TENDER NOTICE

Tender No. – MRO3/2024-25/001 Date: 31st May 2024

Re: Tender for Proposed Civil, Interior Furnishing, Electrical, Air Conditioning, Networking and Allied work (on Turnkey Basis) at Fourth floor, New India Center, Dr. Babasaheb Ambedkar Chowk, 17-A, Cooperage Road, Colaba, Mumbai, Maharashtra 400001.

Tenders are invited in 2 bid system for Interior Refurbishment Work at for our offices i.e. DO-120400, DO-121000, Conference & Meeting Rooms located at 4th Floor, New India Centre building for selection of contractor.

The work shall be executed as per specifications and supervision of the architect, **M/s. Design Ideas.**

Tender documents can either be downloaded from company's e-procurement website **www.tenderwizard.com/NIAEPROC** or **www.newindia.co.in**

The New India Assurance Company Limited intends to invite e-tender from contractor for the Interior Refurbishment of DO-120400, DO-121000, Conference & meeting Rooms on 4th floor New India Center.

The cost of tender is **Rs. 1770/- (Inclusive of GST)** (non –refundable) to be paid by DD favoring **The New India Assurance Co. Ltd.** payable at Mumbai on or before the last date of submission at the office Estate and Establishment Department, Mumbai Regional Office - 3, 3rd Floor, New India Center, Dr. Babasaheb Ambedkar Chowk, 17-A, Cooperage Road, Colaba, Mumbai, Maharashtra 400001.

EMD for this work is Rs.1,50,000/- (Rupees One Lac Fifty Thousand Only) without interest to be paid by DD favoring **The New India Assurance Co. Ltd.** payable at Mumbai on or before the last date of submission above address. Scanned copy of the same (DD for tender fee & EMD) must be uploaded on the website **www.tenderwizard.com/NIAEPROC**

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MSME registered firms, registered under Interior Renovation/ Decoration only are exempted from paying the tender cost & EMD on submission of valid certificate and the MSME certificate shall be uploaded on portal.

The estimated cost of project is Rs.74,03,000 (without GST)

Bidders can submit their bid on or before 25th June 2024 up to 3.00 PM through e-procurement only i.e. through www.tenderwizard.com / NIAEPROC. No other mode of bid submission is accepted.

Pre-Bid Meeting will be held on 7th June 2024 ~~3.00 PM~~ 11 AM at site.

The New India Assurance Company Limited do not bind themselves to accept any or all the bids and reserve the right any or all bids without assigning any reason.

Note: No documents except tender fee & EMD or MSME certificate to be submitted offline at above given address.

Deputy General Manager
Mumbai Regional Office -3.

I.T. Dept. H. O. MUMBAI

I N D E X

SPECIAL INSTRUCTIONS TO BIDDERS FOR E-TENDERING

1. Tender document with detailed terms and conditions is available on our Website www.tenderwizard.com/NIAEPROC. Interested parties may download the same and participate in the tender as per the instructions given therein on or before the due date of the tender. The tender shall have to be submitted online through the e-Procurement system on www.tenderwizard.com/NIAEPROC.

2. As a pre-requisite for participation in the tender, vendors are required to obtain a valid Digital Certificate of Class IIB (with both signing and encryption component) and above as per Indian IT Act from the licensed Certifying Authorities (For ex. N-codes, Sify, E-mudra etc.) operating under the Root Certifying Authority of India (RCAI), Controller of Certifying Authorities (CCA). The cost of obtaining the digital certificate shall be borne by the vendor. In case any vendor so desires, he may contact our e-Procurement service provider M/s. Antares Systems, for obtaining the Digital Signature Certificate.

3. Corrigendum / amendment, if any, shall be notified on the site www.tenderwizard.com/NIAEPROC. In case any corrigendum / amendment is issued after the submission of the bid, then such vendors, who have submitted their bids, shall be intimated about the corrigendum/amendment by a system-generated email (In case of open tender corrigendum / amendment will be on the public dashboard and no mail will be fired for the vendor who has not participated by that time). It shall be assumed that the information contained therein has been taken into account by the vendor. They have the choice of making changes in their bid before the due date and time.

4. Vendors are required to complete the entire process online on or before the due date of closing of the tender.

5. The Commercial/Price bid of only those vendors shall be opened whose Technical bid is found to be acceptable to us. The schedule for opening the price bid shall be advised separately.

6. Directions for submitting online offers, electronically, against e-Procurement tenders directly through internet:

i. Vendors are advised to log on to the website www.tenderwizard.com/EPROC and arrange to register themselves at the earliest.

ii. The system time (IST) that will be displayed on e-Procurement web page shall be the time considered for determining the expiry of due date and time of the tender and no other time shall be taken into consideration.

iii. Vendors are advised in their own interest to ensure that their bids are submitted in e-Procurement system well before the closing date and time of bid. If the vendor intends to change/revise the bid already entered, he may do so any number of times till the due date and time of submission deadline. However, no bid can be modified after the deadline for submission of bids.

iv. Once the entire process of submission of online bid is complete, the vendors are required to go to option own bid view through dashboard and take the print of the envelope receipt as a proof of submitted bid.

v. Bids / Offers shall not be permitted in e-Procurement system after the due date / time of tender. Hence, no bid can be submitted after the due date and time of submission has elapsed.

vi . No manual bids / offers along with electronic bids / offers shall be permitted.

7. Once the Commercial/Price bids are opened, vendors can see the rates quoted by all the participating bidders by logging on to the portal under their user ID and password and clicking on other bid view.

8. No responsibility will be taken by and/or the e-Procurement service provider for any delay due to connectivity and availability of website. They shall not have any liability to vendors for any interruption or delay in access to the site irrespective of the cause. It is advisable that vendors who are not well conversant with e-tendering procedures, start filling up the tenders much before the due date /time so that there is sufficient time available with him/her to acquaint with all the steps and seek help if they so require. Even for those who are conversant with this type of e-tendering, it is suggested to complete all the activities ahead of time. It should be noted that the individual bid becomes viewable only after the opening of the bid on/after the due date and time. Please be reassured that your bid will be viewable only to you and nobody else till the due date/ time of the tender opening. The non-availability of viewing before due date and time is true for e-tendering service provider as well as New India Assurance officials.

9. The New India Assurance Company Limited and/or the e-Procurement service provider shall not be responsible for any direct or indirect loss or damages and or consequential damages, arising out of the bidding process including but not limited to systems problems, inability to use the system, loss of electronic information etc.

10. Bidder should arrange for the Tender Cost/EMD as specified in the tender. The original should be posted/couriered/given in person to the Tender Inviting Authority, within the bid submission date and time of the tender.

11. The bidder has to submit the tender document(s) online well in advance before the prescribed time to avoid any delay or problem during the bid submission process.

12. The details of the Tender Cost and EMD document submitted physically to the Department before due date of submission of tender and the scanned copies furnished at the time of bid submission online should be the same otherwise the Tender will be summarily rejected. Ensure that the copies of Tender Cost and EMD are submitted under their respective heads only.

13. The Tender Inviting Authority (TIA) will not be held responsible for any sort of delay or the difficulties faced during the submission of bids online by the bidders due to local issues.

14. Bidder should take into account all the corrigenda published before submitting the bids online.

15. The bidder should see that the bid documents submitted should be free from virus/ and if the documents could not be opened, due to virus, during tender opening, the bid is liable to be rejected.

16. Please note that if rates are not filled in BOQ, then system will show it as zero. If bidder fails to quote any rates in the BOQ, then their bid will be considered 'incomplete bid' and their bid will be rejected. Only complete bids will be considered for further evaluation.

17. Tender cost/exemption will be as per government rules applicable to MSME. Please submit relevant certificates in respective heads (Interior Renovation/ decoration) along with hard copies of the documents in the department for pre-verification.

18. Only bids submitted through online mode will be considered for evaluation.

19. If the amount quoted by the L1 bidder is less than 25% of the estimated cost, she/he shall submit a bank guarantee of amount equal to the difference in the amount quoted and total estimated cost. In case of freak rates for particular items, the L1 bidder shall submit a bank guarantee equal to the difference between the amount quoted and the estimated rate of particular items.

20. In case of any clarification pertaining to e-Procurement process, the vendor may contact the following agencies/personnel:

S.N	Particulars	Company Name	Contact Details
1	For e-Tendering Support	M/s. Antares Systems	09731468511 (Mr. Sushant) lokesh.hr@etenderwizard.com
2	For Tender related Queries	The New India Assurance Co. Ltd	022-2289 2730 (Mr. Suresh Gurav) suresh.gurav@newindia.co.in / 022-2289 2707 (Mrs. Madhavi Hendre) madhavi.hendre@newindia.co.in

MOST IMPORTANT INFORMATION

Reference No. MRO3/2024-25/001	
Tender for Proposed Civil, Interior Furnishing, Electrical, Air Conditioning, Networking and Allied work (on Turnkey Basis) at Fourth floor, New India Center, Dr. Babasaheb Ambedkar Chowk, 17-A, Cooperage Road, Colaba, Mumbai, Maharashtra 400001.	
Tender publishing date	31st May 2024
Last Date of Bid submission	25th June 2024 before 03.00 PM
Tender Fees (Non- Refundable)	Rs. 1770/- (**inclusive** of 18% GST)
EMD (refundable)	Rs. 1,50,000/-
Address for communication and submission ofEMD and Tender fees.	Deputy General Manager, **Mumbai Regional Office - 3**, 3rd Floor, New India **Center, Dr.** Babasaheb Ambedkar Chowk, 17-A, Cooperage Road, Colaba, Mumbai, Maharashtra 400001
Contact Details	Telephone: **022-22708 514/511** **E-Procurement portal:www.etenderwizard.com/NIAEPROC or https://www.newindia.co.in/portal/TenderNotice**
Architect	**M/s. Design Ideas** Contact Person: Mr. Paresh Padgaonkar Contact no. **9821004421**.

INSTRUCTION FOR FILLING IN TENDER

SECTION – I

1.0 THE TENDER OFFER:

1.1 The tender documents will be available on**www.tenderwizard.com/NIAEPROC as well as www.newindia.co.in**

1.2 The bidder has to use the E-Tender portal only for participating in the tender (Refer **SPECIAL INSTRUCTIONS TOBIDDERS FOR E-TENDERING**).

1.3 Downloading of tender document from E-Tender portal is mandatory for tender participation.

1.4 The online bids under two bid systems comprising of (1) The Technical Bid and (2) Commercial Bid should be submitted online on E-Tender portal on or before 25th June 2024 before 3.00PM. The commercial Bid should be quoted **excluding GST & other Taxes (if any) which shall be payable by NIA as actuals.** The various documents tobe submitted Online and Offline along with the Technical and the Commercial Bid are metioned in the Section II and Annexure-1 of this document.

1.5 No Offline documents shall be accepted except of tender cost and EMD DD/MSME certificate.

1.6 At any time prior to the last date of receipt of bids, the Company may, for any reason, whether at its own initiative or in response to clarifications requested by the prospective bidders, modify the tender documents byclarifications.

1.7 The clarifications, if any, issued by the Company at any time before the due date of submission of the bid will become part of the tender document and would be notified on both the websites.

1.8 No bid will be accepted after the due date &time.

1.9 The details of the Tender Cost/ Bid Security Declaration document submitted physically to the Department before due date of submission of tender and the scanned copies furnished at the time of bid submission online should be the same otherwise the Tender will be summarily rejected. Ensure that the copies of Tender Cost/BidSecurity Declaration are submitted under their respective heads only

SECTION – II

PART A-TECHNICAL BID (ONLINE)

The scanned copies of the following documents

1) **Demand Draft** for Tender Document Fees worth R**s. 1770/-(inclusive of 18% GST)** towards Tender Fee drawn infavor of **"The New India Assurance Co., Ltd.,"** payable at Mumbai.

2) **EMD of Rs. 1,50,000/- (in form of Demand Draft)**

3) **Technical Bid as per Annexure-1 and supporting documents.**

PART A-TECHNICAL BID (OFF LINE)

The following documents

a. Original DD towards tender document Fees i.e, DD of Rs. 1770/- (or MSME Certificate)

b. Original DD towards EMD i.e, DD of Rs. 1,50,000/- (or MSME Certificate)

are required to be submitted offline in physical/hard copies to Deputy General Manager, **Mumbai Regional Office - 3**, **3rd** Floor, New India **Center, Dr.** Babasaheb Ambedkar Chowk, 17-A, Cooperage Road, Colaba, Mumbai, Maharashtra 400001 on or before 3.00PM in one sealed envelope super scribed as **Offline Document Submission for "Tender for Proposed Civil, Interior Furnishing, Electrical, Air Conditioning, Networking and Allied work (on Turnkey Basis) at Fourth floor, New India Center, Dr. Babasaheb Ambedkar Chowk, 17-A, Cooperage Road, Colaba, Mumbai, Maharashtra 400001."** failing which the bidder(s)is/are liable to be rejected and their tender may not be opened.

The details of the DD/any other accepted instrument, physically sent, should tally with the details available in thescanned copy and the data entered during submission time. Otherwise the submitted bid will not be acceptable.

PART B-COMMERCIAL BID (ON LINE ONLY)

a) Commercial Bid as per **Annexure-3**

Note: No offline documents are required to be submitted for commercial bid.

SECTION III

- **GENERAL TERMS & CONDITIONS**

1. PROCEDURE FOR PROCESSING THE TENDER DOCUMENTS:

1.1 The Committee constituted by the Company will open the "Technical Bid" electronically and off-linedocuments cover physically. In case, offline documents sealed cover does not contain Demand Drafttowards Earnest Money Deposit and Tender documents fees, the bid offer may be rejected.

1.2 The Commercial Bids of Technically qualified bidders will be opened by the Committee electronically in the presence of the bidders who wish to be present for opening, L1 will be identified on the Total Price of the Commercial Bid & Summary.

1.3 Any Commercial Bid incomplete in any respect will be disqualified.

1.4 This procedure is subject to changes, if any, and the procedure adopted by the Company for opening thetender shall be final and binding on all the parties.

2. Location:

2.1 Address of the Premises: **Proposed Civil, Interior Furnishing, Electrical, Air Conditioning, Networking and Allied work (on Turnkey Basis) at Fourth floor, New India Center, Dr. Babasaheb Ambedkar Chowk, 17-A, Cooperage Road, Colaba, Mumbai, Maharashtra 400001."**

1.1 Tenderers must get acquainted with the proposed work and study drawings, designs, specifications, conditions of contract and other conditions carefully before tendering. The Tenderer shall seek clarifications on any item, if required, prior to submitting his tender. No request of any change in rates or conditions for want of information on any particular point shall be entertained after receipt of the tenders.

1.2 The Tenderer is advised to inspect the site to ascertain the nature of site, access thereto, location, facilitiesfor procurement of materials, labor rates and execution of the work. The Tenderer shall be deemed to have full knowledge of the site and drawings whether or not he actually inspects them.

2.0 **AGREEMENT:**

The successful bidder shall have to enter into a detailed Agreement. A Performa/Draft Agreement as mentioned in **Annexure-2.** However, the Company reserves the right to alter/vary/amend/modify all or any of the terms set outin the said Performa/Draft Agreement.

Encl:

- **Annexure-1(Technical Bid)**
- **Annexure-2- (Security Deposit)**
- **Annexure-4 - (Commercial Bid)**

GENERAL CONDITIONS

Contractor will not disclose details of the work to any person or persons except those engaged in its performance,and only to the extent required for the particular portion. Contractor will not give any item concerning details of the work to the press or a news disseminating agency without prior written approval from NIA / Architect contractor shall not take any pictures / photographs on site without written approval of NIA /Architect.

A. DEFINITIONS:

1. The "**CONTRACT"** means the documents forming the tender and acceptance thereof any the formal agreement executed between NIA and the Contractor together with the documents referred to therein including these conditions, the specifications bills of quantities, designs, drawings and instructions issued from time to time by NIA or any person authorized by the competent Authority, and all these documentstaken together shall be deemed to form one contract and shall be complementary to one another.
2. In the contract the following expressions shall unless the context otherwise required, have the meaningshereby respectively assigned to them.
3. The expressions "**Works" or "Work"** shall unless there be something either in the subject or context repugnant to such construction, be constructed and taken to mean the works by or by virtue of the contract contracted to the executed whether temporary or permanent and whether original, altered,substituted or additional.
4. The "**Contractor"** shall mean the individual or firm or company whether incorporated or not undertaking the works and shall include the legal personal representative of such individual or the persons composingsuch firms or company and the permitted assigns of such individual or firm or firms or company.
5. The "Contract **Sum"** shall mean in case of item rate contracts, the cost of the works arrived at after extension of the quantities shown in the schedule of quantities by the items rates quoted by the Contractor / Tenderer for the various items.
6. A "**Day"** shall mean a day of 24 hours from midnight to midnight irrespective of the number of hoursworked on that day.
7. "**Expected risks"** are risks due to riots (otherwise than among Contractor's labors / employees) and civil commotions (in so far as both these are uninsurable), wars (whether declared or not), invasions, act of foreign enemies, Hostilities, Civil war, rebellion, insurrection military or usurped power, any act of Governments, damage from aircraft, acts of God such as earthquake, lighting and unprecedented floods,and other causes over which the contractor has no control and accepted as such by NIA of the part of works in respect of which a certificate of completions has been issued.
8. "**Market-Rate"** shall be the rate as decided by Architects on the basis of the cost of materials and labour at site when the work is to be executed plus the percentage mentioned in **Schedule `F'** to cover all overheads and profits. This is applicable to Extra items.
9. "**Schedule"** referred to in these conditions shall mean the relevant schedule (s) annexed to the Tenderdocuments / papers issued by NIA of the standard schedule of rates prescribed by NIA and the amendments thereto issued from time to time.
10. "**Project Architect**" shall mean **M/s. Design Ideas** and will include duly authorized representative orany other person empowered by them in this behalf to discharge all or any of their functions.

11. **Architect** shall mean qualified Engineer or nominated official (Authorised official) duly appointed by NIA / Architect who will act on their behalf.
12. The competent authority shall mean The Deputy General Manager, **Mumbai Regional Office - 3**, **3rd** Floor, New India **Center, Dr.** Babasaheb Ambedkar Chowk, 17-A, Cooperage Road, Colaba, Mumbai, Maharashtra 400001 and will include duly authorized representative / officials or any other person empowered by NIA / Architect in this behalf to discharge all or any of their functions.
13. Where the context so requires words imparting the singular only include the plural and vice-versa.
14. Headings and marginal notes to these conditions shall not be deemed to form part thereof or be takeninto consideration in the interpretations or constructions thereof of the Contract.
15. **Foreclosure of Contract** in full or in part due to Abandonment or Reduction in scope of work:

If at any time after acceptance of the Tender NIA shall decide to abandon or reduce the scope of the works for any reason whatsoever and hence not require the whole or any part of the works to be carried out, the Architect / NIA (Authorized official) shall give notice in writing to the effect to the contractor and the contractor shall have no claim to any payment of compensations or other issues whatsoever, on account of any profit or advantage which he might have derived from the execution of the works in full but which he did not derive in consequence of the foreclosure of the whole or part of the works.

B. TERMINATIONS OF CONTRACT FOR DEATH:

1. If the Contractor is an individual or a proprietary concern and the individual or the proprietor dies and ifthe Contractor is a partnership concern and one of the partner dies then unless the Competent Authority is satisfied that the legal representative of the individual contractor or of the proprietor of theconcern and in the case of partnership,

the running partners are capable of carrying out and completing the contract, the Competent Authority shall be entitled to cancel the contract / terminate the contract as to liable for payment of any compensations to the estateof the deceased Contractor and / or to the surviving partners of the Contractor's firm on account of the cancellations of the contract. The decision of the competent Authority that the legal representatives of the deceased Contractor or the surviving partner of the Contractor's firm cannot carry out and complete the contractshall be final and binding on the parties. In the event of such cancellation NIA shall not hold the estate of the deceased Contractor and / or the surviving partners of the Contractor's firm liable in damages for not completingthe contract.

C. CANCELLATIONS OF CONTRACT IN FULL OR PART:

If the Contractor

1) At any time makes default in proceeding with the work with due diligence and continues to do so aftera notice in writing within 7 days from the NIA/Architect/Authorized Official.
2) Commits default in complying with any of the terms and conditions of the contract and does not remedy it or take effective steps to remedy it within 7 days after a notice in writing is to given to himin that behalf by the NIA / Architect / Authorized official.

3) Fails to complete the works or items of works within individuals / particular date of completion on orbefore the date (s) of completion and does not complete them within the period specified in a noticegiven in writing on that behalf by the NIA/Architect.

4) Shall offer or give or agree to give to any person in NIA service or to any other person on his behalf any gift or considerations of any kind as an inducement or reward for doing or for bearing to do or forhaving done or fore borne to do any act in relations to obtaining or execution of this or any other contract for NIA.

5) Shall obtain a contract with NIA as a result of running tendering or other non bonafide methods ofcompetitive tendering or.

6) Shall obtain / enter into a contract with NIA in connection with which commission has been paid or agreed to be paid by him or to his knowledge unless the particulars of any such commission and the terms of payments thereof have previously been disclosed in writing to the competent Authority / NIA.Being an individual or if a firm any partner thereof shall at any time being adjudged insolvent or have areceiving order or order for administration of liquidations or composition (other than a voluntary liquidations for the purpose of amalgamation or construction) under an insolvent act for the time being in force or make any conveyance in assignment of his effective or composition or arrangement for the benefit of his creditors or purpose so to, or if any applications be made under any Insolvency Act for the time being in force for the sequestration's of his estate or if a trust deed be executed by him for the benefit of his creditor or.

7) Being a company shall pass a resolution or the court shall make an order for the liquidation of itsaffairs or a receiver or manager on behalf of the debenture holders shall be appointed or circumstances shall arise which entitle the court or debenture holders to appoint a receiver or manager or.

8) Shall suffer an execution being levied on his goods and allows it to be continued for a period of 35days.

9) Assigns, transfer, sublets (engagement of labours on a piece work basis or of labour with materials not to be incorporated in the work shall not be deemed to be subletting) or attempts to assign transfer or subject the entire works or any portion of the work without prior approval of the competent Authority. The competent Authority may without prejudice to any other right to remedy which shall have occurred or shall occur thereafter to the NIA by written notice cancel the contract as whole or only such items of work in default fromthe contract.

10) NIA shall on such cancellation have power to:

   i. Take possession of the site and any materials, constructional plant / building etc.,implements, stores etc
   ii. Cary out the incomplete work by any means at the risk and cost of the contractor.

11) On cancellation of the contract in full or in part the site / authorized official shall determine what amount if any, is recoverable from the contractor for completion of the works or part of the works or in case of the works or part of the works is not to be completed the loss or damage suffered by NIA Indetermining the amount credit shall be given to the contractor

for the value of contractor's materials taken over and incorporated in the work and use of tackle and machinery belonging to the contractor.

12) Any excess expenditure incurred or to be incurred by NIA in completing the works or part of the worksor the excess loss or damages suffered or may be suffered by NIA as aforesaid after allowing such credit shall be recovered from any money are not sufficient the contractor shall be called in writing to pay the same within 30 days. If the contractor shall fail to pay the required sum within the aforesaid period of 30 days the NIA / Architect / authorized official shall have the right to sell any or all of the Contractor's unused materials, construction plant, implements, temporary buildings etc., and apply the proceeds of the sale thereof towards the satisfaction of any sums due from the Contractor under the contract and if thereafter there by any balance outstanding from the Contractor it shall berecovered in accordance with the provisions of the contract.

