiry of validity period or before the issue of letter of acceptance whichever is earlier or makes any modification in the terms and conditions of tender which are not acceptable to department, then the department shall, without prejudice to any other right or remedy be at liberty to forfeit 100% of the earnest money deposit.

2) In case of forfeiture of earnest money as prescribed above, the tenderer shall not be allowed to participate in the tendering process in future for the period of three years in any of the work.

LIFE INSURANCE CORPORATION OF INDIA
NORTH CENTRAL ZONAL OFFICE, KANPUR

NAME OF WORK:- E-Tender for Proposed Modernization works including Interior, Civil, Electrical Installation, Fire Alarm, Air-conditioning, Data cabling, Modular Chairs, Furniture's and Ancillary works at Branch Office building Lakhimpur under Divisional Office – Lucknow.

AMENDMENT TO CONDITIONS OF CONTRACT

The following amendments are made to Conditions of Contract. These amendments will supersede all the provisions given elsewhere in the tender document.

- i) The clause no. 15.3 (h). The quantities for various items in BOQ may vary up to any extent and all extent of quantities including variation shall be paid at quoted tender rate only.
- ii) The clause no. -23 on page no.-34 & 35, 37 (37.1 to 37.9) at page no.43 and 44 for LUMP SUM ADVANCE also stands deleted.

Seal & Signature of Contractor

Chief Engineer

GENERAL CONDITIONS OF COMPREHENSIVE/ AMC CONTRACT FOR ACs**1- COMMENCEMENT OF CONTRACT**

This is an operation & maintenance contract for routine operation and comprehensive maintenance (CAMC) AC facility provided in the building. This Contract will commence automatically, immediately after the successful completion of defect liability period of one year from the date when installation / equipments have been taken over on completion of work.

2- SECURITY DEPOSIT

Lump sum security deposit Rs.20000/- (Rs. Twenty thousand only) shall be deposited by the contractor in the form of a Crossed Demand Draft / pay order in favor of LIFE INSURANCE CORPORATION OF INDIA before commencement of Contract failing which security deposit shall be got adjusted from the retention money (retained by LIC till the successful completion of DLP). In case contractor refuses to execute the AMC contract from the date of commencement, the Security deposit shall be forfeited. The security deposit shall be refunded after successful completion of AMC period of five years. Please also note that no interest shall be payable on security deposit.

3- DURATION OF CONTRACT

Five years from the date of commencement of AMC i.e Five years from the date of successful completion of **defect liability period of one year.**

After completion of the AMC contract period of Five Years, contractor will have to hand over entire premises / utilities /equipments in good working condition to the next contractor. Any pending defect shall be got rectified on the risk & cost of the existing contractor and cost incurred in removing the defects will be recovered from the pending bill & Security deposit lying with LIC.

4- CONTRACT AGREEMENT

The contractor will have to enter into the contract agreement as per the articles of agreement which will be executed by the Chief Engineer, LIC of India at Kanpur. Sr. Divisional Manager, LIC of India, Divisional Office Faizabad shall be responsible for contract administration.

5- PENALTY FOR DELAY IN ATTENDING TO COMPLAINT(S)

For the delay in attending to complaints, penalty shall be imposed as per the details furnished in Terms & Conditions of this tender. Reasonable extension of time may be considered for delay due to the force majeure as legally interpreted or for other causes which LIC may certify as beyond the control of contractor.

6- ACCOMMODATION

The contractor will have to make their own arrangement for the accommodation of staff storage of tools etc.

7- TERMS OF PAYMENT

No advance payment will be made for CAMC. The AMC charges will be paid at the end of every quarter on submission of a satisfactory PM Service report / breakdown service report / log book along with the attendance of providing personnel for shift duty and a log sheet of complaint calls and routine maintenance schedule attended to. The proportionate amount will be deducted if complete services are not provided.

If main 'Construction associates' & "OEM / Specialized agency" through a mutual agreement on adequate value stamp paper which is valid in court of law, OEM/Specialized agency agrees to bind themselves to all the terms & conditions and ready to undertake all contractual obligations in accordance with the tender document and if directed by the main construction associates in the said legal agreement, payment for the CAMC/AMC shall be made directly to the OEM/Specialized agency who has entered upon into an agreement with employer through "Tripartite Agreement". However "Main construction associates" will not be absolved from their responsibility for successful completion of CAMC/AMC.