13) Any sums in excess of the amounts due to the NIA and unsold materials, construction plant etc., shall be returned to the contractor, provided always that if the cost or anticipated cost of completion by NIA of the work or part of the work is less than the amount which the contractor would have been paid and the completed the works or part of the works such benefit shall not accrue to the Contractor.

D. TENDERS, RATES ETC.

1. The work to be carried out under the contract shall except as otherwise provided in these conditions includeall labour, materials, tools, plants, equipment and transport which may be required in preparation of and for and in the full and entire execution and completion of the works. The descriptions given in the schedule of quantities shall unless otherwise stated be held to included waste on materials, carriage and cartage, carrying in, return of empties, hoisting, setting, fitting and fixing in position and all other labours necessary in and for the full and entire execution and completion as aforesaid in accordance with good practice and recognized principles.
2. The attached bill of quantities is our best estimate of the job.
3. All the quantities therein are approximate, payments will be made on the actual measurements / certifiedby the Architect / NIA authorized official & project Architect.
4. NIA will have the right to omit, alter, add or cancel any of the items of work shown in the schedule withoutassigning any reason whatsoever and no claim for compensation will be entertained for the same, NIA is further at liberty to carry out any items of work departmentally or through any other contractor and no compensation will be paid to the main contractor on that account.
5. Work contained in the Schedule of Quantities comprises the erection of a reinforced concrete structure, with masonry walls, windows / doors, plastering / filling etc. water tanks, plumbing / sanitary work, interiorworks, electrical work and exterior work within the premises such as roads, paving etc.

6. Before submitting the Tender, the contractor shall visit and examine the site situated at Fourth floor, New India Center, Dr. Babasaheb Ambedkar Chowk, 17-A, Cooperage Road, Colaba, Mumbai, Maharashtra 400001.
7. satisfy himself /herself as to the nature of the existing roads or other means of communications, the character of the soil and of the excavations, the correct dimensions ofthe work facilities for procuring various construction and other materials and shall obtain generally his own information on all matters and conditions affecting the execution of the works. 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. The Contractor shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his tender for the works and of the rates and prices quoted in the schedule of quantities which rates and prices shall except as otherwise provided cover all hisobligations under the contract and all matters and things necessary for the proper completion and maintenance of the works.
8. It must be clearly understood that the whole of the conditions and specifications are intended to be strictlyenforced and **that no extra work will be allowed unless they are clearly outside the spirit and meaning of the conditions and have been ordered in writing by NIA / Architect (authorized official)**
9. Before filling the Tender the Contractor will check all drawing and schedule of quantities and will get an immediate clarification from Architect / NIA as required on items not clearly understood. Any claim for anyloss or compensation will not be entertained on this account.
10. The rates quoted by the Contractor shall be for finished work measured in site and should include supply of all materials labour, tools tackles, marking out and clearing of the site and liaison charges, with licensed plumbers for preparing plans, line out permission from Municipal Corporation, Statutory bodies etc. unless specifically mentioned otherwise. **The rates shall be exclusive of all taxes such as GST & other Tax if any**
11. The rates quoted by the Contractors should also include for providing all scaffolding, hoists, tackle and other plant, shuttering profiles and apparatus generally required for the proper execution of the work. The contractors shall provide without extra charges all labour and apparatus required by NIA for testing and measuring the works and for weighing measuring, providing or testing the efficiency of any portion of the works and shall also at his own cost provide all planking gang ways, etc. necessary for affording access toevery part of the works.
12. The rates quoted by the Contractor should cover for necessary transport of materials from place ofavailability to the site of works.
13. The Contractor is expected to quote rate for each item after careful analysis of cost involved for the performance of the completed item considering all specifications and conditions of contract. This will avoidloss of profit or gain in case of curtailment or change of specification for any item. **In case it is noticed that the rates quoted by the tenderer for any item are Abnormally Low Rate (ALR). Analysis for such rates willhave to be furnished by the tenderer on demand, to satisfy NIA about the reasonableness of the rates. NIA may demand additional security deposit for such ALR items in form of Bank Guarantee for**

differenceof amount i.e. estimated rate minus quoted rates. Such additional SD shall be released on successful completion of project and certificate is issued thereof.

E. EXTRA ITEMS

1. The NIA (authorised official) shall have the power to make any alterations in, omission from, addition to or substitutions for the schedule of rates the original specifications, drawings, designs and instructions that may appear to him to be necessary or advisable during the progress of the work and the Contractor shall be bound to carry out the such altered / extra / new items of work in accordance with any instructions whichmay be given to him in writing signed by the NIA, and such alterations, omissions, additions or substitutions shall not invalidate the contract and any altered additional or substituted work which the contractor on the same conditions in all respects on which he agreed to do the main work. The time for completion of work may be extended for the part of the particular job at the discretion of the NIA, for only such alternations, additions or substitutions of the work, as he may consider as just and reasonable. **The rates for such additional, altered or substituted work under this clause shall be worked out in accordance with the following provisions. :-**

i. If the rates for the additional, altered or substituted work are specified in the contract for thework, the contractor is bound to carry out the additional, altered or substituted work at the same rates as are specified in the contract.

ii. If the rates for the additional, altered or substituted work are not specifically provided in the contract for the work, the rates will be derived from the rates for similar class of work as are specified in the contract for the work. The opinion of the Architect / NIA, as to whether or notthe rates can be reasonably derived from the items in this contract, will be final and binding on the contractor.

iii. If the rates for the altered, additional or substituted work cannot be determined in the manner specified in sub clause (a) & (b) above, then the contractor shall, within 7 days of the date of receipt of order to carry out the work, inform the NIA / Architect (authorised official)of the rate which it is his intention to charge for such class of work, supported by analysis of the rate or rates claimed, based on standard market rate analysis hand book published by NBO, and the NIA / Architect shall determine the rates on the basis of the prevailing market rates of materials, transport and labour plus 15% for overheads and contractor profit and pay the contractor accordingly. The opinion of NIA / Architect (authorised official) as to current market rates of materials and labour involved will be final.

2. Architect / NIA (authorised official) shall issue instructions to the contractor in regard to what is to be done concerning on object reported by the contractor under the proceeding sub clause and such instruction maybe required to contractor to permit the examinations, excavations, or removal by a third party. Architect / NIA (authorised official) may issue instructions to the contractor in regard to be removal and disposal of thesame at the expenses of NIA If in the opinion of the Architect / NIA, the above activity has involved the contractor indirect loss of time the NIA / Architect may allow extension of time for the completion of work equal in period to assessed loss of time on this account. The contractor shall not be eligible to claim any financial compensation due to any delay caused in this account.

3. NIA shall have the right to direct the contractor to purchase and use materials from any source for theproper execution of work.

4. Except if and to the extent otherwise provided by the contract, the provision of the General conditions of contract and special conditions shall prevail over those of any other documents forming part of the contract.Several documents forming the contract are to be taken as mutually, explanatory. Should there be any discrepancy inconsistency error or omission in the

contract or any of them the matter may be referred to Architect / NIA who shall give his decisions and issue to the contractor instructions directing in what manner the work is to be carried out. The decision of the Architect / NIA (authorized official) shall be final and conclusive, and the contractor shall carry out work in accordance with this decision.

5. Works shown upon the drawing but not mentioned in the specifications or described in the specifications without being shown on the drawings shall nevertheless be held to be included in the same manner as if they had been specifically shown upon the drawings and described in the specifications.
6. NIA reserves the right to accept or reject any or all the tenders without assigning any reasons. In otherwords, NIA do not bind themselves to accept the lowest of any tender.
7. Tender submitted by tenderer shall remain valid for acceptance for a period of 120 days from the date of opening of the tender. The tenderer shall not be entitled during the said period of 120 days, without the consent in writing of NIA to revoke, or cancel his tender. In case of revoking or cancelling his tender, varying any terms in regard whereof without the consent of NIA in writing the tenderer shall forfeit earnest money paid by him along with the tender.
8. In case of discrepancies between schedule of quantities, the specifications and or the drawings thereof, the following order of preference shall be observed.
    i. Descriptions in Schedule of Quantities.
    ii. Particular specification and special conditions, If any.
    iii. Drawings:

In any case the most stringent of the above three shall apply. The decision of the NIA / Architect in this regard is final. In case of varying or conflicting provisions made in any one document forming part of the Contract NIA shall be the deciding authority with regard to the intentions of the documents.

1. Any error in descriptions, quantities or rates in schedule of quantities or any omissions there from shall not vitiate the contract or release the contractor from the execution of the whole or any part of the work comprised therein according to drawings and specifications or from any of his obligations under the contract.

F. PAYMENT TERMS

1. **No Advance shall be paid to the contractor. The payment shall be made in total 3 numbers Bills (2 nos running bills & 1 nos final bill). The minimum bill value shall be Rs 25 Lacs (Rs 25,00,000/-) and the payment shall be made after certification by the architect subject to retention and other deductions. 7% of the total bill will be retained towards retention money. The same will be paid after completion of Defect Liability Period.**

2. Income tax / cess / taxes / other / statutory levies if any shall be deducted from every running bills and final bill payment as applicable from time to time as per Government of India / State Government.

3. All running bills (if any) as well as final bills submitted in approved proforma shall be submitted to the Architect by the contractor in quadruplicate for certification. All the bill copies shall be accompanied by measurement sheets and quantity calculation in support of the quantities contained in the bill with soft & hard copies.

4. All the works in progress will be jointly measured by the representative of NIA and the contractor progressively. Such measurements will be recorded in the measurement book by the NIA / Architect or his authorities representative and signed in token of acceptance by the contractor or his authorized representative.

5. All items having a financial value shall be entered in the measurement books, level book etc. prescribed byNIA that complete record is obtained of all work performed under the contract.

6. For the purpose of taking joint measurements the contractor's representative shall be bound to be present whenever required by the Architect. If, however, he is absent for any reason whatsoever the measurementswill be taken by the NIA / Architect or his representative and these will be deemed to be correct and bindingon the contractor.

7. The contractor shall without extra charges provide assistance with every appliance, labour and other thingsnecessary for measurement of work.

G. METHODS OF MEASUREMENTS:

1. Except where any general or detailed description of work in quantities expressly shows to the contrary schedule of quantities shall be deemed to have been prepared and measurements shall be taken in accordance with the procedure laid forth in specifications not withstanding any provisions in the relevantstandard method of measurement or any general or local custom. In the case of items which are not covered by the specifications, measurements shall be taken in accordance with the relevant and latest standard method of measurement issued by the Bureau of Indian Standards. (All Measurements will be noted as per actual without any rounding off)

H. DEFECT LIABILITY PERIOD (DLP)

1. The contractor shall **guarantee the installation/work for a period of 12 months from the date of issue of completion certificate**. Any damage or defect that may arise or lie undiscovered at the time of issue of completion certificate, connected in any way with the equipment or materials supplied by him or in the workmanship shall be rectified or replaced by the contractor at his own expense as deemed necessary by NIA or in default, NIA may cause the same to be made good by other workmen and deduct expenses (of which the certificate of NIA shall be final) from any sums that may be the or at any time thereafter, become due to the contractor or from his security deposit, or the proceeds of sale thereof, or of a sufficient portion thereof.
2. At the end of the defects liability period the contractor shall submit a written application for release ofretention money, EMD and Security Deposit. NIA shall release the money only after ensuring that all the defects pointed out by NIA/Architect till completion of DLP have been rectified by the contractor satisfactorily.
3. Any amount found due from the contractor to NIA from time to time will be recovered currently from the running bills. Similarly if, at any time, should there evidence of any lien or claim for which NIA might havebecome liable and which is chargeable to the contractor, NIA shall have the right to retain out of any payment then due or thereafter to become due an amount sufficient to completely indemnify NIA against such lien or claim and if such lien or claim remain unsettled after all payments are made, the contractor shall refund or pay to the owner all money that the latter may be complied to pay in is charging such lienor claim including all costs reasonable expenses.
4. The contractor will be fully responsible for rectifying any defects brought to his notice by NIA / project Architect in writing within **seven days of receipt of the intimation**. In case the contractor fails to attend to defects as stipulated therein, NIA reserves the right to complete the rectification through another agency ofits choice and recover the cost of such repairs from the contractor's dues against running bills/ final bill / retention money for this or any other job.

I. SECURITY DEPOSIT

1. On acceptance of the tender, ***the successful tenderer shall, within the time stipulated in***

the letter of intent, deposit with the Employer by Demand Draft, a security deposit of 2% (two percent) of the value of the contract, before he is allowed to execute the contract and commence work.

2. Failure to deposit this additional amount, within the stipulated time which shall include any extension grantedby the Employer at its discretion, will make the earnest money deposited by the tenderer liable to forfeiture and the acceptance of his tender shall be considered as withdrawn.

3. The Security Deposit will be returned after completion of Defect Liability Period.

J. LIABILITY FOR DAMAGE, DEFECTS AND RECTIFICATION THEREOF

1. If the Contractor or his workmen or employee shall injure or destroy any part of the building in which they maybe working or any building road, fence etc., contiguous to the premises on which the work or any part of it is being executed or if any damage shall happen to the work while in progress, the contractor shall upon receipt of a notice in writing in the behalf make the same good at his own expenses. If it shall appear to the NIA / Architect or his representative at any time during the construction or re-construction or prior to expiration of defects liability period that any work has been executed with unsound, imperfect or unskilled workmanship or that any materials or articles provided by the contractor for execution of the work are unsound or of a quality inferior to that contract for, or otherwise not in accordance with the contract or that any defect, shrinkage or other faults have appeared in the work arising out of defective or improper materials or workmanship, the contractor shall upon receipt of a notice in writing in that behalf from the Architect / NIA forthwith rectify or remove or reconstruct the work so specified in whole or in part as the case may require or as the case may be and / or remove the materials or articles so specified and provide other proper and suitable material or article.
2. At his own expenses, notwithstanding that the same may have been inadvertently passed, certified and paid for and in the event of his failing to do so within the period to specified by the NIA / Architect may rectify or remove and re execute the work and / or remove and replace with other, materials or articles complained of,as the case may be by either means at the risk and expense of the Contractor.
3. In case of repairs and maintenance works, splashes and droppings from white washing, painting etc., shall be removed and surface cleared simultaneously with completing of these items of wok in individual rooms, quarters or premises etc., where the work is done without waiting for completion of all other items of work inthe contract. In case the contractor fails to comply with the requirement of this condition the Architect / NIA shall have the right to get the work done by other means at the cost of the Contractor. Before taking such action, however, the NIA / Architect (authorized official) shall give three days' notice in writing to the contractor.

K. OVER PAYMENTS AND UNDER PAYMENTS:

1. Wherever any claim for the payment of a sum of money to NIA out of or under this contract against theContractor the same may be deducted by NIA from retention money / Security deposit or any sum then due or which at any time thereafter may become due to the contractor under this contract and failing that under any other contract with NIA or from any other sums due to the contractor from NIA which maybe available with NIA he shall pay within ten days the claim in cash / Demand Draft on demand.
2. NIA reserves the right to carry out post payment audit and technical examinations of the Running / final billincluding all supporting vouchers, abstracts etc. NIA further reserves the

right to enforce recovery of any overpayments when detected, notwithstanding the fact that the amount of the final bill may be included byone of the parties as items of disputes before an arbitrator appointed under condition of this contract and notwithstanding the fact that the amount of the final bill figures in the arbitration award.

3. If as a result of such audit and / or technical examinations any overpayments is discovered in respect of anywork done by the contractor or alleged to have been done by him under the contract it shall be recovered by NIA from the Contractor by any of all methods or made of recovery as prescribed above or if any under payment is discovered, the amount shall be duly paid to the contractor by NIA.

L. COMPLETION PERIOD AND COMPENSATION CLAUSE

1. The Contractor shall commence work within 7 days from the date of receipt of letter of intent / email from NIA confirming that the purchase order is being awarded to him. The formal purchase order will be typed and mailed in due course after the letter of intent. Completion period for the entire work contained in the tender and such of the extra items, if any, which form an integral part of the contract, contained in the tender is **8 Weeks from** the date of commencement of work at site as specified in above. The time limit specified herein will be strictly adhered to and will form the essence of the Contract. 0.5% of total contract value per week up to maximum of 5%, there after the owner may get the work done at contractor's risk andcost.
2. The successful contractor will be required **to submit PERT / CPM analysis** of the entire work within 10 days of issuing the LOI showing completion period as **8 weeks**. The progress of the work shall be checked with the PERT / CPM analysis at various stages of completion. NIA shall have the right to terminate the contract ex- party if progress of the work is found to be unsatisfactory and there are no efforts from the contractor's sideto make up for the delays if any.

M. COMPLETION CERTIFICATE

1. The work shall be considered "Virtually Complete" only after the Contractor submits to Architect / NIA thefollowing documents obtained by him through his licensed plumber / Licensed electricians.

    a. As soon as the work is completed the contractor shall give notice of such completion to Architect /NIA and within thirty day of receipt of such notice,

Architect /NIA shall inspect the work and shall furnish the contractor with a certificate of completion indicating.

i. The date of completion.
ii. Defects to be rectified by the Contractor and /or.
iii. Items for which payment shall be made at reduced rates.

2. When the separate periods of completion have been specified for items or groups of items, Architect / NIA shall issue separate completion certificate for such item or group of items. No certificate of completion shallbe issued, nor shall the work considered to be complete till the contractor shall have removed from the Employers premises on which the work has been executed all scaffolding, sheds, temporary structures and surplus materials except such as are required for rectification of defects, removal all huts and sanitary arrangements required for his workmen on the site in connection with the execution of work as such have been erected by the Contractor or the workmen and clear all dirt from all parts of the building (s) in upon or about which the work has been executed thereof and clean floor, all gutters and drains, ease doors and shutters, oil locks and fastenings, labeled keys clearly and handed them over to the NIA or his representative and made the whole premises fit for immediate occupations or use to the satisfaction of the NIA.
3. If the contractor shall fail to comply with of the requirements of these conditions as

aforesaid on or before the date of completion of the works, NIA may at the expense of contractor arrange to remove scaffoldings, surplus materials and rubbish etc., as he thinks fit and the contractor shall have no claims in respect of any such scaffolding or surplus materials except for any sum actually realized by the sale there of less the cost offulfilling to requirements any other amount that may be due from the contractor. If the expense of fulfilling such requirements is more than the amount realized on such disposal as aforesaid the contractor shall forthwith on demand pay such excess.

4. The whole of the work including all extra and additional items if any and when ordered are to be completed inthe time stated in the contract and the contractor will be required if necessary, to work overtime to stick to NIA requirements to complete all the works by the stipulated date. No extra claim for extension ofcompletion period will be allowed on account of this factor.
5. The completion period of the entire work as stated above shall be deemed to be the essence of the contract. Incase of delay in completing the work beyond the specified completion date the contractor will be required to pay a penalty at the rate of 0.5% of the total contract value per week subject to maximum of 5% of the actual cost of the project, there after the owner may get the work done at contractor's risk. The penalty will be recovered either from the contractor's bills or from the Security Deposit / Retention Money.
6. In case of delay of over 5 weeks in completion of the work beyond a stipulated completion date, NIA reservesthe right to terminate the contract and get all the jobs completed through another agency of its choice. Any extra expenditure that NIA will have to incur for completion of the balance jobs through another agency on account of higher rates quoted by the agency will be recovered from the contractor's Security Deposit, Retention Money and pending bills.

N. Extension of completion period

If the work is delayed by

1. Force Majeure
2. Serious loss or damage by fire or
3. Civil commotions, local combinations of workmen, strikes or lockout affecting any of the trades employedon the work, or
4. Delay on the part of other contractors or tradesman engaged by NIA in executing work not forming part ofcontract.
5. Non – availability of stores, which are the responsibility of NIA to supply.
6. Non-availability or breakdown of tools and plant to be supplied or supplied by NIA.

7. Request for extension of time to be eligible for considerations, shall be made by the contractor in writingwithin fourteen days of the happening of the event causing delay. The contractor may also if practicable,indicate in such a request the period for which extension is desired.
8. In any such case NIA may give a fair and reasonable extension of time for completion of work. Such extension shall be communicated to the Contractor by NIA in writing within one month of, the date ofreceipt of such request by NIA.

SITE FACILITIES

A. SETTING OUT OF WORK

1. The NIA / Project Architect shall supply dimensioned drawings levels and other information necessary to enable the Contractor to set out the works. The Contractor shall provide all setting out apparatus requiredand set out the works and be responsible for the accuracy of the

same. He shall amend at his own cost and to the satisfaction of the NIA / Project Architect any error found at any stage which may arise thought inaccurate setting out unless such error(s) is / are based on incorrect data furnished in writing by NIA / Project Architect in which case the cost shall be on the account of NIA. The Contractor shall protect and preserve all bench marks liability period unless the NIA / Architect directs their removal.

B. SITE DRAINAGE:

1. All water which may accumulate on the site during the progress of works or in trenches and excavations from other than the expected risks shall be removed from the site to the satisfaction of the NIA / Architect at the Contractor's expenses.

C. NUISANCE

1. The contractor shall not at any time do cause or permit any nuisance on the site or do anything which shallcause unnecessary disturbance or inconvenience to others at or near the site of work.
2. The contractor shall all times give access to the staff of statutory bodies as well as other agencies associatedwith the project and shall provide them all facilities like scaffolding, water, lighting etc. at site for discharging their duties.
3. No residential accommodation provided to the workmen/labor at the site. NIA reserve the right for thesame
4. The Contractor shall provide at his cost all temporary lighting arrangement required for the works and toenable contractors and sub-contractors to complete the works in the specified time including that for the workmen of any sub – contractors or special tradesmen.
5. NIA may provide **Electricity power on non-chargeable basis** for the works mentioned in the tender at onepoint. The necessary all electrification, wiring, lighting arrangement (including separate meter installation) shall be made available by the contractor and for which contractor shall not be paid any charges for the same. Misuse of electricity power shall be charged as 0.1% of contract value.

D. WATCHING AND LIGHTING:

1. The contractor shall provide and maintain at his own expense all lights, guards, fencing and watchingwhen and wherever necessary or required by the NIA / Project Architect for the protection of the works or for the safety and convenience of those employed on the works or the public.

E. EQUIPMENT & STAFF ASSISTANCE FROM THE CONTRACTOR

1. Theodolite, levels, plumb bobs, prismatic compass, chain, steel and metallic tapes and all other surveying instruments found necessary on the works shall be provided by the Contractor for the due performance of their contract as instructed by NIA. The NIA /Architect will use any or all measurementinstruments or tools belonging to the Contractor as and when he chooses for checking the complete works as well as the work in progress.
2. All scaffolding and ladders that may be necessary for taking measurement at site will be provided by theContractor.
3. The Contractor shall provide the following minimum equipment and machinery in good working condition at site during the entire period of construction/renovation as and when required.

F. The Contractor will be allowed to work for 8 (Eight) hours a day and 7 (Seven) days a week. However, no concreting shall be done during night or in the absence of the NIA / Architect. For workingbeyond normal working hours the Contractor shall obtain prior permission from the NIA /Architect.

EXECUTION

A. Admission to Site:

1. The Contractor shall not be permitted to enter on (other than for inspection purposes) or take possession of site untilinstructed to do so by the Architect / NIA in writing. The portions of the site to be occupied by the Contractor shallbe defined and / or marked on the site plan failing which these shall be indicated by the NIA / Architect at site and the operations beyond the areas. In respect of any land permitted by NIA for the use of the Contractor for thepurpose of or in connection with the contract. The same shall be subject to the following and such other terms and conditions as may be imposed by NIA.

2. The such use or occupations shall not confer any right of tenancy of the land to the contractor.

3. The Contractor shall have no right to put up any constructions of his own of any nature or type on NIA land excepttemporary constructions for storage of equipment for the work under the contract or as a resting place for labourers employed by him for the work provided that he obtained the requisite previous permission in writingfrom NIA or from the Architect in accordance with NIA procedure which permission they would be entitled to refuse in their absolute discretion. Such construction will be erected at the contractor's own cost.

4. If any electricity is used in any of such constructions the Contractor shall himself pay for the same. The Contractorshall at his own cost demolish all such constructions and remove the debris thereof, as also all his materials and equipment's and clean and level the site thereof before handing over the completed work to NIA.

5. The Contractor shall provide if necessary or if required on the site all temporary access thereof and shall alter adapt and maintain the same as required from time to time and shall take up and clear them away as and when nolonger required and as and when ordered by the NIA / Architect and made good all damages done to the site. TheContractor shall note that the final bill will not be certified for the payment till the action as above is completed by the Contractor to the entire satisfaction of the NIA / Architect (Authorised official).

6. All the work shall be carried out as per detailed drawings and instructions of the Architect / NIA (Authorised official).

7. All drawings, tracings, photo prints and writings (except letter) shall be the sole property of Architect / NIA andmust be returned to them on completion of the works.

8. The drawings maintained on the site are to be carefully mounted on boards of appropriates size and covered with acoat of approved varnish. They are to be protected for ravages of termites, ants, silver fish and other insects.

9. The completion of the work may entail working in the monsoon also.

10. The contractor must maintain a minimum labour force as may be required for the job and plan and execute the construction and erection according to the prescribed schedule. No extra rate will be considered for such work inmonsoon.

11. During the execution of the work, Contractor must check his work with the drawings. The Contractor shall be responsible for all the errors in this connection and shall have to rectify all defects and / or error at his own cost,failing which NIA reserves the right to get the same rectified at the risk and cost of the Contractor.

B. MATERIAL TO BE PROVIDED BY THE CONTRACTOR.

1. The Contractor shall at his own expense and without delay supply to the NIA / Project Architect, samples of materials proposed to be used in the work. The NIA / / Project Architect shall within 15 days of supply of samples or within such period as he may require intimate to the Contractor in writing and inform the Contractor whether samples are approved by him or not. If the samples are not approved, the Contractor shall forthwith arrange to supply to the NIA / Project Architect for his approval fresh samples complying with the specification laid down in the contract. A set of all approved samples shall be maintained at site under lock& key by the Architect / NIA.
2. Architect / NIA shall have full power to require removal of any or all the materials brought to the site by the Contractor which are not in accordance with the contract specifications or do not confirm in character or quality to sample approved by him. In case of default on the part of the Contractor in removing rejected materials, the Architect / NIA shall be at liberty to have them removed by other means. The Architect / NIA shall have full power to procure other proper materials and in the event of the Contractor refusing to comply,he may cause the same to be supplied by other resources. All costs which may attend upon / incurred upon such removal and / or substitution shall be borne by the Contractor.
3. The Contractor shall indemnify NIA or any employee of NIA against any action, claim or proceeding relating toinfringement or use of any patent or design or any alleged patent design rights and shall pay any royalties orother charges which may be payable in respect of any articles or materials or part thereof included in the contract. In the event of any claim being made or action being brought against NIA or any agent, servant or employees of NIA in respect of any such matters as aforesaid the Contractor shall immediately be notified thereof.
4. NIA / Project Architect shall be entitled to have **tests carried out as specified in the contract for any materialssupplied by the Contractor**, other than those for which as stated above, satisfactory proof has already been furnished, at the cost of the Contractor and the Contractor shall provide at his expense all facilities which the NIA / Project Architect require for the purpose. IF no tests are specified in the contract and such tests are required for the purpose and the charges for these tests shall be borne by the Contractor only. The cost of materials consumed in the test shall be borne by the Contractor in all cases except when otherwise provided.
5. Representative of NIA connected with the contract, shall be entitled at any time to inspect and examine any materials intended to be used in or on the work, either on the site or at factory or workshop or at other place(s) manufactured or at any places where these are laying or from which these are being obtained and theContractor shall give such facilities as may be required for such inspection and examination.
6. Trees designated by the NIA / Project Architect shall be protected from damages during the course of the works and earth level within 1 meter of each such tree shall not be damaged, when necessary such treesshall be protected by providing temporary fencing.

C. LABOUR

1. The Contractor shall employ labour in sufficient number either directly or through sub – contractors when such subletting is permitted to maintain the required rate of progress and of quality to ensure workmanship of the degree specified in the contract and to the satisfaction of the NIA / Architect. TheContractor shall not employ in connection with the works any person who has not completed his Eighteenth year of age.
2. In case of any class of work for which there is no such specification supplied by NIA as is mentioned in thetender documents, such work shall be carried out in accordance with Indian Standard Specifications andif the Indian Standard Specifications do not cover the same the work should be carried out as per standard Engineering practice subject to the approval of

the Architect /NIA.

3. The contractor shall on the written request of NIA / Architect immediately dismiss from the works any person employed by him therein who may in the opinion of NIA be incompetent or misconduct himself and such person shall not again be employed on the works without the written permission of NIA/Architect (authorized official)
4. The Contractor or his agent shall be in **attendance at the site (s)** during all working hours and shall supervise / superintend the executions of works with such additional assistance in each trade as the NIA / Architect may consider necessary. Order given to the Contractor agent shall be considered to have the same force as if they have been given to the Contractor himself.
5. Architect / NIA shall communicate or confirm his instructions to the Contractor in respect of the executions of work in a "**work site order book**" maintained in the office authorised representative shall confirm receipt of such instructions by signing the relevant entries in the book.
6. Any instructions issued by the Architect / NIA orally, shall be of no immediate effect but shall be confirmed in writing by the Contractor to the site NIA / Architect within seven days and if not dissented from in writing by the Architect / NIA to the Contractor within 7 days from receipt contractor's confirmation shall take effect as from the expirationsofthelettersaid7daysofgivingsuchoralinstructionsshall himself confirm the same in writing, then the Contractor shall not be obliged to confirm as aforesaid and the said instruction shall take effect as from the date of NIA / Architect confirmation and provided that if neither the Contractor nor the Architect / NIA shall confirm such oral instructions in the manner and at the time aforesaid but the Contractor shall nevertheless comply with the same then the Architect / NIA may confirm the same in writing at any time prior to the issue of the Final certificate and the said instructions shall thereupon be deemed to have taken effect on the date on which it was issued.
7. The Contractor shall provide and do everything necessary for the proper execution of the works according to the true intent and meaning of the drawings and specifications taken together, whether the same may or may not be particularly shown on the drawings, or described in the Schedule of Quantities, provided that the same can be reasonably inferred therein from. Figured dimensions and all dimensions and particulars to be taken from the actual work.
8. The whole of the work must be proceed with such sections and at such times as directed by NIA
9. Architect / NIA (authorised official) may from time to time issue further drawings or written instructions which are hereafter collectively referred to as `Architect's Instructions' in regard to:
    i. The variation or modification of the design, quality or quantity of works or the addition or omission or substitution of any work.
    ii. Any discrepancy in the drawings or between the schedule of quantities and / or drawings and / or specifications.
    iii. The removal from the site of any materials brought thereon by the contractor and the substitution of any material therefor.
    iv. The removal or re-execution or both of any works executed by the Contractor.
    v. The dismissal from the works of any persons employed thereupon.
    vi. The opening up for inspection of any work covered up.
    vii. The amending and making good of any defects of works improperly carried out.

10. The contractor shall forthwith comply with and execute any work comprised in such Architect's Instructions. Any instructions given verbally shall be deemed as instructions for the proper execution of the works as long as they do not involve any extra charges.
11. If the Contractor after receipt of written notice form the Architect / NIA requiring compliance within seven days fails to comply with such drawings or Architect instructions or both as the NIA / Architect may issue, NIA may employ and pay other persons to

execute any such drawings or Architect instructions and all cost incurred in connection therewith as certified by the Architect shall be borne by the Contractor or may be deducted from any amount due or that may become due to the contractor under the contract or may be recovered as a debt.

A. INSPECTIONS AND APPROVALS:

1. All works embracing more than one process shall be subject to examinations and approval at each stage thereof and the Contractor shall give due notice to the NIA / Project Architect shall be entitled to appraisethe quality and extended thereof.
2. No work shall be covered up or put out of view and without approval of Architect NIA or his authorized representative and the Contractor shall afford full opportunity for examination and measurement of any work which is about to be covered up or put out of view and for examination or foundations before permanent work is placed thereon. The Contractor shall give due notice to the NIA / Project Architect or his authorised representative wherever any such work or foundation is ready for examination and the NIA / Project Architect or his representative shall without unreasonable delay unless he considers it unnecessary and advises the Contractor accordingly attend for the purpose of examination and measuringsuch work or of examining such foundation he shall, if required by the NIA / Project Architect uncover such work at the Contractor's expenses.
3. Duties and powers of NIA / Project Architect and his authorised representative and other officers of NIA. The duties of the representative of the NIA / Project Architect are to watch and supervise the progress of works and to test and examine any materials to be used or workmanship employed in connection with theworks. They shall have no authority to order any work involving any extra payment by NIA or to make any variations in the works except when authorised by the NIA. The NIA / Architect may from time to time in writing delegate to his representative any of the powers and authorities vested in him and shall furnishes to the contractor a copy of all such written delegation of powers and authorities. Any written instructions of written approval given by the representative of NIA / Architect to the Contractor within terms of such delegations shall bind the Contractor and NIA as though it had been given by the NIA / Architect.
4. Failure of the representative of Architect to disapprove any work or materials shall not prejudice the power of the NIA / Architect thereafter to disapprove such work or material and to order pulling downremoval or breaking up thereof.
5. If the Contractor shall be dissatisfied with any decisions of the representative of the Architect / NIA he shall be entitled to refer the matter to the Architect / NIA who shall thereupon confirm, reverse or varysuch decisions.
6. The whole of the materials (except where otherwise described), stores and equipment required for the faithful performance of the contract must be provided through normal trade channel, and must be the best of their kind available at the time and the Contractor must be responsible for the proper and efficient carrying out of the work. The work must be done in best and most workmanlike manner. Samples of all materials to be used must be submitted to the Architect /

NIA on the site for approval prior to procurement. The Contractor shall furnish to the Architect / NIA for approval when requested or if required by the specifications, adequate samples of all materials and finished to be used in the work. Such samples shall be submitted before the work is commenced and in ample time to permit tests and examinations thereof. All materials finished and applied in actual work shall be fully equal to the approved samples.

7. During inclement weather the Contractor shall suspend concreting and plastering for such time as the Architect / NIA may direct and shall protect from injury all works in the course of erection.

8. Should the work be suspended by reason of rain, strike, lockouts or other cause the Contractor shall take all precautions necessary for the protection of the work and at his own expense shall make good any damages arising from any of these causes.

9. The Contractor shall keep accurate records of weather, temperature, visitors and any other occurrences affecting the progress or quality of the works.

10. All shavings, cuttings and other rubbish as it accumulates from time to time during the progress of the works and at completion including that of sub – Contractor and specific tradesman to be cleared and carted away and all materials condemned by the Architect / NIA shall be removed from site as and when required during the entire duration of the work at no extra cost.

11. The Contractor shall protect all projecting cills and mouldings and all concrete steps from injury during the progress of the work by rough timber casings securely fixed.

12. The Contractor shall provide all necessary templates, moulds for circular or shaped work, carpenters or joiners work or any other trade.

13. The Contractor shall 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 Architect / NIA at the time of completion. Before giving up possession, the contractor must see that all doors sashes etc. work easily and shall make all necessary adjustments.

14. The Contractor shall provide suitable stone with flat tops and build the same in concrete for temporary bench marks. All the pegs for setting out the work and fixing the necessary levels required for the execution thereof shall if desired by the Architect / NIA likewise be built in masonry at such places and in such manner as NIA may determine.

15. Particular care must be taken to see that the floors are not overloaded by stacks of materials during construction. It is important that no load comes on the reinforced concrete floors until they are at least 3 weeks old and at no time must the load placed upon them exceed the load for which they are designed

16. The Contractor has to provide all necessary holes, slits and depression etc. in form work and concrete to place pipelines or ancillary services in any form as shown in the drawings or as directed by NIA

17. The Contractor shall cover up and protect from injury from any cause all new work also for supplying all temporary doors, protection to windows and any other requisite protection for the whole of the works executed whether by himself or specified tradesmen or sub

contractors and any damage caused must be made good by the contractors at his own expenses.

18. The Contractor shall provided temporary teakwood barricading upto 4' 0" height from the floor level to all lift walls and / or shafts opening on all floors to safeguard against any accidental fall and maintain them till such time as permanent enclosures are installed. No extra payment will be allowed on the contractsum for complying with this clause.

D. STATUTORY

1. The contractor shall conform to the provisions of any regulations and by – laws of any water or lighting companies with whose system the structures are proposed to be connected and shall before making any variations from the drawings that may be necessitated by so conforming give to the Architect / NIA on site written notice specifying the variations proposed to be made and the reason for making to and apply for instructions thereon. In case the contractor shall in due course receive instructions, he shall proceed with the work, conforming to the provision regulations or by-laws to the supply companies and shall provide forand pay all fees and charges.
2. The contractor will be fully responsible for complying with all relevant provisions of the Contractor LabourAct and shall pay rates of Wages and observe hours of work/ conditions of employment according to the rules in force from time to time.
3. The contractor shall comply with provisions of payment as per the following acts : Payment of wages Act,1936, Workmen's Compensation Act,1923 Industrial Dispute Act, 1947Minimum Wages Act, 1948Employees State Insurance Act, 1948 Maternity Benefit Act, 1961, Mines Act, 1952 or

   Any amendments / modifications thereof or any other law relating thereto and rules made there under fromtime to time. NIA / Architect shall on a report having being made by an inspecting office as defined in the contract labour regulations have the power to deduct from the money due to the Contractor any sum required or estimated to be required for making good the loss suffered by a worker (s) by reasons of no – fulfillment of conditions of contract for the benefit of workers no – payment of wages or of deductions made from his or their wages which are not justified by the terms of contract or non-observance of the saidcontractor's labour Regulation.
4. The contractor shall pay to labour employed by him, and in the case of his giving any part of the work on sub

   – contract he shall ensure and be responsible to see that the sub – contractor pays to labour employed by such contractor, wages not less than wage or remuneration as provided in the contract labour (Regulationsand Abolition Act) and in the Rules, Regulations and orders.
5. The Contractor shall indemnify the NIA against any payments to be made under and for observance of theRegulations aforesaid without prejudice to his rights to claim indemnity from his sub - contractor.

E. SAFETY CODE:

1. The Contractor shall at his own expenses arrange for the Safety provisions as amended to these conditions or as required by the NIA / Architect in respect of all labours directly or indirectly employed for performance of the works and shall provide all facilities in

connections therewith. In case the contractor fails to make arrangements and provide necessary facilities as aforesaid, the NIA / Architectshall be entitled to do so and recover the cost thereof from the Contractor. Safety precaution to be takenin all respects (till completion of works) including for all concern human being. The contractor shall be responsible for any damage or loss of part / limb or death human being.

2. From the commencement to the completion of the works, the contractor shall take full responsibility for the care thereof and of all the temporary works (defined as meaning all temporary works of every kind required in or for the execution, completion or maintenance of the works). In case damage, loss or injury shall happen to the works or to any part thereof or to temporary works or to any cause whatsoever (save except the Expected Risks as defined in) repair at his (Contractor's) own cost and make good the same so that at the time of completion, the works shall be in good order and condition and in conformity in every respect with the requirements of the contract and NIA instructions. In the event of any such damage, loss or injury happening from any of the Expected Risks the contractor shall if any to the extent required by NIA repair and make good the same as aforesaid at the cost of NIA.

F. INSURANCES

1. The Insurance for the following will be covered and paid for by the contractor, and contractor shall indemnify the NIA and hold the NIA harmless in respect of all and any expenses arising from any suchinjury and / or damages in respect of:

    a. Workmen's Compensation and Risk of Accidents to contractor's own employees.
    b. Contractors all risk Insurance to cover the total cost of project with third party coverage.

2. The contractor has to insured building/site under construction/renovation till completion and it should beplace to be employer in the name of the NIA. Contractor shall submit the copy of policy details within 15 days of receipt of LOI/Work order.
3. If the contractor and / or his sub contractor fails to effect and keep in force the Insurance referred to above or else where in the contract or any other insurance which he may be required to effect and keep in force, NIA reserves the right to keep in force and such insurances and pay such premium or premia as may be necessary for the purpose and from time to time deduct the amount so paid by NIA as aforesaidfrom any moneys due or which becomes due to the contractor or recover the same as a debt from the contractor.

4. The aforesaid insurance policy / policies shall not be cancelled till the Architect / NIA has agreed to their cancellation.

5. The Contractor shall prove to the Architect / NIA from time to time that he has taken out all insurance policies referred to above and has paid the necessary premium for keeping the policies alive till the expiryof the defects liability period.
6. The contractor shall ensure that similar insurance policies are taken out by his sub– contractor (if any) andshall be responsible for any claims of losses to NIA resulting from their failure to obtain adequate insurance protections in connection thereof. The contractor shall produce or cause to be produced by his sub – contractor (if – any) as the case may be, the relevant policy or policies and premium receipts as andwhen required by the Architect /NIA.

G. <u>NOTICE TO LOCAL BODIES.</u>

1. The contractor shall comply with and give all notices required under any Government authority, instrument, rule or order made under any act of parliament, state laws or any regulations or by-laws of anylocal authority relating to the works. He shall before making any variations from the contract drawings necessitated by such compliance give to the NIA / Architect a written notice giving reasons for the proposed variations and obtain the Architect

instruction therein.

H. ARBITRATION

1. All disputes or differences of any kind whatsoever which shall at any time arise the parties hereto touchingthem or concerning the work or execution or maintenance thereof this Contract or the construction operation or effect thereof or to the rights or liabilities of the parties or arising out of or in relation thereto whether during or after determination, foreclosure or breach of this contract (other than those inrespect of which the decision of any person is by the contract expressed to be final and binding) shall after written notice by either party to the contract or the other of them and to the Appointing Authority who shall be appointed for this purpose by the Employer, be referred for adjudication to a sole arbitrator to be appointed as here in after provided.
2. For the purpose of appointing the sole Arbitrator referred to above, the Appointing Authority will send within thirty days of receipt by him of the written notice aforesaid to the Contractor, a panel of the three names of persons who shall be presently unconnected with the organization for which the work is executed.
3. The Contractor shall on receipt by him of the names as aforesaid, select any one of the persons named to be appointed as a sole Arbitrator and communicate his name to the Appointing Authority within thirty days of receipt by his the names. The Appointing Authority shall thereupon without any delay appoint thesaid person as the sole Arbitrator, if the Contractor fails to communicate such selections as provided above within the period specified, the appointing authority shall made the selection and appoint the selected person as the sole Arbitrator.
4. If the appointing Authority fails to send the Contractor the panel of three names as aforesaid within the period specified, the Contractor shall send the Appointing Authority a panel of three names of persons who shall be unconnected with either party. The Appointing Authority shall on receipt by him of the names as aforesaid select any one of the persons named and appoint him as a sole Arbitrator. If the Appointing Authority fails to select the person and appoint him as the sole Arbitrator within 30 days of receipt by him of the panel and inform the Contractor accordingly, the Contractor shall be entitled to appoint one of the person from the panel as a sole arbitrator and communicate his name to the Appointing Authority.
5. If the Arbitrator so appointed is unable or unwilling to act or resign his appointment or vacate his office due to any reason whatsoever another sole arbitrator shall be appointed as aforesaid.
6. The work under the Contract shall, however continue during the Arbitration proceeding and no paymentdue or payable to the Contractor shall be withheld notice on account of such proceedings.
7. The Arbitrator shall be deemed to have entered on the reference on the date he issues notice to both theparties fixing the date of the first hearing.
8. The Arbitrator may from time to time, with the consent of the parties, enlarge the time for making andpublishing the Award.
9. The Arbitrator shall give a separate award in respect of each dispute in accordance with the terms of theContract and give a reasonable award.
10. It is also a term of the Contract that if Contractor (s) do/does not make any demand for arbitration in respect from the Clients / Architects that the bill after due verification is passed for payment of a lesser amount, or otherwise, the arbitration shall be deemed to have been forfeited and Client / Architects shallbe relieved and discharged of their liability under this agreement in respect of such claim(s). Further, it isagreed that for the purpose of this clause such notice is deemed to have been received by the Contractor(s) within 2 days of posting of the letter by Clients / Architects or when delivered by hand immediately after receipt thereof

by the Contractor(s), whichever is earlier. Further, a letter signed by the officials of Clients / Architects that the letter was so posted to the Contractor(s) shall be conclusive.The Fees, if any of the Arbitrator shall, if required be paid before the award, be paid half and half by each of the parties. The costs of the reference and of the award including the fees, if any of the Arbitratorwho may direct to and by whom and in what manner, such costs or any part thereof shall be paid and may fix of settle the amount of costs to be so paid.

11. The award of the Arbitrator shall be final and binding on both the parties.
12. Subject to a fore said, the provisions of the Arbitration and Conciliation Act 1996, or any statutory modification of re- enchantment there of and the rules made there under, and for the time being in force,shall apply to the Arbitration proceeding under this Clause.

SPECIAL CONDITIONS OF CONTRACT

1. It shall be distinctly understood that notwithstanding the reviews and suggestion if any, by the NIA or Project Architect the sole and ultimate responsibility for the stability and performance of the form workand staging and all other temporary works shall be that of the Contractor.
2. The partners or Directors of the Contractor shall meet the officers of NIA or its consultants at the site ofworks or at their respective offices whenever requested to do so.
3. The Project Architect shall supply to the contractor reasonably complete engineering drawings. All **the drawings required for the complete execution** of the work shall be submitted by the Architect within 7 days of issue of work order. **Bar bending schedules and shop drawings** required for proper execution ofwork shall be prepared by the Contractor and submitted well in advance within 14 days of issue of work order to NIA and its Project Architect to permit scrutiny, corrections resubmissions and final approval without causing any delay in the construction/renovation work.
4. The Contractor shall confirm to the provisions of the Government Act relating to the work, and to the regulations and bye-laws of the local authorities. The contractor shall give all notices required by the said act, and obtain all required permission and license and pay all fees payable to such authorities in connection with constructing and maintaining temporary electric and water supply at site for the said project. All aspects of temporary works including their stability shall be the sole and ultimate responsibility of the Contractor.
5. NIA reserves the right to use the premises and any portion of site for execution of any work not includedin this contract which NIA may desire to get executed by other agencies. The Contractor shall allow all reasonable facilities for the execution of such work but shall not be required to provide any plant or material for such work except by special arrangement with NIA in such a manner as not to impede the progress of the works included in this contract and the Contractor shall not be responsible for any damage or delay which may happen or be occasioned by such work.
    i. In addition to previous stipulations, the Contractor shall be represented at site at all times duringthe tenure of the contract by responsible and qualified engineers approved by NIA Such engineer shall form the Contractor's Project Management & Site Supervisory Team. They shallbe in constant attendance upon all activities of the work. Contractors staff shall comprise of atleast the following to be permanently on site for the entire duration of the project.