8- SUBMISSION OF BILLS

The vendor shall submit invoices within 10 days of ending of each quarter to the Engineering Department, LIC, Divisional Office Faizabad for payments along with the certified copies of original routine service reports and original break down call reports of various installations, along with attendance of engaged personal for shift duty, a log sheet of complaint calls, and routine service maintenance schedule attended to as set out in scope. Payment will be released quarterly at $\frac{1}{4}$ (one fourth) of the accepted annual AMC rates. Payment will be released through NEFT.

9- ESCALATION

The quoted rates shall be firm and no escalation would be paid on approved AMC/CAMC rates. AMC/CAMC rates have been fixed for the five years including considering the variation @ 5% on previous year approved rates for AMC/CAMC.

10- TAXES DUTIES ETC.

The Rates are inclusive of all taxes and duties as applicable at the time of submission of tender. All statutory deduction shall be made from the bills. GST shall be paid extra as per applicable rates.

11- CONTRACT LABOUR ACT.

The contractor shall pay his employee as per the contract labour act and observe hours of work and conditions of employment according to exiting rules under Contract Labour Act as applicable. Further it shall be contractor's responsibility to ensure the regular payment to his workmen. The contractor shall comply with all the all statutory requirement as may be notified by the Government.

12- WORKMAN COMPENSATION ACT

The Contractor shall fully indemnify the Employer against all claims which may be made upon the Employer, whether under the **WORKMEN'S COMPENSATION ACT** or any other **STATUTE** in force during the currency of this Contract or at Common law in respect of any Employee of the Contractor or any Sub-Contractor and shall at his own expense effect and maintain until the completion of CAMC Contract, with "licensed General Insurance Company" a **POLICY OF INSURANCE** of adequate amount in the joint names of the Employer and the Contractor against such risks and deposit such policy or policies with the employer & renew the same as required from time to time during the currency of the Contract.

Any injury to the service personnel while attending the servicing/breakdown calls will be the sole responsibility of service provider. No compensation whatsoever would be given by LIC

13- STATUTORY COMPLIANCE BY THE CONTRACTOR:

The firm shall ensure payment of minimum wages to the workmen employed by they/them through NEFT to their bank account/s and shall maintain a register of wages and shall issue a wage slip to every workman employed by they/them and obtain their signature or thumb impression on the wage slips. In addition, they have to provide essential amenities like drinking water, first aid facility etc. to their employees as per Contract Labour Act 1970. Salary of the employees shall be disbursed through NEFT only to their bank account and a copy of the NEFT payment shall be produced with the bill to be submitted to LIC for record.

The firm has to give undertaking on Non Judicial Stamp Paper of applicable amount that he undertakes to actually pay wages to all the labourer of all descriptions to be engaged by him for completion of that particular job/work at the rate which is not less than the one prescribed under minimum wages under CLRA Act and also keep the Principal Employer indemnified against all the actions that may be initiated against the Principal Employer by the Statutory Authorities for his failure to pay such wages and provide the essential amenities.

The firm shall indemnify and keep indemnified LIC against all losses and claims, damages or compensation for breach of any provisions of the Payment of Wages Act, 1936, Minimum Wages Act, 1948, Contract Labour (Regulation and Abolition) Act, 1970 or any other labour law/statute in force in this regard. The firm only shall be responsible for liabilities, if any, in this regard.

The Bidder shall not deploy any person below the age of 18 years.

14- MAINTENANCE

The contractor shall be responsible for ensuring the defects or complaints lodged are attended, to the entire satisfaction of LIC and keep the system in satisfactory working condition. The contractor must ensure that the lead time for attending the complaints are within the stipulated time mentioned against each service as per the special condition.

15- MAINTENANCE THROUGH OEM

Maintenance of the equipments like AC machines shall be arranged through the original equipment manufacturer / supplier or their authorized dealers based on recommendation of the manufacturer.

Contract will be awarded to the bidder for Operation & Maintenance of specialized infrastructure services of AC machines as defined in the tender document and for the AMC period, after the commissioning / handing over of the entire work.