1. Engineer (Diploma holder with at least 7years' civil and interior works experience) – 1person.
2. Jr. Engineer(Min. 5years' experience having Diploma Holder civil and interior worksexperience) – 1persons.

    ii. Cost of recovery against materials, utilities or services supplied or arranged for by NIA shall bemade by deducting the respective amount from the running as well as final bills.

6. Although Schedule of Probable Quantities & Rates has been divided into various sub – section, the ratesquoted for a particular item of work in one sub – section shall be made applicable to similar item of work in any other sub – section if that item is not listed in the Schedule of that other sub –section.
7. This project is subjected to inspection by various audit / vigilance agencies of

Government of India / NIA if any inspection of works is carried out by such agencies contractor shall extend his full co- operation to these agencies in examining records, works etc. on inspection by such agencies, any and in their inspection report, if it is pointed out that Contractor has not carried out work according to guideline laid down in this tender documents and also if any recoveries in some items is pointed out therein, same shall be recovered from contractor's R. A. Bills / Final Bill. The items under dispute shall not be paid in full till inspection agency gives their no objection report.

8. This work being prestigious NIA, quality of materials & workmanship are expected from the contractor of very high standard.
9. The successful tenderer is bound to carry out any item of work up to any deviation in quantities, for the completion of the job.
10. The Electrical works is to be executed through licensee electrical contractor only.
11. Material testing report can be asked for by NIA. The contractor must cooperate with the employer (NIA) to make available such reports from the manufacturer of the material used in the tender with no extra cost.
12. NIA shall be the sole deciding authority on the brand and make of the materials to be used.
13. The contractor should issue necessary statutory certificates, like Form A/B for Firefighting work, Electrical work etc through licensed agencies & submit the same to the respective statutory body.
14. The contractor to arrange for & make provisions for statutory approval from MCGM (ward/ building proposal department) based on the drawings prepared by the Architect.
15. The contractor to also consider for any amounts required to be appropriated for loading/ unloading agencies on the site such as Mathadi worker unions, or any other agencies that may be present on the site. New India Assurance will not be under any obligation to sort out any such matters arising during execution of the work. The contractor shall also be responsible for clearing off the debris accumulated on the site as per the MCGM guidelines & in the dumping ground approved by the MCGM.
16. The contractor should also take adequate care of the vehicles & other property situated below on the ground to prevent any damage caused by falling debris.
17. The contractor to preferably arrange for a portable material lift for lifting & bringing down the material/ debris. If the contractor chooses to use the passenger lift in the building, he shall be solely responsible for any damage to the lift on account of misuse by the contractors staff & the repair cost shall be deducted from the contractors bill at his risk & cost.

SCHEDULE – F

1	• Earnest Money Deposit	:	**Rs. 1,50,000/-**
2	• Initial Security Deposit	:	2% of the total tendered amount (for successful bidder)
3	• Defects Liability Period (DLP)	:	12 months from the date of issue of virtual completion certificate and handing over the completed work to owners
4	• Period of commencement	:	7 days from the date of letter of intent / work order
5	• Duration of completion of work	:	**8 Weeks**
6	• Liquidated damages at the rate	:	0.5% of total contract value per week up of to maximum of 5% of the contract value, there after the owner may get the work done at contractor's risk and cost i.e. beyond delay of 5 weeks
7	• Retention money	:	a) 7% retention money to be kept from every running bill -to be released after completion of DLP
		:	b) Security deposit to be released on expiry of the defect's liability period after rectification in executed works.
8	• Terms of rate	:	The rates shall be at site of work and Should be excluding of GST
	• Period of validity of tender		120 days from opening of tender
	• Period for honoring interim bill		The interim bills if raised shall be paid within 15 working days of receipt from the architect)
	• Validity of rates after award of work	:	The rates shall be firm for period of 5 Months from the date of award of work or till final completion of work whichever is later. **"NO ESCALATION IN PRICES WILL BE ALLOWED"**
	• Minimum value of work of Interim bill	:	**25 Lacs.**

GENERAL SPECIFACTION

1. Upon it becoming reasonably apparent that the work is delayed, the contractor shall forthwith give written notice of the cause of the delay to the client and the Architect. Then the client and the Architect shall as soon as they are able to estimate the length of the delay beyond the date or time aforesaid, make in writing a fair and reasonable extension of time for completion of the work, provided always that the contractor shall use constantly his best endeavour to prevent delay and shall do all that may reasonably be required to the satisfaction of the client and the Architect to proceed with work.
2. **Damage for non-completion:** If the contractor fails to complete the works by the date specified in the conditionsor within any extended time fixed, the contractor shall pay to NIA a sum calculated at the rate stated in the special conditions as agreed liquidated damages for the period during which the said work shall so remain or have remained incomplete. The client may deduct such damages from any money that is otherwise payable to the contractor, under this contract.
3. **Extra Items :** All authorised extra items where rates cannot be derived from tender the contractor shall submit rates, supported by rate analysis worked on the 'actual cost basis' plus 15% towards establishment charges, contractor's overhead and profit & GST etc
4. **Deviation in Quantities:** There is no variation limit in tender quantity, for any variation in plus or minus, contractor is supposed to execute the same at quoted rates.
5. **Photographs :**The rate quoted shall include the cost of supplying colour photographs of 8" x 10" size including soft copy to employer after completion of work from various angle one set each to Employer and the architect separately in respect of each floor/dept as directed.

TECHNICAL SPECIFICATIONS

PART-I CIVIL, PLUMBING & INTERIOR WORKS

SECTION I: DEMOLITION, DISMANTLING AND MODIFICATIONS DURING CONSTRUCTION OF BUILDING INTERIORS

GENERAL

SCOPE OF WORK

Work included:

This section covers the requirements of works involving demolition and/or dismantling parts of building interiors not involving the structure or any part of the building that contributes to the integrity and stability of the building

This section includes preliminary works in preparation for demolition such as obtaining permits; disconnection and/or controlled operation of building services; precautionary measures for the safety of the building, its occupants and workers.

This section includes demolition of non-load-bearing masonry and concrete walls; ally types of partitions and wall cladding; doors and windows; suspended ceiling; wall and floor finishes.

This section includes the dismantling of built-in cabinets, counters, Kitchen Platform, furniture and fixtures.

This section includes disconnection, dismantling and controlled operation of electrical systems, water supply, drainage and sanitary systems, HVAC systems and all other building services by skilled operatives competent in their respective fields.

This section includes the salvaging, retrieval and safe storage of all material as required by the contract and the transport and disposal of all unwanted material and debris.

Work excluded:

This section does not include structural demolition or modifications.

RELATED WORK SPECIFIED ELSEWHERE

Temporary works
Electrical
Water supply & drainage
HVAC

SUBMITTALS

The contractor shall submit the following to the architect for review and approval well before the commencement of work.

- Required approvals from all concerned authorities
- Proposed demolition and dismantling plan and day-to-day progress schedule showing clearly the sequence of operations for disconnection of building services, controlled operation of services to retain and safety precautions. This shall be accompanied by description of procedures proposed to be followed.
- Equipment proposed to be used for demolition and dismantling.
- Proposals for temporary works to partition and protect adjacent or nearby areas in use, including dust control and clean up procedures.
- Proposal for temporary storage of salvaged material and for debris to be transformed off site.

CONTROL OF PROCEDURES AND SAFETY

The contractor shall devise and be responsible for all procedures to ensure the safety of the building, the workers and the other occupants during the demolition and dismantling work. The work shall at all times be under the direct supervision of experienced foremen under the overall supervision of the contractor's site engineer.

HANDLING, STORAGE, TRANSPORTATION AND DISPOSAL

Handle and store materials retrieved from the demolition and dismantling in accordance with IS:7969. Whenever there is a conflict in the requirements of IS:7969 and the provisions herein, the more stringent of the specifications shall apply.

Store debris and salvaged material separately in designated places approved by the submittals procedure described above. All salvaged material shall be classified and stored separately by categories agreed upon prior to commencement of demolition.

Do not pile up material in a manner that will cause the structure to be over loaded. Stack material so that the stacks are stable and do not cause obstruction to movement.

Do not allow debris to accumulate beyond the capacity of the approved area for temporary storage. Do not dump debris in public rights-of-way, in private property without owners consent, in municipal garbage receptacles etc. The contractor shall dispose of debris only at dumping grounds approved by the local authority in manner not objectionable to the authority.

Transport debris to the approved dumping grounds at times permissible by law and acceptable by local practice. Take precautions to avoid spillage of debris from the transport vehicle en-route.

MATERIALS AND PRODUCTS

SCAFFOLDS AND LADDERS

Scaffolds and ladders used in the demolition and dismantling shall be in accordance with IS:3696 Part 1 and Part 2.

The scaffolding shall be designed and erected by the contractor in accordance with the requirements of the work, by experienced workers. All scaffolding material shall be in good serviceable condition and assembled to be stable in the conditions of the work being performed.

MECHANICAL EQUIPMENT

Do not use mechanical equipment without the prior approval of the architect.

Do not use gas cutting and electric welding or cutting without the prior approval of the architect. Take special precautions to prevent fire if permission is granted for gas and electrical cutting and welding.

EXECUTION

GENERAL

Survey and mark out clearly the portions that are to be demolished or dismantled. Proceed with demolition and dismantling strictly in conformance with the plans, sequence, schedules and procedures proposed by the contractor and approved by the architect.
Proceed with work only in the presence and under control of skilled supervisors.

Do not proceed with work if latent conditions contrary to expectations or assumptions are encountered as work proceeds. Do not proceed with work if any part of the building assumed to be non-structural and non-load-bearing is discovered or suspected to be structural and contributing to the stability of the building. Report to the architect and obtain approval to

proceed further.

Maintain in a journal with serially numbered pages, inventories of all salvaged items as the work proceeds.

WATER SUPPLY AND SANITATION PIPES, FIXTURES AND FITTINGS

Dismantling of water supply, drainage and sanitary installation shall be carried out under the supervision of a licensed plumber, employing competent skilled workers.
Coordinate dismantling work with related permanent work to be installed, if any.
Shut off water supply and drainage pipes by closing valves or by providing plugs to isolate the systems to be dismantled from those to be retained. Ensure that areas in use are not disturbed during the progress of work by providing temporary service connections. If possible complete and protect proposed permanent modifications before commencing dismantling and demolition work.

Fixtures and fittings shall be removed only by skilled technicians to salvage them with minimum damage. Dismantle in the following sequence:
- Fittings such as faucets, showers, taps, valves, meters, gauges etc.
- Fixtures such as wash basins, WC's, urinals, pumps etc.
- Pipes, tanks, and heavy equipment
- Brackets, supports, hangers and foundations

Complete dismantling of water supply, drainage and sanitary installation before commencing demolition of walls and partitions, flooring, ceiling etc. Closely coordinate the works if this is not practically possible.

ELECTRICAL

Dismantling of electrical installation shall be carried out under the supervision of a licensed electrical contractor, employing competent certified electricians.

Carefully survey the entire existing system and coordinate dismantling work with related temporary permanent works, if any. Modify the existing system, if required before commencing dismantling work to ensure that the functioning of systems outside the demolition areas is not affected.

Shut off and isolate electric supply to the demolition and dismantling area. Take precautions to ensure that the disconnected circuits may not be accidentally re-energized.

- Disconnect supply cables and isolate all distribution boards within the work areas. Disconnect and remove the distribution boards. Provide temporary service connections to the work areas from a temporary DB fed by an exclusive cable tapped from a board outside the work area with an isolation switch close to the temporary DB.Do not provide temporary services through any existing circuits in the areas to be demolished.
- If DB and circuits located within the demolition areas cannot be disconnected or diverted, they shall be clearly marked out and identified with cautionary signs to distinguish them from others that are to dismantled.
- Have a skilled electrician on standby.
- Fixtures and fittings shall be removed only by skilled technicians to salvage them with minimum damage.
- Complete dismantling of electrical installation before commencing demolition of walls and partitions, flooring, ceiling etc.

OTHER SERVICES

Carefully survey each of the existing systems in its entirety and coordinate dismantling work with related temporary and permanent works, if any. Modify the existing system, if required, before commencing dismantling work to ensure that the functioning of systems outside the demolition areas is not affected.

Systematically shut off and isolate each system from the demolition and dismantling area. Take precautions to ensure that the portions to be retained are clearly marked out and identified with cautionary signs to distinguish them from others that are to dismantle.

Follow a sequence of dismantling by which valuable equipment, fittings and other material are recovered with minimum damage.

Complete dismantling of all services before commencing demolition of walls and partitions, flooring, ceiling etc.

SECTION II: CAST IN PLACE PORTLAND CEMENT CONCRETE

GENERAL

SCOPE OF WORK

Work included

This section cover the requirements for supply of materials, mixing, forming, placing, compacting, finishing, jointing, curing and all other works as required for cast-in-place concrete.

The scope of work includes testing of concrete as required by this specification.

Work not included

Concrete reinforcement

RELATED WORK SPECIFIED WORK ELSEWHERE

Concrete reinforcement

Metal decks

QUALITY CONTROL

The contractor shall be fully responsible for quality control inspection and testing. All concreting operations shall be at all times under the supervision of a qualified and experienced engineer.

The quality control supervisor shall be responsible for the following regular tests and inspection:

- Consistency measurements such as slump, air-content, temperature, cement content etc.
- Taking and testing of specimens from concrete pours and having them tested in accordance with the codes and standards.
- Inspection and approval of framework and reinforcement.
- Inspection and approval of batching and mixing facilities.
- Inspection and approval of concrete placement, consolidation, finishing and curing operations.
- Inspection and approval of form removal.
- Maintaining complete, up to date records, throughout the contract of all concreting operations, inspection, tests etc.
- The standard age of concrete for tests is 28 days, but seven-day test may be used to predict probable 28-day strength, provided that the relation between 7-day and 28-day test strength is established and the 28-day tests are subsequently performed for confirmation. The acceptance criteria for concrete shall be as set out in NBC, Part VI, section 5, table 5.
- Any concrete, which is deemed by the architect not to comply with this specification shall be broken and replaced, including all reinforcement.

TRANSPORTATION, HANDLING AND STORAGE

Cement and dry admixtures shall be stored in dry, water proof, well ventilated housing or silos. Liquid admixtures shall be stored in clean, isolated containers.

Packaged cement
Packaged cement shall be delivered to the mixing site in original moisture proof, sealed packages, which shall be labeled with the weight, name of manufacturer, brand and type specified. Cement received in broken or damaged packages shall not be used.

Packages of cement, which vary in weight by +/- 3% shall not be accepted.

Bulk cement
Bulk cement shall be stored separately from packaged cement. Bulk cement shall be stored in dry, weather tight, well ventilated bins with provisions for prevention of moisture absorption or the intrusion of foreign matter.

Facilities for sampling of cement shall be proved at the weighing hopper, or at the feed line immediately before entering the hopper.

Different brands of cement, or the same brand of cement from different sources, shall not be used without prior notification by the contractor.

Aggregates
Aggregates shall be transported and stockpiled separately according to their sources and gradations. Aggregates shall be handled in a manner, which will prevent segregation and contamination with earth or foreign materials.

If the aggregates show segregation, or if the different grades become mixed, the aggregates shall be re-screened before placing in the proportioning bins. Contaminated aggregates shall not be used.

Aggregates shall not be transferred directly from trunks, railroad cars or barges to the proportioning bins when moisture content or/and water absorption is such that it will affect the accuracy of the proportioning of the concrete mixture. In such cases, the aggregates shall be stockpiled until the excess moisture drains off.

Muddy or oil-leaking equipment shall not be allowed to operate on the stockpiles.

Formwork

All formwork materials that may be affected by moisture or whether shall be stored in dry, weatherproof, well ventilated housing.

All formwork material shall be handled and stored to prevent damage.

FORMWORK

Forms are designed by the contractor to have sufficient strength to carry the hydrostatic head of the concrete as a liquid without deflecting beyond acceptable limits. Besides the weight of concrete and reinforcement, the formwork shall be designed for loads and lateral pressures due to construction operations.

Maximum deflection of facing materials which reflect in concrete surfaces exposed to view shall be not greater than 1/240 of the span between structural supports.

Where necessary to maintain the tolerances indicated, the framework shall be cambered to compensate for anticipated deflections due to the weight and pressure of the fresh concrete and also due to any other construction loads.

The surface of forms is to be designed to provide the correct finish, as specified in the subsection herein.

CURING:-
Exposed Surfaces of concrete shall be kept continuously in a damp or wet condition for at least seven days from the date of placing of concrete.

Approve curing compounds may be used in lieu of moist curing with the permission of the Architect/Engineer-in-charge. Such compounds shall be applied to all exposed surfaces of the concrete as soon as possible after the concrete has set.

COVER:-
To maintain the specified amount of concrete cover to the reinforcement small precast concrete blocks of grade similar to that of concrete to be placed shall be used as indicated hereunder unless otherwise specified in the drawings.

a) At each end of reinforcing bar, not less than 25mm, nor less than twice the diameter of bar.
b) For a longitudinal reinforcing bar in a beam, not less than 25mm, nor less than the diameter of the bar.
c) For a longitudinal reinforcing bar in a column, not less then 40mm nor less than the diameter of the bar.
d) For tensile, compressive, shear or other reinforcement in a slab, not less than 15mm, nor less than the diameter of the bar.
e) For Vertical or horizontal reinforcement in concrete walls not less than 15mm nor less than the diameter of the bar.
f) For reinforcement in footings, pile caps and raft foundations not less than 50mm.

ADMIXTURES: -
Plasticizers may be used in the concrete work to achieve better workability admixtures or cement containing additives (Such as accelerators, retarders, water proofing agents etc) shall not be used unless specified or otherwise directed or approved by the Architect/Engineer-in-charge.

COARSE Aggregate: -
The Coarse aggregate for the reinforced concrete work shall consist of crushed gravel, black trap, granite or other stone to the approval of the Architect/ Engineer-in-charge and shall be free from dust. If considered necessary by the Architect / Engineer-in-charge the aggregate shall be washed specially until an approved cleanliness is obtained. The use of laminated stone, flat or flaky material will not be permitted. The combined coarse aggregate shall in all respects be so graded as to allow 95% to 100% by weight to pass a 20mm BIS Sieve; 25% to 55% by weight to pass a 10mm BIS Sieve and 0% to 10% by weight to pass a 5mm BIS Sieve. The aggregates of different sizes shall be stored in separate stacks in clean state and free from all dirt.

The coarse aggregate where absorption of water after 24 hours immersion is more than 5% by weight shall not be used.

When required by the Architect/Engineer-in-charge tests indicated in BIS 383 shall be carried out by contractor at this cost to show the acceptability of the materials.

Stored piles of aggregate shall have good drainage, preclude inclusion of foreign matter and preserve the gradation.

FINE AGGREGATE: -
Sand shall conform to BIS: 383 and relevant portion of BIS: 515. It shall pass through a BIS: Sieve 4.75mm (3/16-B.S.) test sieve, leaving a residue not more than 5%. It shall be from natural source or crushed stone screenings, chemically inert, clean, sharp, hard, durable, well graded & free from dust, clay, shale, large pebbles, salt, organic matter, loam, mica or other deleterious matter. The sum of percentage of all deleterious materials in sand shall not exceed 5% by weight. It shall be washed, to reduce the percentage of deleterious substances to acceptable limits. Sand shall not contain any trace of salt and it shall be rejected.
The fine aggregate for concrete shall be graded within limits as specified in BIS: 383 and the Fineness modulus may range

between 2.60 to 3.20.
The fine aggregate shall be stacked carefully on a clean hard dry surface so that it will not get mixed up with deleterious foreign materials. If such a Surface is not available, a platform of planks or iron sheets or brick floor or a thin layer of lean concrete shall be prepared.
The sand for plaster shall be screened & washed.

WATER PROOFING:-

The cement based waterproofing work shall be carried out through approved contractor with 10 years guarantee as per their specifications under the supervision of the contractor.

Terrace, Canopy, Refuge area, roofs, Tops of balconies, lift machine rooms, water tank, pump room and watchman's cabin roof: These shall be finished with water proofing treatment as per the approved agencies specifications and as approved by architect with a guarantee of 10 years. Water proofing treatment will include necessary waterproof brickbat coba of required minimum thickness 75mm laid to required slope. Top of brickbat will be finished with waterproofing treatment and china mosaic flooring of approved colour by Architects finished smooth made watertight including 300mm round vata at junction of slab and parapet wall complete.
Toilets: This shall be as per approved agency's specifications with 10 years guarantee. Water proofing treatment to sunk portion including waterproof brickbat coba filling. Before filling brickbat coba, the walls upto 600mm above general finished floor level will be finished with waterproof treatment as per waterproofing agency's specifications.

TESTING:-

All G. I. pipes and fittings may be tested to a pressure of 10.5 Kg/cm2 to ensure that pipes have proper threads and that proper materials (such as white zinc and spurnyarn) have been used in jointing. All leaky joints must be made leak- proof by tightening or redoing at contractors expense.

MATERIALS AND PRODUCTS

CEMENT

Cement shall be ordinary Portland conforming to IS: 269 and shall meet the following additional requirements:

Compressive strength
At 3 days ------- 160 Kg/Cm2 minimum
At 7 days ------- 220 Kg/Cm2 minimum

Time of setting (vicat):
Initial set ------- 30 minutes minimum
Final set ------- 5 hours maximum

COARSE AGGREGATES

Coarse aggregates shall comprise clean crushed or uncrushed gravel, crushed stone or a combination of the tree free from adherent coatings deleterious materials, organic impurities and salts in accordance with IS:383.

The coarse aggregates shall be selected, screened to various particle sizes and rinsed as necessary to meet the acceptance criteria.
The normal size of coarse aggregates used for different purposes shall be as given below:

Reinforce concrete – 20mm maximum; 4.75 mm minimum
Floor screed upto 75mm th over existing concrete slab – 8mm maximum, 1mm minimum
Un-reinforced mass concrete – 40mm maximum; 4.75mm minimum

The coarse aggregates shall comply with the requirements set forth below:

Slake durability index using distilled water as slake fluid – 99.0% minimum
Clay lumps and friable particles – 1.0% maximum

Water absorption – 2.5% maximum
Sodium chloride – 0.03% maximum

FINE AGGREGATES

Fine aggregates shall comprise clean natural sand with rounded or sub rounded particles free of adherent coatings, deleterious materials, organic impurities and salts in accordance with IS :383.

Fine aggregates shall be selected, screened and rinsed as necessary to meet acceptance criteria.

The aggregates shall comply with the requirements set forth below
Clay lumps and friable particles – 1.0% maximum
Material finer than 75 micros – 2.0% maximum
Water absorption – 1.0% maximum
Sodium chloride – 0.05% maximum

WATER

Water for rising aggregates, for in Company in the concrete and for curing shall be clean potable water free from injurious amounts of oils, acids, salts, alkalis, organic matters and other potentially deleterious substances when examined in accordance with IS:3025 and when compared with the limits specified in this specification.

The maximum permissible concentrations of chemicals and organic and inorganic solids shall be in accordance with NBC, Part VI, Section 5, paragraph 4.1.3.2. The pH value of water shall generally be between 6 and 8.

FORM MATERIALS

The selection of materials suitable for formwork shall be made by the contractor unless specified otherwise based on maximum quality consistent with the specified finishes and safety.

The use of proprietary forming systems is recommended and should be used where possible.
MISCELLANEOUS MATERIALS

Water stops to the used in water tight concrete construction joints shall be polyvinchloride (pvc) of the size and type shown on the drawing.

Other inserts and embedment shall be as shown on drawing.

Form release agents to prevent concrete adhering to formwork shall be non-staining, non-reactive, rust preventive and guaranteed to be compatible with subsequent surface applications to concrete.

CONCRETE GRADES AND MIXES

General
Controlled concrete or designed concrete mix is concrete of which the constituted proportions have been determined by preliminary tests to meet the acceptance criteria of the grade of concrete required.
Ordinary concrete or normal concrete mix is concrete of which the constituent proportions ar based on nominal mixes without preliminary tests.

Only controlled concrete shall be permitted for use in reinforced concrete and concrete used in building structures. Ordinary concrete shall generally not be used except by written approval of the architect preceded by a written request for use of ordinary concrete by the contractor giving reasons why he wishes to do so.Concrete in this specification shall always mean controlled concrete.

Grades of concrete are denoted by a designation consisting of the letter 'M' followed by a numeral indicating the 28-day cube compressive strength in Kg/cm2.

Each grade of concrete may consist of one or more 'mixes' determined by cement content, quantity and gradation of aggregates, water cement ratio, slump, type of admixtures etc.

Each mix within a grade shall be considered a specific type given an appropriate distinctive nomenclature and will require approval by the architect. The contractor shall use the approved the approved mix for approved uses.

Strength requirements of concrete.

The strength requirements of concrete for the various grades of concrete shall be as given below, determined on the basis of the compressive strength of 150mm cubes at 28 days after mixing in accordance with IS: 516

Grade of concrete	**Preliminary test Comp. Strength in Kg/sqcm (min)**	**Works test Comp. Strength in (Kg/sqcm (min**
M100	135	100
M150	200	150
M200	260	200
M250	320	250
M300	380	300
M350	440	350
M400	500	400

For explanation refer NBC, Part VI, section 5, table 1.

Concrete mix proportions for ordinary concrete:
The concrete mix proportions for ordinary concrete shall be as given below:

Grade of	**Total quantity of dry**	**Proportion of**	**Qty of water**
Concrete	aggregate by volume per 50 Kg of cement being the sum of individual volumes of fine and coarse aggregates (max in ltrs)	Fine aggregates to coarse aggregates in ltrs)	per 50Kg of cement (maximum
M100	300	Generally 1:2 but	34
M150	220	subject to an upper	32
M200	160	limit of 1:1 ½ and	30
M250	100	lower limit of 1:3	27

For explanation refer NBC, Part VI, section 5, table 3and 4.

SECTION III: BURNT CLAY BRICK MASONRY

SCOPE OF WORK

Work included

This section covers the requirements for the supply of materials and workmanship for the construction of load bearing and non-load bearing burnt clay brick masonry including all types of mortar, grouting and masonry accessories.

This section includes architecturally exposed burnt clay brick masonry in association with stone masonry.

RELATED WORK SPECIFIED ELSEWHERE

Stone masonry
Cast-in-place Portland cement concrete
Concrete reinforcement
Plastering

QUALITY CONTROL

The contractor shall be responsible for the quality of the burnt clay brick masonry. The masonry work shall at all times be under the direct supervision of an experienced foreman under the overall supervision of the contractors site engineers. The bricks shall comply with I.S.1077.

EXECUTION

GENERAL

The setting and layout of masonry shall be the contractor's responsibility and shall be in strict conference with the drawings.

The contractor shall accurately locate openings, returns, offsets etc. in accordance with the drawings.

The contactor shall layout walls in advance for accurate spacing of surface bond patterns with uniform joint widths and to properly locate openings. Use of less than half size bricks at corners, jambs and other locations shall be avoided.

Cut bricks carefully to prevent disintegration and to obtain clean, sharp, un chipped edges. Cut-bricks may be used not more than twice in a straight-run course.

COORDINATION WITH OTHER WORK

The contractor shall coordinate and schedule the masonry work with other related work and trades to avoid cutting and breaking of masonry after erection and for proper sequencing.

ACCURACY AND TOLERANCES

Erect walls and columns true to line and plumb, with courses level with joints of uniform thickness and spacing. Corners, returns, jambs etc. shall be square or true to angles shown on drawings.

Acceptable tolerances are as given below:

Variation from means plan: Walls shall be constructed as true planes. When tested with a 3 meter straight edge, placed anywhere on the wall in any direction, the maximum deviation from a true plane shall be within 5mm.

Variation from plumb: Variation from plumb shall be within 5mm in 3meters height.

Variation from level: Variation from the level for any masonry course shall not exceed 6mm in any 6mtere bay.

Variation from positions: Variation from positions shall not exceed 6mm from the designated position shown on the drawing.

CONCRETE WORK

All concrete work associated with masonry shall proceed keeping pace with masonry.
Concrete lintels, sills, and stringer course etc. shall be flush with the masonry surfaces, unless otherwise indicated.

CURING

Cure the masonry construction by continuously keeping moist for at least 7 days

SECTION – IV - JOINERY

1. **General:**The type of shutters for doors, windows, ventilators etc. viz. paneled glazed wire gauzed and flush shall be as indicated and detailed in the drawing.

2. **Flush Door shutters:** Door shutters shall be 35 mm thick flush door shutters/solid core type non decorative factory made confirming to IS- 2202 and ISI marked with block board core (confirming to the requirements as per IS-1659 1969) with internal hard wood clippings and both faces commercial ply veneered. Adhesive used shall be phenyl form aldehide synthetic resin conforming to BWP types specified in IS-848-1974.
3. Contractor shall obtain the approval for the name of the manufacturer of the flush door shutters from the Site Engineer/Architect before placing the supply order. While asking for the approval, copy of the "Bureau of Indian Standard" letter under which manufacturer has been authorized to mark the product with ISI marking should be attached. Site Engineer and Architect before giving the approval shall ensure that the validity date of license has not expired.

4. **Testing of Flush Door Shutters**: On receipt of the shutters at site the Site Engineer or the Architect shall be entitled to get the samples of door shutters tested in any approved laboratory. From each lot of approximately 100 shutters, one shutter shall be selected at random by the Site Engineer/Architect. The cost of replacement of the door shutters selected as samples, their transportation to the laboratory and cost of testing by the laboratory shall be borne by the contractor.

5. Glazed & Gauzed Door Shutters: Shutters shall be 35mm thick. These shall consist of first class i.e. champ, hillock, mango wood styles, top, bottom and lock rails as per details shown on drawings. Timber to be used for these shutters shall be of good quality, seasoned of material growth and conforming to IS-4021-1963. Seasoning and ASCU treatment shall be done as per IS-402-1962. Styles and rails of shutters shall be in one piece only. Styles and rails shall be jointed to each other by tonen or mortice at right angles. Mountings and glazing bars shall have joints and shall be shrub tanned to the maximum depth, which the size of member would permit.
6. **Wire gauge shutters:** Provisioning and fixing of wire 35mm thick gauge shutters to all external doors including main entrance door and all openable windows is in the scope of work of this contract. Wire cloth shall be securely housed in rebates by giving a right angled bend and fixing by means of suitable staples at intervals of 75mm. Over this wooden bead of specified size shall be fixed with nails, or screws, where indicated to cover the rebate fully. The space between the beading and the rebate shall be filled with putty to give it a neat finish. Exposed edges of the beads shall be rounded.

7. Door and windows shutters shall be provided as per details shown on the drawings.

8. The bottom of door shutters shall be 5mm above the finished floor level.

9. The glass panes shall be free from flaws, specks or bubbles and shall have square corners and straight edges. The glass panes shall be so cut that it fits slightly loose in the frames. The glass pane shall be fixed to the shutter with first class hardwood beading of size as indicated properly screwed to the shutter with steel nails and necessary adhesive as per details as shown on drawings.

10. Glazing to windows/doors shutters shall be as follows of quality as approved by Project Engineer &Architect.

(a)	Fan light of Doors shutters	:	4 mm thick plain sheet glass.
(b)	Door Shutters fully glazed	:	5.5mm thick plain sheet glass.
(c)	Windows (openable & fixed) except for toilets:		4 mm thick plain sheet glass.
(d)	Windows openable and fixed of toilets	:	4 mm thick pin head glass.

NOTE: On all toilet door shutters, aluminum sheet 18 gauge bent to U shape shall be provided at the bottom of the flush shutters. This sheet shall be upto 30cm height on the inner face of the shutters and upto 20cmheight on the outer face of the shutters. This shall be fixed with 12mm steel Nails.

Section – V - Aluminium Doors, Windows & Ventilators.

1. The Aluminium extruded sections shall conform to Designation 63400 given in IS 737-1986 and shall be of manufacturers such as JINDAL or Hindalco or INDAL or equivalent manufacturers to be approved by the Architect/ Site Engineer.

2. The Aluminium Doors, Windows, Ventilators and Glazing sections shall be anodized (anodic coating shall conform to IS 1868) as per colour approved by the Architect and Site Engineer.

3. The fabrication shall be carried out having mechanical joints, accurately machined and fitted to form hair-line joints, with the vertical and horizontal sections at the corners to meet in 45 degrees mitered. The jointing shall be either with accessories such as cleats and cleating screws or by crimping with Hydraulics Press on to heavy duty extruded Aluminium cleats. The relevant arrangement shall be got approved by the Architects. The Glazing shall be fabricated and anchored to withstand wind pressures as per the Indian Standards.
4. Before proceeding with any manufacture, Shop Drawings for each typical elevation shall be submitted for the approval of the Architect and no work shall be performed until the approval of the shop Drawings is obtained.
5. All Glazing shall be airtight and watertight, using appropriate extruded EPDM gaskets/as manufactured by Anand Lescuyer Pvt.Ltd., or equivalent; and sealant which shall be of high quality and performance requirements.

6. Each Glazing shall be tailor-made as per openings at Site.No cutting and making good of exposed grit wash plaster surfaces shall be permitted.

7. All the Aluminium sections shall be wrapped with self-adhesive non-staining thick layer of PVC tapes as Manufactured by M/s.Bhor Industries or equivalent as approved by the Architects, and shall be duly packed for avoiding scratches or blemishes to the powder coated surface of the sections till the installation is completed.

8. The frames shall be fixed to concrete/masonry /brick work with dash fasteners and the method of fixing shall be got approved by the Architects before installation. The drilling of holes for inserting the dash fasteners shall be carried out with drilling machines and the frame shall be fixed in plumb, line and level at jambs, sills and heads.

9. The perimeter gap between the outer frame and the masonry shall be sealed with poly sulphide sealant as per the make approved by the Architect.

10. **Glazing:** The glass panes shall be free from flaws, specks or bubbles and shall have square corners and straight edges. The glass panes shall be so cut that it fits slightly loose in the frames. The glass pane shall be fixed to the shutter with Aluminium beading and E. P.D.M gasket properly shaped as per the drawing. The glass panes shall be of make as specified.

SECTION VI - BUILDERS HARDWARE

1. Manger shall be provided to all doors/windows/ventilator/shutters with necessary matching screws of suitable size

2. Fittings and fixtures to all doors window and ventilators etc. shall be Aluminum anodized Matt finish ISI marked of make as specified.These shall be ISI marked where manufacturer contractor shall obtain the approval of the name of the manufacturer and brand of fittings from page of Director/Architect before placing the supply order. While asking for the approved copy of bureau of Indian Standard letter under which the manufacturer has been issued the license and authorized to make the items of builder hardware with ISI marking should be attached and one sample of each fillings of the particular brand duly ISI marked shall be given by contractor.

3. Butt hinges for doors shall be ISI marked cold rolled mild steel heavy quality of size as specified with mild steel pin and shall be oxidized finish. These shall be welded to pressed steel frames as specified.

4. Handles for window shutters shall be 75mm long & door shutters shall be 125 mm D-Type Aluminum anodized.

5. Link chain and sliding channel shall be sturdy of CP brass and shall be provided to main entrance door of all units as specified.
6. Magic eye for entrance door shall be wide-angle best quality.This shall be fixed at 1400mm height from finished floor level.

7. One sample piece of each fitting shall be produced for approval of Site Engineer /Architect. The bulk supply order shall be placed by the contractor only after approval is accorded by Site Engineer/Architect.

Schedule of Builder's Hardware: Schedule of Hardwares/fittings to door,window and ventilator shutters shall be as per drawing.

9. **Mortice Latch (Vertical Type):** Mortice latch (Vertical type) shall confirm to IS 5930-1970. Specification for mortice latch (Vertical type).These latches shall be capable of being operated inside and outside and shall be provided with a pair of Aluminium anodized lever handle fitted on the handle plate in order to close the door.The latches shall be of brass alloy. Faceplate shall be provided in front of the ease plate, size of latch shall be 65mm.

10. **Mortice Locks:** These shall conform to IS 2209-1976. Specification for Mortice locks (Vertical Type). These shall have body, body covers, cast plate, faceplate, skirting plate lever, follower of cast brass and locking bolt and latch bolt extruded brass. Lever spring and latch spring shall be of phosphor bronze. The locks shall be supplied with 2 Nos. stainless steel keys. Locks shall be 6 lever. The lock shall be easy working with lever and shall be capable of being opened with from both inside and outside and shall be provided with a paid of Aluminium anodized lever handles on the handle plate in order to close the door from both side.

11. Hydraulic Door Closer (Floor Type) : The Contractor shall provide double acting Hydraulic Door Closer model No.F-32, Cat No.1204 with SS Plate, Capacity to carry door weight upto 380Kg of EVERITE brand or Cat No.OFS 9621 of OPEL brand. These shall be of approved brand and manufacturer as above (Confirming to IS-6315) for Aluminium door including cost of cutting floor as required, embedding in floors and cover plate etc.

NOTE:

i) It shall insure that all builder's hardware are from one manufacturers only for the entire work, However, if due to any reason contractor progress to provide part quantity from other manufacturer approved in Para 2 above, then he may be permitted but he will have to obtain specific approval of Project Engineer/Architect for this change in brand. This will be subject to that all items and fixtures in any particular blocks shall be always of one manufacturer only. In no circumstances items of two manufacturers shall be used in all of the particular blocks.

ii) Project Engineer before giving the approval of the name of the manufacturer and brand shall ensure that the validity date of license for making the fittings, as ISI marked has not expired.

iii) Those fittings which are not manufactured, as ISI marked shall also be of the one brand of which the ISI marked fittings are approved by Project Manager.

SECTION VII: CERAMIC WALL AND FLOOR TILING

SCOPE OF WORK

The tiles will be selected by the owner and the cost of tiles delivered at site will be adjusted against the allowance for this item provided in the contract documents.
The scope of work under this specification section covers the unloading of materials at site, storage and safekeeping, furnishing of all other materials, accessories, labour, tools, equipment and the installation of tiles.

RELATED WORK SPECIFIED ELSEWHERE

Stone masonry
Burnt clay brick masonry
Cast-in place Portland Cement concrete
Lath and plaster
Structural wood work

QUALITY CONTROL

The tiling shall be carried out under the direct supervision of an experienced tiller foreman who shall continuously check the work of the tiling teams to ensure stringent quality control.

COORDINATION WITH OTHER TRADES AND CONTRACTORS

The tiling work shall be coordinated with other trades and contractors. The contractor shall check and ensure that all work preceding tiling is complete before commencing the work

PROTECTION

Protect other finished work during tiling work to prevent damage and protect the finished tiling work from any damage after completion.

FLOOR AND WALL TILING AND PAVING

SCOPE OF WORK

This section covers the furnishing of all materials (other that those supplied at site by the owner) equipment and labour for floor and wall tiling and paving including but not limited to:
Marble to floors and walls
Polished granite to floor and walls
Granolithic flooring with surface hardener
Cast-in-place Portland cement concrete pavement –external.
Polished granite and marble steps & risers
The owner will provide at site the following material against allowances in the contract documents:
Marble for floors and walls cut to sizes as determined by the contractor according to site conditions.

RELATED WORK SPECIFIED ELSEWHERE

Cast-in place Portland cement concrete
Ceramic wall and floor tiles
Stone masonry

TILES
The tiles will be selected by the owner and the cost of tiles delivered at site will be adjusted against the allowance for this item provided in the contract documents

The contractor shall order take delivery and arrange for the transportation of the tiles to the site from the suppliers nominated by the owner. Costs for ordering, transportation etc. upto delivery at site will be adjusted against the allowance.

EXECUTION

LAYOUT OF TILES

Plan the layout of tiles on all continuous surfaces to ensure that:
The horizontal joints of tiles on walls are all in line.

The layout of tile pattern is in accordance with the design intent.
As far as practicable, jambs, sills and heads of windows, doors and other opening correspondent to tile joints.
Cut tiles will not be less than half tile.
At external corners the tiles may be joined with 45 degree mitered joints.
When required, floor and wall tile joints are aligned.
When floor tiles continue through adjacent rooms the joints are continuous.
At jambs, sills and heads of windows, doors and other openings the finished surface of tiles should match the construction details of the windows and doors and other openings.

PREPARATORY WORK FOR LAYING TILES OVER MASONRY OR CONCRETE

Ensure that all sub-surface installation is in place,tested and approved.Plan ahead, in coordination with all trades involved, so that the requirements of the checklist will be met.
Roughen concrete surfaces, wet the surface and apply a bond coat of rich cement-sand slurry.

Wet masonry surfaces.

Apply a leveling coat of cement or cement lime plaster as specified for plastering in a single coat to a minimum thickness of 15mm and score the surface as a bond for subsequent application. Allow the surface to set and proceed with the application of tiles.

QUALITY CONTROL

The contractor shall be responsible for the quality of materials supplied by him and all workmanship. The work shall be executed under the direct supervision of competent foreman and the quality control staff of the contractor. All defective work shall be replaced by the contractor.

COORDINATION WITH OTHER TRADES AND CONTRACTORS

The contractor shall schedule and coordinate the work under this specification with other trades and contractors to prevent avoidable cutting and patching after installation.

MATERIALS AND PRODUCTS

MARBLE

The marble slabs for use in flooring shall be un-polished 3.4” uniformly thick slabs selected by the owner / architect against the allowance in the contract documents. The sum allowed in the contract shall be inclusive of taxes for delivery within the municipal limits of Mumbai.
The marble slabs for use in wall cladding shall be tin-oxide polished ¾” uniformly thick slabs selected by the owner / architect against the allowance in the contract documents. The sum allowed in the contract shall be inclusive of taxes for delivery within the municipal limits of Mumbai.

The contractor shall place orders and take delivery from the owners nominated supplier and arrange for the transportation and delivery to site. All costs for ordering, taking delivery and transportation from within the municipal limits of Mumbai to the site shall be adjusted against the contractors rate outside the allowance in the contract.
The contractor shall cut the basic slabs to the sizes and shapes required.

POLISHED GRANITE TILES AND SLABS

The granite tiles and slabs for use in flooring shall be polished ½" or ¾" uniformly thick slabs selected by the owner / architect against the allowance in the contract documents. The sum allowed in the contract shall be inclusive of taxes for delivery within the municipal limits of Mumbai.
The granite slabs for use in wall cladding shall be polished ¾" uniformly thick slabs selected by the owner / architect against the allowance in the contract documents. The sum allowed in the contract shall be inclusive of taxes for delivery within the municipal limits of Mumbai.
The contractor shall place orders and take delivery from the owners nominated suppliers and arrange for the transportation and delivery to site. All costs for ordering, taking delivery and transportation from within the municipal limits of Mumbai to the site shall be adjusted, against the contractors rate outside the allowance in the contract.

The contractor shall cut the basic tiles and slabs to the sizes and shapes required.

GRANOLITHIC FLOORING

Cement shall be ordinary Portland cement.
Coarse and fine aggregate shall be clean washed quartz of grading between 6mm and 100 microns.
Water shall be clean potable water free of salts, organic, mineral or other deleterious material.
Surface hardener and sealer shall be of an approved manufacturer specializing in the manufacture of concrete additives and treatment materials,

CAST-IN-PLACE PORTLAND AND CEMENT CONCRETE PAVEMENT

Concrete shall be as specified in the specifications in the specification section titled 'CAST-IN-PLACE PORTLAND CEMENT CONCRETE'.

Steel reinforcement shall be as specified in the specification section titled 'CONCRETE REINFORCEMENT'.
SETTING BED FOR FIXING TILES AND SLABS

Setting bed for fixing tiles and slabs shall be cement / sand mortar as specified in specification section titled 'STONE MASONRY'
JOINT GROUT
Joint grout shall be finely ground marble dust mixed with White Portland Cement and colour pigment to match colour of tile or as directed by the architect.

CUSHIONING

Cushioning below setting bed shall be clean river sand.

EXECUTION

CONSTRUCTION AND EXPANSION JOINTS
Floors shall be laid with construction joints cut through the setting bed to the base at regular intervals in every third joint in both directions.
Expansion joints shall be provided at intervals varying between 5 meters to 6 meters directions as indicated on drawings or instructed by the architect on site.

Granolithic and cast-in-place concrete paving shall be installed in preplanned alternatively bays of approx 4 meters x 4 meters as indicated on drawing or instructed by the architect at site.
Expansion joints shall be filled with a flexible joint grout and finished neatly.

INSTALLATION OF MARBLE FLOORS

Install as per details given on drawings.
Spread sand cushion to obtain the required slopes and lightly moisten by sprinkler water.
Install the setting bed of cement / sand mortar to an even thickness and dab on a thin coating of neat cement paste.
Place the pre-soaked title and firmly tamp into position with a wooden mallet, level the surface with respect to the adjacent tiles and the required finish level. Adjust joint thickness by means of spacers. Cut through setting bed, to bed at construction joints as previously explained.
Clean off excess cement paste from joints as required for grouting.
Trim tiles to suit junctions with walls and other trimming lines.
After the setting bed has reached final set, clean the surface with a damp cloth without excess water. Rake and clean joints in preparation for grouting.
Grout the joints with thick slurry of a grouting and ensure that the joints (except expansion joints) are filled completely with grout.
Cure the installation with clean water by ponding for a period of 7 days.
After the grout has been cured and hardened; commence grinding of the surface, to level out all unevenness of joints. Use a mechanically operated rotary grinder polishing machine using abrasive stones of appropriate grade.
After the surface has been ground level, clean the surface by flushing with water two or three times to clean the surface of all grinding slurry. When excess water has dried off and the surface is in a moist conditions, reapply grout, rub into the entire surface and build up an even thickness throughout. Cure for minimum period of four days by ponding.
After the grout has hardened, polish the surface with a mechanically operated rotary grinder / polisher using finer abrasive stones until the surface is smooth and even, to receive sealer and polish. During the final grinding operation, sprinkle the surface lightly with powdered oxalic acid crystals to remove minor score and scratch marks. Clean of all traces of acid by through flushing with water.
Project the floor from on-going construction activities until final sealing and polishing.
Prior to substantial completion and handling over, apply an approved sealer and then polish and buff the surface to a fine sheen using a silicon wax polish.
Tolerance: The finished surface when tested with a 3 meter long straight edge placed anywhere in any direction shall not show a gap of more than 3mm. Provided that no abrupt differences are discernible.