Tripartite agreement will be executed between Employer, Main Construction Associates and OEM in accordance with the tender document after the award of work but before commencement of work at the site.

16- EXTRA ITEM WORK

Any additional work to be carried out shall be paid for at the rates as per the mutual agreements or as per the analysis for Extra Item on the basis of CPWD norms or as per the approved DSR Rates. While making reimbursement of the cost of material on submission of original paid bill, an amount @ 15% on the bill amount shall be paid in account of handling charges & Contractors profit.

17- INSURANCE POLICIES

The contractor is responsible for all injuries/ damages to men, materials and properties etc. which may arise from the operation or negligence of himself and / or his sub contractor's own account. The contractor / OEM / Specialized agency shall take following insurance policies from the General Insurance Company of adequate amount in the joint name of employer (LIC of India) as a first Party & contractor as a second Party.

- i. Workmen's Compensations policy
- ii. Contractor All Risk with Third Party Liability

In default of the Contractor insuring as provided above, or having insured, failing to renew the same, as required, the Employer, on his behalf may so insure/renew and may deduct the premiums paid from any monies due or which may become due to the Contractor together with penalty amounting to Rs.10,000/- or double the premium amount whichever is more, for each extension of such policy.

18. TERMINATION OF CONTRACT

The Corporation reserves the right to terminate / cancel the whole or part of the agreement at their sole discretion after giving one month's notice to the service provider. If the contract is terminated by the service provider, it would be liable for penalty which would be equivalent to 10% of the contractual amount of the unexpired period of maintenance contract.

19. Rates mentioned in the Schedule of quantity are subject to the General condition of comprehensive AMC contract and Terms & Conditions of contract for comprehensive Annual Maintenance of contract.
20. Discipline wise inventory of all major items will be prepared and copy of the inventory will be handed over to the construction associates which will form the part of this CAMC contract agreement.

CHIEF ENGINEER

TERMS & CONDITIONS OF CONTRACT FOR ANNUAL MAINTENANCE CONTRACT (AMC)

1. For providing the AMC services, the contractor should ensure availability of spare parts and skilled man power and must ensure that complaints are attended to within specified time as detailed below under uptime and lead time. If the services are not provided within the stipulated time or remains outstanding beyond 24 hrs. thereafter (excluding Sunday), LIC May carry out the job at the risk and cost of the contractor without prior intimation to the contractor.
2. For CAMC of AC machines, construction associates will be required to engage OEM or its dealer with back to back CAMC.
3. Log-sheets are to be maintained for preventive and break down maintenance carried out at each location separately and copy of the log book of respective quarter shall be attached to the quarterly bills
4. The Contractor should submit Service report for regular and complaint calls duly attended & acknowledged by the concern official. Original copy of Service / PM – Reports should be enclosed along with periodic bills as a proof of attending services failing which payment will not be considered.
5. The contractor will be responsible not only for his own men and material but also for the security of the equipment / materials of the LIC. The cost of repair/replacement of equipment damage due to mishandling by the worker of the contractor will be deducted from the contractor's bill after loss assessment by the authorized Engineer of the Corporation. In case of any dispute decision of the Sr. Divisional Manager will be final & binding on contractor.
6. Arranging all major components requiring repair / replacement / refill (which is not covered in CAMC contract) with prior consent and approval of LIC shall be the responsibility of contractor
7. **Tools & Tackles:** The bidder should provide all tools and tackles required for the safe and satisfactory maintenance of the related equipment / installation.
8. The service provider / bidder shall perform preventive maintenance to the equipments mentioned above and to its accessories as per service manual of OEM.
9. **Uptime & Lead Time and penalties :-**

We expect that uptime for all the utilities / facilities provided in the building shall be about 99% or above and for attending to the complaints within the following lead time (Except Saturday, Sunday & Holiday) is expected. Minor repairs are the repairs which requires only the services of technician without consumption of any material or use of small spare parts such as screws, nuts, bolts, elbows, bends, electrical switch sockets, small length of wire / cables, gland packing grease / lubricant, tripping of equipment, false alarm, cleaning of filters etc.