INSTALLATION OF POLISHED GRANITE FLOORS

The flooring shall be from pre-polished granite tiles or slabs cut to size and shape required with their edges ground smooth.
Spread sand cushion to obtain the required slopes and lightly moisten by sprinkling water.

Install the setting bed of cement / sand mortar to an even thickness and dab on a thin coating of neat cement paste.
Place the pre-soaked title and firmly tamp into position with a wooden mallet, level the surface with respect to the adjacent tiles and the required finish level. Adjust joint thickness by means of spacers. Cut through setting bed, to bed at construction joints as previously explained.
Clean off excess cement paste from joints as required for grouting.
Trim tiles to suit junctions with walls and other trimming lines.
After the setting bed has reached final set, clean the surface with a damp cloth without excess water. Rake and clean joints in preparation for grouting.
Grout the joints with a thick slurry of the grouting mix and ensure that the joints (except expansion joints) are filled completely with grout. After the grout has dried, thoroughly clean the surface to remove all traces of grout from the surfaces.
Project the floor from on-going construction activities until final sealing and polishing.
Prior to substantial completion and handling over, apply an approved sealer and then polish and buff the surface to a fine sheen using a silicon wax polish.
Tolerance : The finished surface when tested with a 3 meter long straight edge placed anywhere in any direction shall not show a gap of more than 3mm, provided that no abrupt differences are discernible.

INSTALLATION OF POLISHED MARBLE AND KOTAH STONE WALL CLADDING

The cladding shall be form pre-polished marble or granite slabs cut to the size and shape required with their edges ground smooth.
Cladding shall be installed using dabs of neat cement paste behind the cladding.
Align surfaces and joints accurately using temporary plaster of paris dabs to keep tiles or slabs in place till the setting dabs are fully set and hardened. Grout the voids behind the tile with cement / sand slurry. When the slurry has set, remove the excess slurry and plaster of paris dabs and clean the surface and lightly rake the joints in preparation for grouting.
Grout the joints and point to a neat finish and thoroughly clean the surface to remove all traces of grout from the tile surfaces.
Apply surface sealer and polish prior to handover.

INSTALLATION OF GRANOLITHIC FLOORING

The installation of granolithic flooring shall generally be in according with the specification section titled 'CAST-IN-PLACE PORTLAND CEMENT'
The finish shall be unformed finish type U3.
The surface hardener and sealer shall be applied in accordance with the manufacturers specifications.

PROTECTION AND CLEANING

All work covered by this specification shall be protected after installation and handed over in good condition after thorough cleaning.

SECTION – VIII- WALL FINISHES

1. **General**

a) **Scope:** This section shall cover internal and external plastering/rendering works as shown in the drawings.

b) **Mortar:** The mortar of specified mix shall be used.

c) **Scaffolding:** Stage scaffolding shall be provided for plastering work as per standard practice and as directed by Architect/Site Engineer. This shall be independent of the walls.

d) **Preparation of Surfaces:** Joints of brickwork wall s hall be raked-out properly.Dust and loose mortar shall be brushed out. Efflorescence if any shall be removed by brushing and scraping, shuttering imperfections of all concrete shall be roughened by hacking with chisel and all resulting dust and loose particles cleansed and the surface shall be thoroughly hacked or bush hammered to the satisfaction of Architect/Project Engineer.The surface shall be thoroughly washed with water, cleaned and kept wet before plastering is commenced.

e) **Approval of Architect/Project Engineer to be taken:** No plastering work shall be started before all conduits, pipes fittings and fixtures clamps, hooks etc.are embedded, grouted and cured and all defects removed to the satisfaction of Architect/Project Engineer. Special approval shall be taken from Architect/Project Engineer before starting each plastering work. No cutting of finished plaster shall be allowed. No portion shall be left out initially to be patched up later on.

f) **Mixing:** The ingredients shall be mixed in specified proportions by volume. The mixing shall be done in a mechanical mixer on water-tight platform. The cement and sand shall first be mixed thoroughly dry in the mixer. Water shall then be added gradually and wet mixing continued for at least a minute until mortar attains the consistency of a stiff paste and uniform colour. Mortar shall be used within 30 minutes of addition of water. Mortar which has partially set shall not be used and removed from the site immediately.

2. **Internal Surfaces**

i) Plastering shall be started after the completion of ceiling plaster from top and gradually worked down towards floor.

It shall not, at any place be thinner than as specified. To ensure even thickness and a true surface plaster of about 15cm x 15 cm shall be first applied horizontally and vertically at not more than 2m interval over the entire surface to serve as gauges. The mortar shall then be applied to the wall/surface between the gauges and finished even. All corner junctions and rounding shall be truly vertical or horizontal and finished carefully. Inspecting the work at the end of the day plaster shall be cut clean to line, where recommencing the plastering, edge of old work shall be crapped, cleaned and wetted with cement putty before restarting plastering

ii) Cement plastering internally on all internal surfaces including soffits of RCC slabs, chajjas, lintels, alround shelves, inner side of parapets and alround of parabolas etc. shall be as shown on drawing. Wherever not shown it shall be as under:-

(a) 12mm thick plaster in cement mortar 1:6 (1 cement: 6 parts 75%: fine sand & 25% coarse sand) mixed with 10% of lime water over brick and concrete surfaces. Dubbing out wherever required (i.e. bringing up the undulation on the rough face of brick work in level with proudest points) shall also be executed in the same mix along with rendering coat.

(b) 6 thick plaster in cement mortar 1:3 (1 cement: 3 fine sand) on soffits of RCC slabs, chajjas, lintels and kitchen platforms and alround of shelves and para golas.

(c) 10mm x 6mm grooves shall be provided in ceiling plaster at junction of wall and ceiling.

(d) 12mm thick plaster in cement mortar 1:4 (1cement: 4 parts 75% fine sand & 25% coarse sand) mixed with water proofing compound CICO-1 (liquid) as per manufacturer's instruction to be done on the inside face of the book shelves and cupboards.

(e) 15mm thick plaster in cement mortar 1:4 (1 Cement: 4coarse sand) mixed with water proofing compound CICO-1(liquid) as per manufacturer's instruction to be done on the internal surfaces of parapet walls including dubbing wherever required.

(f) Before plastering it should be ensured that brick masonary joints are raked out (at least on even surfaces) to a depth of 12mm and all concrete surfaces are rough enough for proper adhesion of plaster. If not they shall be made rough by hacking or bush hammering at intervals of 2". Efflorescence if any and dust/dirt shall be removed.The surfaces shall be wetted adequately before plastering.

(g) G.I. Chicken wire mesh of 24 gauge and 20mm mesh shall be fixed all along RCC Surface adjoining brick work given 150mm lapping on either side of the junction in double fold or as called for using nails etc and cement slurry before plastering. Ensuring equal thickness of plaster on both sides of the mesh.

(h) Sand used in plaster shall be within the grading zones as stipulated in the IS silt contents shall not exceed 4% by weight. Brick surface shall be raked out at the end of day brick work to afford key to plaster. Plaster surface shall be hard and even without patchy appearance. If they flake or show scratch marks if rubbed by appointed nail the plaster shall be rejected, dislodged and redone.

SECTION – IX - WHITE WASH, DISTEMPER AND PAINTING

GENERAL

SCOPE OF WORK

Work Included: This section covers the surface preparation, field priming and field painting or finish coating of all wood, plaster, concrete and metal surface, (both interior and exterior) as called for in the finish schedule. In addition, all surface, schedule or not, such as piping, tanks, equipment and machinery shall be painted when called for in the finish schedule or in their respective section of these specifications. Contractor shall finish all labour materials, tools and

equipment required to complete the work.
Surface not to be painted: The following surface shall not be painted stainless steel, aluminum, brose, copper, lead, brass, factory pre-finished surfaces and installed surfaces. In addition surface of steel member which ate to have concrete cast against them or are to be fully embedded in concrete shall be pointed.
Shop primed Equipment: Final field painting or touch-up of manufacturer's shop primed or shop painted equipment shall not be done until operational testing has been complete and certified.

RELATED WORK SPECIFIED ELSEWHERE

Quality Control
Structural Steel
Lath and Plaster
Architectural woodwork
Cast-in-place Portland Cement concrete.
MOCK-UPS

In addition to the requirement for submitting colour samples, the contractor shall, prior to proceeding with paint application, provide mock-up or field samples, for each substrate to be painted. The mock-ups or field samples shall be painted to demonstrate method of application, finish texture, colour and quality of workmanship. The size and location of the mock-up or field samples shall be determined by the architect.

PRODUCTS

ACCEPTABLE MANUFACTURES
All coating material (paints) shall be furnished be a manufacture, regularly engaged in the manufacture of coatings shall be the manufacturer's best-grade for the intended substrate.

MATERIALS
Coating materials are listed herein by generic type (vehicle) for various substrates. A1 materials proposed will be subject to review and acceptance by the architect.

Coating accessory materials such as linseed oil, shellac, turpentine and other materials not specifically indicated herein but required to achieve the finished specified shall be of high quality and as far as possible from the manufacturer of the coating material.
Coating shall be ready-mixed, expect for field-catalyzed coatings. Pigments shall be fully ground maintaining a soft past consistency, capable of being readily and uniformly dispersed to a complete homogeneous mixture for brush, roller or airless spray application, as recommended by the manufacturer.
Coating shall have good flowing properties and be capable or drying or cutting free of streaks, runs or sags.
Colours, texture and degree of gloss shall be as shown on the finish schedule. Tint, prime and intermediate coats shall be approximately to the shade of the final coat but with sufficient variation to distinguish them from the preceding coat. Use products of the same manufacturer for succeeding coats. Where red lead primer is used, subsequent coats may be the produce of another manufacturer.
If ferrous metals are shop primed, the contractor shall make every effort to determine the type of primer used. If this is not possible or the primer is not compatible with the proposed finish coat as recommended by the coating manufacturer may be required prior to application of finish coat
PAINTS SELECTION GUIDE

Exterior Surface	
Ferrous Metals (unprimed)	
First Coat	Organic Zinc rich primer
Top Coat	Chlorinated Rubber
Ferrous Metals (Unprimed)	
First coat	Chlorinated rubber Modified Alkyd.
Second Coat	Acrylic Epoxy Enamel
Top Coats	Acrylic Epoxy Enamel

Concrete

First Coat	Acrylic primer/ Sealer.
Second Coat	Acrylic or Vinyl Emulsion
Third Coat	Acrylic or Vinyl Emulsion
Top Coats	Acrylic or Vinyl Emulsion

Cement Plaster

First Coat	Acrylic Latex.
Second Coat	Acrylic Latex.
Top Coats	Acrylic Latex.

Wood Designated Painting.

First Coat	Alkyd Primer
Second	Alkyd Enamel.
Top Coats	Alkyd Enamel.

Galvanized Steel:

First Coat	(Where not passivating coat as recommended by coating shop Bonderized) manufacture followed by a Zinc chromate Primer
First Coat	(Where Galvanized Iron primer Bonderised)
Second Coat	Alkyd Enamel.
Top Coats	Alkyd Enamel.

Interior Surfaces.

Ferrous metals (Unprimed)

First Coat	Red Oxide Primer
Second Coat	Alkyd Enamel
Top Coats	Alkyd Enamel.

Concrete:

First Coat	Acrylic primer/Sealer
Second Coat	Acrylic or Vinyl Emulsion.
Top Coats	Acrylic or Vinyl Emulsion

Gypsum Plaster :

First Coat	Latex Sealer.
Second Coat	Acrylic Latex.
Top Coats	Acrylic Latex.

Cement or Cement lime Plaster

First Coat	Alkali resistant primer.
Second Coat	Acrylic Latex.
Top Coats	Acrylic Latex.

Gypsum Board :

First Coat	Acrylic primer / Sealer (Note required on Moisture resistant board)
Second Coat	Acrylic or Vinyl Emulsion.
Top Coat	Acrylic or Vinyl Emulsion.

Wood Designated for painting :

First Coat	Alkyd primer

Second Coat	Alkyd Enamel.
Top Coats	Alkyd Enamel.

Wood designated for staining and polishing:

First Coat	Alkyd standing Sealer
Second Coat	Modified Polyurethane.
Top Coats	Modified Polyurethane.

Galvanized Steel :

First coat	(Where passivating Coat as recommended by Manufacture followed by a Zinc)
First Coat	(Where Galvanized iron primer Bonderized)
Top Coats	Alkyd Enamel.

SECTION – X - INTERNAL PLUMBING WORK (INTERNAL WATER SUPPLY PLUMBING INTERNAL DRAINAGE)

GENERAL

1.1. The form of Contract shall be according to the "Conditions of Contract". The following clauses shall be considered as an extension and not in limitation of the obligation of the Contractor

1.2. Work under this contract shall consist of furnishing all labour, materials, equipment and appliances necessary and required. The Contractor is required to completely furnish all the plumbing and other specialized services as described hereinafter and as specified in the schedule of quantities and /or shown on the plumbing drawings.

2. Scope of internal water supply, plumbing, internal sewerage and drainage shall consist of providing and fixing of the following for each units of each unit blocks/other buildings as shown on drawings.

3. The entire work shall be carried out by licensed plumbers

(a) CPVC/UPVC/GI pipe with fittings and valves for cold and hot water supply.
(b) Sanitary fixtures, CP fittings and accessories.
(c) Soil, waste, vent, rain water pipes and fittings
(d) Overhead water tank at Terrace with supports.
(e) Internal Drainage including gully traps.

4. **Water supply.**

(a) All GI/CPVC/UPVC pipes and fittings from over head tank to all taps, wall mixers, wash basins, cisterns, sinks, geyser points, washing machine and showers as shown on drawings.
(b) Provision of hot and cold water supply lines in all toilets and kitchen.

5. **MATERIALS**

6. All GI pipes shall be galvanized steel tubes medium grade conforming to IS-1239 and ISI marked of makes Jindal Hissar/Prakash. All CPVC/UPVC pipes shall conform to the relevant IS standards.
7. All GI fittings shall be conforming to IS-1879 and ISI marked.
8. Valve shall be heavy Gun metal full way confirming to IS-778-1971 class I and ISI marked.

LAYING, FIXING AND FITTINGS OF GI PIPES

9. All GI pipes below ground shall be laid in trenches and shall have minimum cover of 600mm.
10. The runs of the pipes shall be straight and pipes shall not run diagonally. Proper bends, elbows, tees at turnings/corners shall be used.

11. All pipes with necessary fittings wherever they are laid on internal faces of the walls shall be concealed in chase. On external faces they will be laid on walls fixed with clamps or on M.S. angle iron brackets as shown in drawings.
12. In the concealed portion of plumbing no joints shall be provided in the pipe lines except in the fittings i.e., bends, elbows, tees and nipples where required.
13. All pipes for water supply (Hot or cold) within toilets and kitchen shall be laid on walls only. No pipe shall be laid in sunken portion of toilets/kitchen.
14. For each unit the size of down comers, branch pipes from the ring (at terrace) from over head tank and branch pipes from down comers shall be of sizes as shown on drawing.
15. Pipes and fittings shall be jointed with screwed fittings, care shall be taken to remove burrs from the end of the pipe after cutting by a round file. Genuine white/red lead and a few strands of cotton thread shall be applied. All pipes shall be fixed in accordance with layout shown on the drawings. Care shall be taken to avoid air pockets. Pipes inside toilets shall be fixed in wall chases at least 30cm above the floor.
16. Pipes in shafts and other locations shall be supported by clamps of design as indicated in the typical detail. Pipes in wall chases shall be anchored by iron hooks.
17. **Unions:** Contractor shall provide adequate number of unions on all pipes to enable dismantling later. Unions shall be provided near each gun metal valve, stop cock, or check valve and on straight runs as necessary at appropriate locations.
18. **Puddle Flanges:** Puddle flanges shall be provided to all connection i.e. inlet overflow, and scour of the over head tank wherever required.
19. **Pipe Protection:** All pipes in chase or under floors or below ground shall be protected against corrosion by applying two coats of bitumen paint, covered with polythene tape and finished with a final coat of bitumen paint.
20. **Painting:** All exposed pipes shall be painted with two coats of oil paint over one coat of primer. Pipes shall be painted to standard colour code as approved by Project Engineer/Architect.
21. **Over Head Tanks**

a. The tanks shall be of molded HDPE and shall be one of the following make.

i) Unitank, ii) Polycon iii) Sintex

b. These tanks shall be located on the roof terrace as shown on drawing. Placed on supports as per details shown on drawings.

c. Each over head water tank shall be complete with the following.

(i) Lid and cover with locking arrangement.

(ii) Inlet, outlet, over flow (25mm), scour pipe (20mm) and Air vent pipe with all fittings.

(iii) Mosquito proof coupling shall be provided to overflow and air vent pipes.

(iv) The inlet pipe to the over head tank shall be provided with ISI marked 25mm brass body ball valve with polythene ball.

(v) The inlet pipe to the over head tank shall be provided with 25mm ISI marked full way gunmetal brass valve and each outlet pipe shall be provided with ISI marked full way gunmetal valve of size of outlet pipe.

(vi) The over flow pipes shall be brought down up to the finished terrace level and laid up to nearest khurra on terrace.

d. The water tank will rest over 100 mm thick RCC 1:2:4 (1 cement:2 coarse sand:4 graded stone aggregate 20mm nominal size) platform with nominal reinforcement of 8mm dia 6"c/c both ways, supported over ISMBs resting on brick wall supports over terrace and finished with cement plaster 1:6 all around as shown in drawings.

22. Vent pipes: Each down take pipe shall be provided with a vent pipe. The height of the vent pipe shall be 150mm above the top of the water tank.

23. **Testing of pipes :**

a) All pipe lines shall be tested hydraulically to pressure of 7 kg/Sq.cm for a minimum period of 24 hours for check for leakage.

b) The pipe line in chase or under floors/ground shall be covered up only after the testing is carried out satisfactorily and passed by Architect/Site Engineer.

c) The instrument, equipment and water for testing shall be arranged by the contractor without extra charges. (i.e. Hydraulic testing machine with pressure gauge)

d) A test register shall be maintained by the Site Engineer and all entries shall be signed and dated by contractor, Architect and Site Engineer.

24. **Insulation**: 24 Hot water lines in chases shall be provided with 20 mm thick insulation by wrapping 6 mm dia asbestos rope and finishing with a coat of 85% magnesia.

25. **Approval of layout of pipes and position of fixtures at site:** The contractor shall mark the location of all fixtures and fittings and layout of GI pipes on the terrace walls/ ground at site and take approval of Site Engineer/Architect before commencement of cutting chases for GI pipes within the building and digging trenches outside the building.

25. Sanitary Fixture and CP Fittings and Accessories

All sanitary ware shall be first quality white-vitreous china and shall be inclusive of all fixing devices nuts, bolts and hangers/Brackets.

These shall be from one of the following manufactures:-

(a) Hindustan Sanitary Ware
(b) Parry Ware
(c) CERA (Madhu Sudan Ceramics)
(d) NEYCER Ceramic

26. It will be ensured that all sanitary fixtures are from one manufacturer only for the entire work i.e. for all the units. However, if due to any reason contractor proposes to provide part quantity from other manufacturer as approved above, then he may be permitted, but he will have to obtain specific approval of Site Engineer/Architect for this change in brand. This will be subject to that all items and fixtures in any particular block/other buildings shall be always of one manufacturer only. In no circumstances items of two manufacturers shall be used in all of the toilets of particular block/other buildings.
27. **Kitchen sink and draining Board**: Kitchen sink and draining boards shall be of stainless steel (Salem stainless steel ISI-304) 1.0mm thick. The sink and draining board shall be in one piece of following sizes with rectangular compartment/bowl. Each sink shall be provided with one CP brass waste and PVC waste pipe.

Overall size (LxW)	=	1060x510mm
Bowl size (LxWxD)	=	500x400x200mm

28. The Stainless steel sink and draining board shall be of one of the following makes:-
    (a) NIRALI.
29. Kitchen Sink shall be supported on RCC/ Kadappah platform having suitable cut for the bowl of the sink as per the details shown on the drawings.
30. All bib cocks, stop cocks, angle-valves, pillar taps, mixtures, showers rose & arm, bottle traps, CP waster and inlet connections and other minor fittings shall be brass chromium plated. These shall be ISI marked where manufactured. Contractor shall obtain the approval of the name of the manufacturer and brand of CP brass fittings from Site Engineer/Architect before placing the supply order. While asking for the approval, copy of the Bureau of Indian Standard letter under which the manufacturer has been issued the license and authorized to mark the five items of CP brass fittings as listed in hereinafter below with ISI marking should be attached and one sample of each fittings of the particular brand duly ISI marked shall be given by contractor. The fittings shall be of CONTINENTAL range from Jaguar Make.
31. Project Engineer before giving the approval of the name of the manufacturer and brand shall ensure that the validity date of license for marking the fittings as ISI marked has not expired.
32. Those CP brass fittings which are not manufactured as ISI marked shall also be of the same brand of which the ISI marked CP brass fittings are approved by Site Engineer as per para above.
33. It will be ensured that all CP fittings are from one manufacturer only for the entire work i.e. for all units in D'unit blocks/other buildings. However, if due to any reason contractor proposes to provide part of quantity from other manufacturer approved in para hereinafter then he may be permitted, but he will have to obtain specific approval of Site Engineer/Architect for this change in the brand. This will be subject to that all items and fittings in any particular block/other buildings shall be always of one manufacturer only. In no circumstances items of two manufacturers shall be used in any of the toilets of particular block/other buildings.
34. All chromium plated brass fittings and accessories shall be provided with CP cast brass wall flanges.
35. For fixing of CP brass fittings wherever required CP brass extension pieces shall be provided.
36. Fixing screws shall be half round head chromium plated brass screws with CP washers.
37. All exposed pipes, if any, within the toilets and near the fixtures shall be chromium plated brass except otherwise specified.

Schedule of Sanitary and CP Brass fittings in all buildings shall be as under:-

(a) Kitchen
(i) Stainless steel Sink with drain board
(ii) CP Brass waste
(iii) Sink Mixer
(iv) GI Waste pipe 40mm dia from CP Waste to floor drain grating

(b) Toilets: - All vitreous china sanitary wares shall be "white". The fittings and fixtures in toilets of each unit shall be as under:-

(A) Wash Hand Basin

(i) Vitreous china first quality wash basin 550 x 400mm wall mounting type on MS Angle brackets.
(ii) Same as above but Oval Shape under counter WB.
(i) CP Brass waste 32mm dia with over flow
(ii) CP Brass bottle trap with CP brass pipe to wall with CP cast brass wall flange
(iii) Brass pillar taps 15mm
(iv) CP Brass Basin Mixer
(v) CP Brass angle valves with CP copper
(vii) Connecting pipes with nuts and washers.
(viii) CPVC waste pipe 32 mm dia

Note: Outlet of CP brass bottle trap shall be connected to nearest floor trap by GI waste pipe (concealed) as per details shown on drawings

(B) Water Closets and Cisterns

(1.) European type white vitreous china ware and cistern with S-trap without vent horn
(2.) White10.00 Litre capacity low level HIP flushing cistern water bird "COMMANDER MODEL"ISI marked complete with Delrin valve and float, fittings and specials of standard make & 40mm white flush bend, over flow with mosquito proof coupling, all washers and rubber bed etc. complete including fixing accessories
(3.) CP brass angle valve with CP copper connecting pipe with nut and washer
(4.) Bakelite solid type seat and cover ISI marked Type 1A (IS-2548-1983) with CP brass Hinges commander brand (black colour)

(C) Urinals

(i) Range of one and three urinals
(ii) Chinaware cistern
(iii) Bottle trap
(iv) CP brass angle valve with CP copper connecting pipe with nut and washer.