	Description of trade / Items	Lead Time		Penalty for delay in rendering services beyond lead time or absence of service personnel
		Minor repair	Major repair	
1.	Split/Casette AC	4 Hrs.	48 Hrs.	Rs.250 for each complaint first day (beyond lead time) thereafter 1.5 Times for each day of delay.
2.	Non attending the quarterly preventive services (minimum once in each quarter).			Proportionate CAMC Charges + penalty @ 25%

The maximum recovery / penalty shall not exceed to CAMC charges per Quarter for each trade against each quarterly bills.

10. Scope of Work

A AC System

INCLUSION :- CAMC of the AC system is inclusive of the following work

- i. Rates are **inclusive of any repair / replacement of components spare parts** for complete AC (including duct able AC system at various locations), +i.e. **Compressor, Compressor terminals & its accessories, capacitors, thermostats, Wire, fan motors, filters, gas charging, repairing / replacement of microprocessor based control panel, refilling / topping up of the refrigerant gas, electrical wires and cabling between indoor & outdoor unit & other components etc.** No extra cost shall be paid on any account except for the work which has been excluded from the scope of work for AC system and has been mentioned here under the heading EXCLUSION. **However if any part is mechanically damaged due to external reasons i.e. earthquake and fire etc, the same can be reimbursed on the basis of actual cost without any labour component, profit and overhead with prior intimation to the concerned authority.**
- ii. Replacement of spare parts of AC machine should be done by using original spare parts of the machine & agency will issue certificate that they have used original components. If at any stage it has been found that contractor has provided under capacity & substandard material suitable recovery as determined by the competent authority (subject to the max. of twice the cost of material / work) shall be made from the bills / any pending due amount with LIC & agency May be debarred for any work in future.
- iii. Dusting of AC & wet cleaning of filter of the each AC machine shall be done at a regular interval of 21-30 days during the first week of April to last week of Sept.
- iv. 1st Wet cleaning of all the machines shall be got done during 3rd week of March to 3rd week of April & 2nd wet cleaning (if instructed) of the machine shall be got done during 3rd week of June to 3rd week of July.. If one wet cleaning of any machine is not done then AMC charges of one quarter will be forfeited.

- v. Any work not mentioned in the list of exclusion shall be deemed have been included in the scope of work for AC system.
- vi. Preventive maintenance of AC system shall be done on quarterly (once on 3 months) basis.

EXCLUSION: - Following work/ items are excluded from the scope of work for CAMC of AC Units.

- i. Complete replacement of AC Units / Pressurization fan, Duct in line Fan etc. which has out lived its standard life.
- ii. **Replacement of refrigerant piping / repairing of refrigerant piping / modification of duct, Ducting work, duct cleaning, repairing of duct insulation / duct lining/ acoustic insulation etc.**

CHIEF ENGINEER

BANK ACCOUNT AND OTHER DETAILS

ANNEXURE

To be submitted along with Tender copy

1. Name of the Company/Firm/Entrepreneur
Institute, etc. _____

2. Address _____

 Phone number _____ STD Code.....NO.....
 E- Mail ID _____

3. Bank Account Details
 - A. Account No. _____
 - B. Type of Account _____
 - C. IFSC/RTGS code _____
 (enclose Xerox copy of the Cheque leaf)

4. PAN No.* _____
5. VAT/TIN Registration No. * _____
6. Service tax Registration No. * _____

I declare that, the above furnished information is correct. During the contract period, if any changes took place in the above said information, the same will be informed with the valid reasons.

SIGNATURE

(* Self Attested copies to be enclosed)

Annexure-‘A’

LETTER OF AUTHORIZATION TO BID(On Non-Judicial Stamp Paper of Rs. 100/-)

To,
The Chief Engineer,
LIC of India,
North Central Zonal Office,
Kanpur.

Date:

Dear Sir,

Ref:- TENDER NO.-----

This has reference to your above e-tender for----- (Name of work).

We confirm that the person so authorized above has digital signatures and confirm that all the prices quoted in On-Line bid by him shall be binding on us.

He is also authorized to take decision on behalf of the company till tender process is completed.

The specimen signature is attested below

Specimen Signature of the Representative

Signature of Authorizing Authority

2.The details of Digital signatures are as below:

S. No.	Name of the person	Digitally Signature Number	Valid up-to
1			

Signature of Authorizing Authority