(D) Shower and Taps

i. CP brass wall mixer with bend for over head shower with central control knob for three positions, for supply to spout, second to stop and third for supply to shower.
ii. 125mm dia CP brass shower rose 15mm with ball joint and 230mm long CP brass extension pipe.

(E) Towel Rail : CP brass towel rail 20mm dia 16 guage600mm long including brackets.

(F) Towel Ring: CP brass towel ring 200 mm dia with CP brass brackets fixed to wall with Flanges & CP brass screws.

(G) Mirror of size as specified in the items and 5mm thickness over every wash hand basin. The mirrors shall be of make Modifloat or Atul Brand made from Tata Ashi float glass. The mirror shall have marine ply backing 6mm thick mounted on kail wood frame ¾" x $1\frac{1}{2}$" with Aluminum angle 30 x 15 x2mm alround & hung on to wall with key hole hooks.

(F) Peg Sets: Aluminum Anodized with 3 hooks

(J) Gratings:

(i) All floor traps (FT) and floor drains (FD) shall be provided with 125mm and 100mm round stainless steel gratings respectively of approved design and shape. The weights of 125mm dia and 100mm dia gratings shall not be less than 130gms and 100 gms respectively.

(ii) Gratings for floor drain (FD) below sink in kitchen shall have suitable hole for passing GI waste pipe from sink.

38. **Geysers:** Scope for arrangement of fixing of Geysers included in this contract is as under:

(a) Arrangement for fixing electric geyser vertical type one each in toilets and kitchen.

(b) In all the units from the provision of common hot water supply shall be made.

(c) Hot water supply of all units shall be from the respective Geysers/Solar heater installed therein.

(d) At the inlet pipe of all Geysers one number CP brass angle valve shall be provided.

(c) The ends of inlet and outlet pipes shall be connected with one PVC connecting pipe with CP brass nuts & washers. This is to pass the water from inlet to outlet till Geyser is installed at a later date.

(d) Provisioning and fixing of Geysers is beyond the scope of this contract.

39. Installation of Sanitary Fittings:

(a) European Type water closets shall be fixed with brass screws of suitable length with PVC plugs or phill plugs embedded in the floor after drilling hole in floor. It should be coupled with low level flushing cistern complete with rubber cone adapters etc, all as per manufacturer instructions.

(b) Wash hand basins shall be fixed firmly to wall with MS angle iron brackets. The brackets shall be given two coats of white enamel paint over a coat of primer. In addition the wash basin shall be securely fixed to walls with a pair of 25x3mm MS clips screwed with raw plugs to walls (placing of basin over the brackets without secure fixing on wall shall not be accepted).

(c) Indian type Water Closets shall be embedded firmly in the floor and its surrounding packed with cement concrete 1:3:6 (1 cement : 3 coarse sand : graded aggregate 40mm graded aggregate) below the level of top of the Closet to receive the top layer of floor finish. WC shall be set in the CI trap in cement concrete 1:3:6 (1cement:3 coarse sand:6 graded stone aggregate 20mm nominal size), joint between WC and Flush pipe will be made in the pre-moulded rubber joint.

(d) Urinals: Urinals shall be lipped type half stall (small) white glazed vitreous china of first quality and size 610x 400 x 380 mm size.

(i) Half stall urinal shall be provided 15 mm dia spreader, 32 mm dia CP domical waste and C.P. cast brass bottle trap with pipe and wall flange, and shall be fixed to wall by one CI bracket and two CI wall clips complete as recommended by manufacturer's directives/Site Engineer.

(ii) Half stall urinals shall be fixed with C.P. brass screws.

(iii) Flushing cistern for urinals shall be automatic type vitreous china as given in the schedule of quantities. Each flushing cistern shall have a copper siphon and inlet nozzle cock to control the flow. Flushing cistern shall be fixed to wall with R.S. or C.I. brackets painted with two coats of white enamel paint.

(iv) Flush pipes shall be G.I. pipes concealed in wall chase but with chromium plated bends at inlets and outlets.

(v) Urinals may be flushed with flush valves as described in the item.

(vi) Waste pipes for urinals shall be any of the following.

a. G.I. pipes. b. Rigid PVC

Waste pipes may be exposed on wall or concealed chase as directed by the engineer-in-charge. Specifications for waste pipes shall be same as given in Section II.

(e) **Urinal Partitions**: Urinal partitions shall be white glazed vitreous chinaware marble or stone of size specified in the schedule of quantities. Porcelain partitions shall be fixed at proper heights with C.P. brass screws with anchor

fasteners and MS clips as recommended by the manufacturer and directed by engineer-in-charge.

(e) All fixtures shall be fixed at proper heights, as shown in drawings and workmanship which shall be of acceptable standards.

40. **Internal Drainage:** Scope of internal sewage disposal and drainage system for all buildings/blocks included in Schedule A part I under this contract will include the following and shall be provided as per the layout/locations shown on drawings:

(a) GI floor drains in toilets and kitchen
(b) HCI waste pipes and their connections upto Gully traps.
(c) HCI soil pipes and their connections upto nearest manholes.
(d) Vent pipes with vertical stacks
(e) All floor traps and gully traps.

Note: SWG sewerage lines from Gully Trap and nearest manholes onwards shall be measured and paid separately under schedule A part III (External sewerage)

41. **Soil, Waste, Vent and Rain Water Pipes:** All pipes shall be sand cast iron and shall comply to IS-1729 of 1979 and shall be ISI marked. Where shown on drawings the floor drains (FD) shall be of GI pipe medium grade ISI marked.

42. All cast iron pipes fittings like bends, branches, floor traps, tees 'Y' junctions, in waste, soil and vent pipes shall be sand cast iron comply with IS 1729 of 1979 and shall be ISI marked. These shall be spigot and socket "Access door shall be made up with 3mm thick insertion rubber washer and white lead. The bolts shall be lubricated with grease or white lead for easy removal later. The fixing shall be air and water tight".

43. **Cast Iron Traps:** Floor trap shall be cast iron, deep seal with an effective seal of 50mm. The trap and waste pipes shall be set in cement concrete blocks firmly supported on the structural floor. The blocks shall be in cement concrete 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate 20mm nominal size) and extended to 40mm below finished floor level. The concrete portion at top of the floor trap inlet shall be finished smooth and water proofed by applying neat cement slurry mixed with water proofing compound. Size of the blocks shall be 30x30cms of the required depth. The trap shall be 100mm inlet and 100mm outlet for kitchen and for toilets. Traps shall have extension pieces to receive waste lines as indicated in typical details.

Urinal Traps: Urinal traps shall be cast iron P&S trap with or without vent and set in cement concrete block specified in para above without extra charge.

Cleanout Plugs: Contractor shall provide cast brass clean out plugs as required. Cleanout plugs shall be thread and provided with key holes for openings. Cleanout plugs shall be fixed to the pipe by a G.I. socket lead caulked.

PVC pipes & fittings: PVC pipes for drainage system shall be rigid upvc pipes conforming to I.S. 13592 Type B.

i. Fittings for the pipes shall be injection moulded with approved type of sockets and 'O' rings joints.

ii. Jointing shall be done as per the manufacturer's recommendation. The pipes and fittings must have matching dimensions for a perfect joint. Loose or excessively tight joints in the system shall not be accepted. Fittings must have sufficient gap (approx. 10 mm) for permissible thermal expansion of pipes.

Fittings

i. Fittings shall conform to the same Indian Standard as for pipes. Contractor shall use pipes and fittings of matching specifications.

ii. Fittings shall be of the required degree of curvature with or without access door of rear, LH or RH .

SECTION XI: GYPSUM BOARD PARTITIONS AND CEILING

GENERAL

It is intended that these specifications cover principal requirement of new gypsum board partition and ceiling construction. To prevent weakening due to calcimine, gypsum wallboard should not be exposed to temperature over 125F (52 C) for extended periods of time.
The Contractor shall furnish all materials, labour and scaffolding required to complete satisfactorily of all gypsum board partitions and ceiling work shown on the Drawings and / or specified.

MATERIALS

All materials shall be of an approval manufactures (India gypsum or equivalent) and shall comprise of the following:
G.I Framing for suspended ceiling
G.I Framing for partition and wall cladding.
G.I. corner beads and edge trims.

Dry-wall screw.
Regular gypsum wall board shall be ½" thick. Long edges shall be squire. Joint treatment materials shall be.
Joint Tape
Joint compound to be ready-Mixed
Fast hardening joint compound.
Topping compound to be ready-mixed.
Adhesive materials shall be joint compound for board application and wallboard /panel adhesive for board for framing application as recommended by manufacturer.

INSTALLATION

Preparation of work:
Commerce gypsum board and ceiling only after all work are complete.
Examine and inspect materials to which gypsum board is to be applied. Remedy all defects prior to installation of drywall. Any defects in the finished installation due to misaligned framing or the work performed under that section of the specification and such defects shall be remedied under that section of the specification.
Installation of wallboard:
Gypsum wallboard shall be applied to wall. Board of maximum practical length shall be used so that an absolute minimum number of end joints occur. Board edges shall be brought into contract with each other but shall be forced into place.
Wallboard joints at opening shall be located so that no end joint will align with edges of opening unless control joints will be installed at these points. End joints shall be staggered, and joint on opposite sides of a partition shall not occur on the same stud.
Gypsum wallboard shall be held in firm contract with framing member while fasteners are being driven. Fastening shall proceed from center portion of the wallboard toward the edges and ends. Fasteners shall be set with the heads slightly below the surface of the wallboard in a dimple formed by the hammer or power screwdriver. Care shall be taken to avoid breading the face paper of the wallboard. Improperly driver nails or screws shall be removed.

SECTION XII: ARCHITECTURAL WOODWORK

SCOPE OF WORK

Work included
This section covers the furnishing of all materials, equipment, accessories and labour for architectural woodwork, including but not limited to:

Wall paneling
Staircases
Railings and balustrade
Wood flooring and decks
Built-in-cabinetry, including plastic emulsion
Miscellaneous finished woodwork
Rough carpentry and framing associated with the above
Preservative treatment of wood
Metal fasteners, accessories and adhesives

Work not included
The following work is not included in this section and is covered elsewhere:
Structural woodwork
Wood doors
Wood windows

RELATED WORK SPECIFIED ELSEWHERE

Structural woodwork
Wood doors and windows
Painting and finish coatings

QUALITY CONTROL

The contractor shall be responsible for the quality of all work and material used in the work and shall implement a programme for inspection and testing to monitor the quality of work.

Wood shall be of the best select grade free of defects in accordance with IS:1629

COORDINATION WITH OTHER TRADES AND CONDITIONS

The contractor shall schedule and coordinate the structural woodwork with other trades and contractors whose work may be affected by the Architectural woodwork.

MATERIALS AND PRODUCTS

WOOD

Generally wood for all architectural wood work shall be teak, except for parquet flooring for which the wood shall be Laurel.
The moisture content of wood shall be in conformance to IS:287 and shall generally be between 12% to 14%.
All wood shall be heartwood from mature trees, of the best grade, with minimum sapwood, free of defects, selected for goods finished appearance.
All grades of wood with the following defects shall be prohibited for use:
Timber with loose grain, splits, compression wood in coniferous timber, heartwood-rot and sap rot and wraps.
Worm holes and pitch knots
Wood, that has been badly stored and damaged.

LAMINATES

Plastic laminates shall be from an approved manufacturer, shall conform to IS: 2046 and shall be of new stock & 1.0-1.5mm in thickness.

PLYWOOD

Plywood shall be of new stock from an approval manufacturer, complying IS:303 BWR (and preservative treated respectively)
Plywood having the following defects shall be prohibited for use:
Damaged surfaces
Loose joints between ply
Badly stored

FASTENER AND ACCESSORIES

Screws shall be of Mild steel, complying to IS:451
Mild steel wire nails shall be in compliance with IS:723
Copper wire nails shall be in compliance with IS:725

ADHESIVES
Adhesive shall be synthetic resin adhesives complying with IS: 851, Fast setting glues such as Rubber solutions/ "Zat Pat" shall not be used.
IRON MONGERY

Flanges, bolts, hasps, screws and other hardware shall be brass of the best quality approved by the architect.
Locks and architectural finish hardware such as handles and knobs will be selected by the owner against the allowance made in the contract documents.

The contractor shall order, take delivery and arrange for the transportation of the hardware from the supplier nominated by the owner. The costs for ordering, transportation etc. upto delivery at site will be adjusted the allowance.

EXECUTION

GENERAL

The preservative treatment of wood shall be performed after conversion of lumber to the required sizes in construction so as to keep subsequent working on them to a minimum.
Brush supply two heavy coats of the same wood preservative chemical to any surfaces which were exposed by cutting, sawing, drilling etc.
Set out all architectural woodwork accurately in accordance with the contract drawings or approved shop drawings, true to line, angles, slopes and panes.
All members shall be in continuous lengths between supports without any immediate joints or splices unless otherwise shown on the drawings.
All sizes shown on the drawings are the finished dimensions and shall be within the tolerances given below:
- For measurement upto and including 100mm in width or thickness +/- 0.5mm.
- For measurement above 100mm in width and thickness +/- 0.1mm

All bearing surfaces shall be constructed to achieve full contract between surfaces over the entire bearing area.
All joints shall be worked to achieve accurate and tight fit with full contract between surfaces.
As far as possible grain and of wood shall be matched for adjacent pieces.

PANELING

Install the wall paneling in accordance with the design and details shown on the drawings.
Check alignment, plumb, plane and dimensions of the backing which is to receive paneling. Make necessary corrections prior to commencing paneling.
Layout paneling in accordance with actual dimensions obtained at site location. Adjust detailed dimensions to obtain the intent of the design.

Install sub-frames and grounds and secure them firmly to the backing, tree to line, plumb, alignment and plane to avoid adjustment while installing paneling.
The panel frames shall be true to dimensions, sections, profiles, mouldings etc. as shown on the drawings. Members shall be in one piece between joints.
Panels shall be of the thickness and profiles shown in the drawings. When a large panel is required to be built up from two or more pieces, the joints shall be tongue and grooved flush joints, glued and drawn tight by means of vices, clamps or other means to obtain permanently indiscernible joints. The colour and grain of the wood shall be matched to conceal the joints.
The frames and panels shall be planed and sanded smooth to remove all tool marks before assembly.
The panel frames shall be joined by 'all wood' joints without metal fasteners by means of the most appropriate glued mortise-and-tenonned joints and wood pins. Mortises and tennons shall be tooled to obtain intimate contact between their surfaces and shall be fully glued with glue.
Joints shall be tightened with vice, clamps, draw straps or other means to obtain tight, indiscernible joints. The grain of wood pins shall match the surface grain of the frames.

Mouldings shall be mitered at 45 degrees to obtain a perfect match of lines, edges and profiles between abutting pieces.
After assembly the joints shall be tooled and sanded to remove minor unevenness at joints.
Planted mouldings and architects shall be fixed by means of headless-nails, neatly punched below the surface of wood.

Tolerances:
- Plane surfaces when tested with a straight edge placed anywhere, in any direction shall not show a gap of more than 1mm between the surface and the edge in any 2 meter length, provided that there is no noticeable abrupt differences in smaller areas.
- Straight lines and edges when tested with a 2 meter long straight edge shall not show a variation of more than 2mm, provided that there are no noticeable abrupt differences.

WOOD VENEERS AND PLYWOOD

Wood veneered plywood shall be 4mm. thick of an approved manufacture. Veneered plywood shall be selected from the best quality new stock for grain and colour appearance.
Plywood shall comply with IS: 5509 and IS: 5539

ADHESIVES AND FASTENERS

Adhesives shall be synthetic resin adhesive complying with IS: 851
Screw shall be of brass.
Copper wire nails shall be in compliance with IS:725

TREATMENT AGAINST DECAY AND INSECT ATTACK

Treatment against and insect attack shall be by means of an approved proprietary product, proven to have outstanding durability under any conditions of exposure, to provide long-lasting protection against decay producing fungi and insects.
The material used for treatment shall be clean, oil-free. Odorless and harmless to people, planes and animals, evens when exposed to fire.
The material shall be spray or brush applied for deep-penetration, fiber- fixed to prevent leaching. The treated wood shall be capable of being subsequently painted or stained without being discolored.
No coal –tar based products shall be used for preservative treatment.
The material used for preservative treatment shall be compatible with the material used for fire retardant treatment.

HARDWARE

All hardware for wood doors and wood windows will be selected by the owner.
The Contractor shall order, take delivery and arrange for the transportation of the hardware from the supplier nominated by the owner. The costs for ordering, transportation etc up to delivery at site will be adjusted against the Allowance.

GLASS

Glass All shall be float glass of glazing quality conforming to BS:952 part 1 or other acceptable standard.
Wired glass: All wired glass shall be polished both sides with square pattern stainless steel wire mesh complying to BS:925, part 1 or other acceptable standard
Insulating glass insulating glass units shall consist of one exterior pane of tinted glass and one pane of clear glass, separated by a 15mm. Thick spacer filled with moisture absorbing desiccant. Each unit shall be hermetically sealed with primary butyl rubber sealant completely covering the unit's edge.
Glass and sizes and thickness shall be as shown on the contract Drawings.
All glass shall bear the label of its manufacturer and the standard to which it is manufactured.
Glazing gaskets : All glazing gaskets shall be 'U' shaped of flexible vinyl or synthetic rubber (Neoprene) to fit the glass thickness.
Setting blocks: All setting blocks shall be of synthetic rubber to provide the necessary edge clearance from frames for the glass.
Glazing components: These shall be clear silicone sealant.

WEATHER STRIPS

The weather strip to seal the perimeter gaps between sashes and frames shall be flexible vinyl or synthetic rubber suitable for heavy-duty application.
Sealant caulk for sealing joints between frames and structural opening shall be a one –part polysulphide sealant suitable for application by a caulking gun

List of Material
Of
Approved Maker/Brands: Civil Works

The contractor shall quote for the best of the materials specified below with ISI mark wherever applicable.The contractor shall obtain prior approval from the Bank / Architect before placing order for the specific materials agencies. In case of non availability of any of the approved/ specified materials/agency. During the execution of the work, the Bank /Architect may approve suitable equivalent brand/agency and his decision shall be final and binding on the contractor and the price variations. If any, shall be adjusted accordingly.

S. No	Materials		Manufacturers
1.	Plywood		Signature /Anchor / Archid / Century / Kenwood / Samrat / Green Mayur (6mm, 9mm, 12mm, 19mm).
2.	Laminates		Signature/Formica /Greenlam / Century / Signature / Heritage / Archid / Newmica / Amulya, Sunmica (1.0 / 1.5mm thick)
3.	Block board		Anchor / Century / Archid / Kenwood / Samrat / Mayur
4.	Soft Board (pin up board)		Jolly board, Western India plywood
5.	Gyp. Board		India gypsum
6.	Metal ceiling		Luxelon, Superseal, Trident, Armstrong
7.	Vertical blinds		Vista, Universal
8.	Screws		GKW / Mettle fold
9.	Brass hinges		Reliance / Punit heavy duty
10.	Hardware		Shalimar, Everite / Reliance (brass powder coated)

11.	Drawer shutter lock		Vijayan / Godrej (3 set of keys)
12.	Ball catch		Magnetic (M-2) / Brass
13.	Door lock / handles		4-C ACME, Golden, Godrej, Ultra
14.	Veneer		Anchor / URO / Durian / Century
15.	Adhesives		Fevicol (SH), Mowicoll, Mahacol, Araldite
16.	Wood preservatives		Woodguard, PCI, Black Japan
17.	Door closure		Yale / Efficient gazets, Everite Hyper
18.	Glass		Modi / Triveni / Hindustan Palington / Asahi / Saint Gobain
19.	Glass tinted		Same as above.
20.	Melamine Polish		Asian paint, MRF, Nerolac, French / Zinc oxide
21.	Paint		ICI, Burger, Nerolac, Asian.
22.	AC grill		Air products, Omicron, Patrawala
23.	Vitrified tiles		Marbonite, / Navin / Orient Bell / Spartek,Kajaria
24.	Ceramic tiles(Non-Skid)		Jhonson & Jhonson, Kajaria, Nitco, Regency
25.	Alu. Door & window sections		Ajit India / Jindal / Indal / Bhansali of 25 microns.
26.	Floor springs		Everite / Hemco / Hyper
27.	Wood preservative		Asian paint / British paint
28.	Grey Cement (43 or 53 Grade) White Cement Putty		A.C.C, L&T, AMBUJA, Jaypee Birla White, J.K. Birla White Putty
29.	Sun control film		Garware
30.	Stainless steel sink		Nirali / Diamond
31.	Carpet		Hitkari / Modi / Trans Asia
32.	Rubber foam		34 density mm foam
33.	WC seat cover		Commander / Patel / Supreme
34.	Toilet paper holder		Parryware / Hindustan / Nycer
35.	Steel (Thermo MechanicallyTreated Steel) High strength deformed bars or mild steel reinforcement		TATA, SAIL, RINL
36.	Clay Bricks		Good quality locally available material approved by Engineer / Architect
37.	Pressed Steel frames for Doors		Fabricated P.S. frames approved by Engineer/Architect.

38.	Pressed Steel frames for Aluminium-Windows, Ventilators.		Indal / Jindal of 25 microns approved by Engineer/Architect.
39.	Flush Door Shutters		Century/ Anchor / Archid / Green / Samrat / Kenwood ,Signature
40.	Aluminum Hardware/fittings		Argent / Classic / Shalimar
41.	Brass Mortice Locks & Latches		Godrej
42.	Latches with Internal locks		Godrej / Ultra
43.	Floor Type Hydraulic door closer (Floor spring)		Everite / Hypper / Hemco
44.	Aluminum door, window and ventilator sections.		Jindal / Indal / Hindalco
45.	Water proofing material / compound.		CICO – I / Roff
46.	Glazed Tiles		Johnson & Johnson / Naveen / Nitco / Regency / Spartek
47.	Cement Concrete (Chequred) Tiles		Nitco / Bharat
48.	Glass Mosaic Tiles		Italia
49.	Synthetic Enamel Paint		Jenson & Nicholsan / Asian / Nerolac /Berger
50.	Oil Bound Distemper		Jenson & Nicholsan / Asian / Burger / Nerolac
51.	Plastic Paint		Jenson & Nicholsan / Burger / Nerolac
52.	Panelled Doors		National / Century / Swastik / Kitply
53.	P.V.C. Doors		Sintex / Mihir / Fixopan
54.	Rolling Shutter & Grills		Good quality locally available material.
55.	Hardeners		“Ironite”.
56.	Red Oxide		“Asian”
57.	Waterproof cement paint / acrylic paint		Snocem India, Nerolac, Nitcocem
58.	Glazing		“Hindustan Pilkington” Tiveni, Modi
59.	Water seal (Epoxy-sterarate) compound		As approved by Architect / Engineer
60.	Medium density fibre-board in lieu of partitions paneled doors and flush doors.		Nuwood, mangalam
61.	Ironmonjires and brass fittings		Jiranna / CIEF/ Shalimar / Everite.
62.	Drawer sliding fitting		Earl bhihari
63.	Veneer		Achor / Kitply / Uro / Durian / Century
64.	Polish		French/Zinc Oxide / Melamine (Asian)

65.	Polyure than foam		'U' foam

PLUMBING WORK

S.No	Materials		Manufacturers
1.	Vetreous china sanitary ware (ISI mark)		Hindustan sanitary ware/ parryware/ Cera
2.	Seats & Covers solid (W.C.)		Commander/ Admiral/ Supreme
3.	PVC Low level flushing cisterns		Commander / Parryware / Hindustan
4.	C P Fittings / Toilet Accessories ISI Marked		Jaquar / Aquel / ESS ESS / Marc
5.	UPVC Pipes (S/W/R Pipes)		Diplast / Supreme / Finolex / Prince
6.	Centrifugal cast CI Pipes & Fittings		RIF / Neco
7.	G.I. Pipes (B-Class)		ITC / Tata / Zenith
8.	G.I. Fittings (ISI Brand)		Unik / AMCO
9.	Gunmetal valves (Full way, check and globe valves)		Leader / Zoloto (with ISI mark) / Sant
10.	S.W. Pipes / Fittings & Gully traps		Perfect / Tirmurti / Bharat
11.	Ball valves		Voltec / Zoloto
12.	Stainless steel sinks		Nirali / Neelkanth
13.	HDPE Tanks		Sintex / Polycon / Unitank
14.	Mirrors		Modiguard
15.	C.I. Manhole Cover		RIF / BIC / Neco
16.	Concrete Man holes SFRC		CICO
17.	Hydropneumatic Systems		Grund Fos / Crompton
18.	Water lifting Pump		Grund Fos / Crompton
19.	Submersible Pump		Grund Fos / Crompton
20.	Chemical Doser		Asia Lmi / Prominent / Ion Exchange
21.	Pressure Gauge		H. Guru
22.	Level Indicator		RM Approved Make
23.	Air Relief Valves		RB / Zolto

24.	Water Meter		Dasmesh / Capstain / Kaycee
25.	PVC Encapsulated footrest.		KGM approved make
26.	C.I. Sluice valves		Kirloskar, Leader with ISI mark on the boAsst.
27.	A.C. Pipes		Everest Ramco
28.	R.C.C. Pipes		Indian Hume pipe
29.	Brass & Gun metal globe, gare valves, feet valves		Leader NETA with ISI marking on the boAsst.
30.	Sanitary Fixture		Hindware / Parryware / Cera
31.	Storage Heaters		Recold, Spherehot
32.	Fire Hydrant		Approved by local fire Bridges Authority
33.	Sand cast soil pipes and fittings		NECO sand cast / B.I.C.
34.	Bracket supports		Hi-tech/MS brackets as per drawings
35.	Towel rail / ring		Jaquar / ESS ESS
36.	Connection pipe-PVC		Kohinoor/Viking
37.	Butterfly valve		Intervalve
38.	PVC Fittings (Moulded)		Clarion / Finolex / Prince
39.	Non-return valve		Intervalve
40.	UV filter		Alfa-level
41.	Stainless Steel		Salem Steel
42.	Marble Mosaic Tiles		Nitco / Bharat / Himalayan
43.	Fire Door		RDG / Shakti / Metdor
44.	RCC pipe		Indian Hume Pipe Co. / Spun Pipe Co.
45.	Stoneware Pipe and fittings		Trimurti / Perfect Potters / Bharat

MODE OF MEASUREMENTS FOR INTERIOR FURNISHING WORKS :

1. DOORS, WINDOWS AND GRILLS.

Clear area over one face inclusive of frame shall be measured. Hold fasts and portion embedded in masonry or

flooring shall not be measured.

2. PARTITIONS IN WOOD WORK
The partition height shall be measured up to bottom of false ceiling and framing members / ply going above shall not be measured

3. DECORATIVE PANELLING OVERWALL OR OVER PARTITIONS
The actual area of cladding shall be measured in square meter.

4. CARPETS
The actual area covered by the carpet shall be measured. No extra shall be allowed for wastage. No deduction shall mad e for columns up to 0.5 sq. meter.

5. PAVING AND TILE WORK
The work mentioned in this section shall be measured in square meter and shall be priced per unit of square meter. In all paving work, the slabs shall be touching the walls and go well under the plaster, but the measurements shall be the clear measurements of the rooms or areas finished. No allowance shall be made for portions going under the plaster.

6. ALUMINIUM SLIDING WINDOWS
The measurement of aluminum sliding windows shall be taken only after the frame going with shutter is fixed in its final finished position in line level and plumb. Width and height shall be measured net between the out to out portion of the aluminum window frames.

7. FALSE CEILING
For false ceiling work, the measurement shall be for the actual area covered. No deductions shall be made for the cutouts, for light fittings, speakers, AC grills and column up to 0.5 sq. meters.

8. WOODWORK
For conversion of centimeters to meter the resultant figure shall be taken upto two digits after decimal point. Third digit shall not be taken into account.

LIST OF INDIAN STANDARDS FOR CIVIL FURNISHING WORKS

IS 4081: Safety code for blasting and related drilling operation

IS 6313: Code of practice for anti termite measures in building

Part 1: Constructional measures.

Part 2 Code of practice for ant termite measures in buildings: Pre constructional chemical treatment measures

CONCRETE

IS 456: Code of practice for plain and reinforced concrete.

MASONRY WORK -BRICK WORK

IS 1077: Specification for common burnt clay building bricks.

IS 2212: Code of practice for brick work

IS 2250: Code of practice for preparation and use of masonry mortars.

PLASTERING AND POINTING

IS 412: Specification for expanded metal steel sheets for general purposes

IS 1635: Code of practice for application of cement and cement-lime plaster finishes

IS 2402: Code of practice for external rendered finishes.

IS 1542 Specification for sand for plaster (Class A grading)

FLOORING

IS 1443: Code of practice for laying and finishing of cement concrete flooring tiles.

IS 4457: Specification for ceramic unglazed vitreous acid resisting tiles.

DOORS AND WINDOWS

IS 287: Recommendation for maximum permissible moisture content for timber used for different purposes in different zones

IS 848: Specification for synthetic resin adhesive for plywood (Phonetic and amino plastic)

IS 1141: Code of Practice for seasoning of timber

IS 2202: Specification for wooden flush door shutters (solid core type)

Part I: Plywood face panels

Part II: Particle board panels and hard board faced panels

GLAZING

IS 1081; Code of practice for fixing and glazing of metal, (steel and aluminium) doors, windows and ventilators.

IS 2553: Specification for safety glass

IS 2835: Specification for flat transparent sheet glass

IS 3548: Code of practice for glazing in building

PAINTING AND POLISHING

IS 1477: Code of Practice for painting of ferrous metals in building

Part I: Pre-treatment

Part II: Painting

IS 2338: Code of Practice for finishing of wood and wood based materials

Part I: Operation and workmanship

Part II: Schedule

IS 2395: Code of Practice for painting, concrete, masonry and plaster surfaces

IS 3537: Specification for ready mixed paint, finishing interior, for general purposes to IS colors

IS 5410: Specification for cement paints colour, as required

IS 6278: Code of Practice for white washing and colour washing

TECHNICAL SPECIFICATIONS ELECTRICAL, FIRE FIGHTING, SECURITY SYSTEM & NETWORKING

The Electrical installation work shall confirm to the following I.S. Standards (latest additions), Local Supply Authorities Rules and Regulations, Indian Electricity Act & rules, National Building code and Fire Safety Norms.All equipment including cables, wires & components thereof should be manufactured & installed as per standards specified by Bureau of Indian Standards (BIS) Where such standards do not exist, then the covered items should be approved from Architects/ Consultants /Clients prior to purchase & delivery to site.

- IS: 732 Code of Practice for Electrical wiring installation (System Voltage not exceeding 650V)
- IS: 1646 Code of Practice for fire safety of buildings (General Electrical Installation)
- IS: 9537 PART-II 1981 Rigid steel conduits for electrical wiring.
- IS: 2667 Fittings for rigid steel conduits for electrical fittings.
- IS: 2509 rigid non-metallic conduits for electrical installations.
- IS: 1293 Pin Plugs and Sockets.
- IS: 694 PVC insulated cables with copper conductors for voltages up to 1100 Volts
- IS: 9532 Specification for conduits for Electrical Installation
- IS: 3854 5A & 15A Switches.
- IS: 3043 Earthing.
- Indian Electricity Act, 1956 and Rules and Fire Insurance Regulations.
- IS: 2026 Specification for power transformer------ Not applicable.
- IS: 2099 Specification for high voltage porcelain bushings. ------ Not applicable
- IS: 355 Specification for insulating oil. ------ Not applicable
- IS: 3639 Specification for fittings and accessories for power transformer. ------ Not applicable
- IS: 2274 Electrical wiring installations (System voltage exceeding 650 volt)
- IS :7752 Guide for improvement of power factor consumer's installations
- IS: 5216 Guide for safety procedures & practices in electrical work
- IS: 3072 Installation & maintenance of Switch gear
- IS: 2551 Guide for danger notice plates
- IS: 8923 warning symbols for dangerous voltages
- IS :13947 Specification for low-voltage switchgear & Control gear
- IS :1777 Industrial luminaries with metal reflectors
- IS :1913 General & safety requirement of luminaries
- IS :116 Circuit Breakers for AC system
- IS :3427 Metal enclosed switchgear & Control gear
- IS: 3837 Accessories for rigid steel conduits.
- IS: 4047 Heavy duty Air break switches & composite switch fuse units for voltage exceeding 100 volts.
- IS :4237 General requirements for switchgears not exceeding 1000 Volts
- IS :4615 Switch socket outlets
- IS:159: Busbars & busbars connections
- IS: 415 marking & arrangement for switchgear board's main connections & auxiliary wiring.
- IS: 415 Tungsten filament lamp
- IS: 722 Three phase watt hour meter with MDI
- IS: 1248 Directing acting electrical indicating instruments
- IS: 1293 three pin plugs & sockets outlets.
- IS :1947 Floods lights
- IS: 2147 Degree of protection provided for enclosure for switchgear
- IS: 2418 Tubular fluorescent lamps for general lighting services

- IS: 2509 PVC electrical Conduits
- IS: 2075 Current Transformer
- IS: 2834 LT Capacitors
- IS: 3106 Code of practice for installation & maintenance of switchgear.
- IS: 2607 Air break isolators for voltage not exceeding 1000 Volts
- IS: 1753 aluminium Conductors for insulated conductor
- IS: 3961 Recommended current ratings for cables
- IS: 3480 Flexible steel conduits for electrical wiring
- IS: 1646 Code of fire safety of building (General Electrical installation)
- IS: 1913 General & safety requirements for electric lighting fitting.
- IS: 1239 Mild steel tubular & other wrought steel pipe fitting
- IS: 6381 Specifications for construction & testing of electrical apparatus.
- IS: 1818 Isolator & Earthing switches
- IS: 3106 Code of practice for selection
- IS: HRC Cartridge fuse unit up to 650 Volts
- IS: 10332 Part I to Part V Specification of Luminaries

SPECIFICATIONS FOR ELECTRICAL WORKS

SPECIAL CONDITIONS OF CONTRACT

1. COMPLETENESS OF TENDER:-

All sundry fittings, assemblies, accessories, hardware items, foundation bolts, termination lugs for electrical connections as required, and all other sundry items which are useful and necessary for proper assembly and efficient working of the various components of the work shall be deemed to have been included in the tender, whether such items are specifically mentioned in the tender documents or not.

2. RATES: -

The rates tendered shall be for complete items of work inclusive of Cost of material, erection, connection, testing, labour, supervision, tool & plants, storage, contingencies, breakage, wastage, execution at any level & height, all taxes (including works contract tax, if any), duties, and levies etc. and all charges for items contingent to the work, such as, packing, forwarding, insurance, freight and delivery at site for the materials to be supplied by the contractor.

3. WORKS TO BE DONE BY THE CONTRACTOR :-

The scope of internal and external electrification under this contract shall include the design, engineering, manufacture, assembly, testing, delivery, erection and commissioning of electrical system including supply of all material, labour, T&P etc for followings –

- Main Switches, Main L T Panels, meter board and external cable connection.
- 11 KV HT Panel.
- 11 KV / 0.433 KV Transformers.
- D. G. Sets with fuel tank, piping, fuel pump, exhaust piping with lagging and supports, cooling system complete.
- Sub and branch distribution boards, MCB's and RCCB's etc.
- Mains and Sub mains between various panels, meter boards and distribution boards.
- Point wiring with Conduits for all type of wiring including circuits, sub mains, light, fans, power and AC etc.
- Switches and socket outlets for light, fans, plug, power, Tel, TV, computer network etc with suitable MS/GI boxes with accessories complete.
- Earthing and Lightning Protection with earth leads/strips.
- Conduits and wiring for Telephone, EPABX, TV system, PA system, Music system and Computer networking, fire alarm, broad band etc.
- Cables and other allied works.
- Provision of emergency electrical supply and distribution for complete light, fans and other specified points are also included in the scope of work. For the purpose of emergency distribution separate DB's shall be installed for Light/fans **and fax machines & staircase** lighting at every place, so that these can be separated.
- Lighting Fixtures fans and exhaust fans. (If these are supplied by the client, then the contractor will erect the fixture as required without any extra payment beyond the contract)
- External lighting including underground cables and connection with the external cables and earthing.
- Feeder pillars with circuit breakers.
- Underground cables.

All the above work shall be complete in all respects up to the satisfaction of architect, consultant, Client and Engineer in charge as per the details mentioned in BOQ and drawings supplied time to time.

Unless and otherwise mentioned in the tender documents the following scope of works shall be done by the contractor, and therefore their cost shall be deemed to be included in their tendered cost:

a) Furnishing of all labour, skilled and unskilled, supervisory and administrative personnel, erection tools and tackles, testing equipment, implements, supplies, consumables like welding rods and gas, oil and grease,

cleaning fluids, insulating tape, anti corrosive paints, jute cotton waste etc., and hardware for timely and efficient execution of the erection work.

b) Transport vehicles necessary for efficient transportation of equipment from Owner's stores to site of erection and excess materials back to owner's stores.

c) Complete assembly, erection and connection, testing and commissioning, putting into successful and satisfactory commercial operations of above equipment.

d) The items of work to be performed on all equipment and materials shall include but not limited to the following:

(i) Receiving, unloading and transportation at site. (To Owner or Contractor's stores and from their upto actual place of erection).

(ii) Opening, inspecting and reporting all damages and short supply items.

(iii) Arranging to repair and/or re-order all damaged and short supply items.

(iv) Storing at site with suitable all weather protection.

(v) Assemblies, erection and complete Installation.

(vi) Necessary coordination between work done by other Contractors.

(vii) Final check-up, testing and commissioning in presence of Owner's representative.

(viii) Obtaining Owner's written acceptance of satisfactory performance.

4. INFORMATIONS REQUIRED FROM CONTRACTOR

i. Typical GA drawing of all equipment to be supplied and disposition of various fittings and loading.

ii. All Annexure of this specification duly filled in and signed by the contractor.

iii. Catalogue of all equipment and components explaining construction features.

iv. Transportation/shipping dimensions and weights, space required for handling parts for maintenance.

v. Type test certificates for all equipment on similar type of equipment.

vi. Final Single line diagram complete with cable sizes etc.

vii. Bill of Materials, Control & schematic line diagram for meter & relay panel, terminal connection/Master Terminal box diagram, wiring diagram with physical location of components for all equipment.

viii. Detailed cabling layout showing cable trench / tray layout, earthing layout.

ix. Detailed lighting layout showing position of fixtures / type of fixtures, circuiting and route of wires / cables / fixing details, DB details.

x. Protections relay settings.

xi. Cable schedule & interconnection chart.

xii. Foundation details and plan, loading details for all equipment.

xiii. Test certificates.

xiv. Instruction manuals of all major equipment.

xv. Test Procedures at sites.

xvi. Test reports of all tests carried out at site.

xvii. 'AS BUILT' drawings (2 sets of soft copies on CD and six sets of hard copies duly wound).

xviii. All layout drawings shall be made in scale of 1:50 or 1:100 unless until agreed by the Owner/ Consultant.

5. PRICES

a) The price quoted for supply items shall include all packing, crating, excise duty, sale tax / Works Contract tax, insurance, freight, loading/ unloading, handling & all other charges.

b) The price quoted for erection & commissioning shall include cost of all consumables, taxes & duties. (if any). No additional taxes/duties shall be payable by Owner.

c) Prices quoted shall be firm and no variation shall be allowed during contract period.

d) Contractor shall furnish prices separately for spare parts for two (2) year's trouble free operation of the equipment and shall furnish the list of the same.

6. ELECTRIC POWER SUPPLY AND WATER SUPPLY :-

Unless and otherwise specified, power supply and water supply as may be required shall be arranged by the contractor for installation and testing of the equipment's at the site of work.

7. PROVISIONS AGAINST ACCIDENTS AND SAFETY MEASURES

a) All safety rules and codes as applicable to work including rules applicable as per factory inspector shall be followed during execution of above work.

b) All safety appliances and protective devices including hand gloves, aprons, helmets, shields, goggles, safety belts etc. shall be provided by Contractor for his personnel.

c) The Contractor shall arrange to provide guards and prominent display caution notices if access to any equipment/ area is considered unsafe and hazardous.

8. SPECIFICATIONS

In the absence of specifications for any work or materials, relevant Indian Standard Specifications shall be applicable. If such codes for a particular subject have not been framed, the decision of the Employer/ Consultant will be final and binding.

9. VARIATION IN QUANTITY

a) The Owner shall have right to delete or increase/ decrease quantity specified in this specification as specified in preamble to Bill Of Materials.

b) Quantities indicated in Bill of Materials are based on engineering status of the project as on date. It is necessary that proper engineering is carried out by the contractor before procurement of material.

c) For procurement of any material & sequential delivery at site from point of view of erection etc. Contractor shall take prior approval from the employer.

d) All left over material for which payment has been made by the employer, has to be taken back by the contractor. The employer shall make necessary deduction from the bills of contractor.

10. SITE VISIT

It is recommended that contractor shall visit site before submission of his offer. Time and date shall be fixed with employer.

11. TOOLS FOR HANDLING AND ERECTION :-

All tools and tackles required for handling of equipment and materials at site of work as well as for their assembly and erection and also necessary test instruments shall be the responsibility of the contractor.

12. CO-ORDINATION WITH OTHER AGENCY: -

The contractor shall co-ordinate with all other agencies involved in the building work so that the building work is not hampered due to delay in his work. Recessed conduit and other works, which directly affect the progress of building work, should be given priority.

13. CARE OF BUILDINGS :-

Care shall be taken by the contractor to avoid damage to the building during execution of his part of the work. He shall be responsible for repairing all damages and restoring the same to their original finish at his cost. He shall also remove at his cost all unwanted and waste materials arising out of his work from the site, from time to time as designed by the Engineer-in-charge.

14. STRUCTURAL ALTERATIONS TO BUILDINGS:-

i. No structural member in the building shall be damaged/altered, without prior approval from the competent authority through the Engineer-in-charge.

ii. Structural provisions like openings, cutouts if any, provided by the department for the work, shall be used. Where these require modifications, or where fresh provisions are required to be made, such contingent works shall be carried out by the contractor at his cost.

iii. All such openings in floors provided by the department shall be closed by the contractor after installing the cables/conduits/rising mains etc. as the case may be, by any suitable means as approved by the Engineer-in-charge without any extra payment.

iv. All chase required in connection with the electrical works shall be provided and filled by the contractor at his own cost to the original architectural finish of the buildings.

15. WORK IN OCCUPIED BUILDINGS: -

i. When work is executed in occupied buildings, there should be minimum of inconvenience to the occupants. The work shall be programmed in consultation with the Engineer-in-charge and the occupying department. If so required, the work may have to be done even before and after working hours.

ii. The contractor shall be responsible to abide by the regulations or restrictions set in regard to entry into, and movement within the premises.

iii. The contractor shall not tamper with any of the existing installations including their switching operations or connections there to without specific approval from the Engineer-in-charge.

16. STATUTORY REGULATION AND APPROVALS :-

All electrical works shall be carried out only by those Contractors who are licensed by the concerned local authorities to execute this type of work. Only "A" Class government approved electrical contractor shall execute the job.

It shall be the responsibility of the Contractor to comply with the regulations laid down by the Indian Electricity Rules and local authorities. The Contractor shall also be responsible for obtaining all the statutory approvals/certificates for the work from the concerned Departments and these certificates shall be handed over to the Architects/Clients at the completion. All coordination with the local electric supply authorities, submitted of application, getting the desired load sanctioned shall be in the scope of contractor. The fees required to obtain the

desired load sanctioned and other legal and miscellaneous charges by local electric supply authority / undertaking shall be given by the client but all follow-ups etc. shall be the contractor's responsibility.

On completion of the work, the contractor shall obtain the certificates of final inspection and approval by the local electric supply authority and deliver these certificates to the Owner/Architects in original. The contractor shall bear all expenses and fees required to obtain these certificates without which the work shall not be taken over and shall not be considered complete.

17. STANDARDS AND CODE OF PRACTICE:-

The work shall be carried out as per the enclosed Specifications of work and the construction drawings to be issued from time to time. These specifications shall be read in conjunction with National Building Code, National Electrical Code 1985, Relevant Codes of Practices and Standards as issued by ISI and Indian Electricity Rules, CPWD specifications for electrical works (all with the latest amendments). The installation shall confirm in all respects to Indian Standard code of Practices. Following BIS codes shall be referred -

a) National Electrical Code

b) IS: 694 – 1977: PVC insulated cables for working voltage up to and including 1100 volts

c) IS: 732 -1989: Electrical wiring installation

d) IS: 1225 -1938: Installation and Maintenance of power Cables up to and including 33 KV Rating

e) IS: 1554: PVC insulated heavy-duty electrical cables.

f) IS: 1860: Installation operation and maintenance of passenger and goods elevator.

g) IS: 2309 -1989: Protection of building and allied structures against lightning.

h) IS: 3043 -1987: Earthing

i) IS: 3646 (Part-1) -1992: Interior Illumination

j) IS: 3661 (Part-2) -1967: Current rating for cable

k) IS: 3661 (Part-5) -1968: Current rating for cable

l) IS: 5216 (Part-1) -1982: Recommendations on safety procedures and practices in electrical work.

m) IS: 7098 (1 & 2): XLPE insulated cables

n) IS: 10028 (Part-1) -1985: selection, Installation and Maintenance of Transformers

o) IS: 10118 (Part-1) -1982: Selection, Installation and Maintenance of switchgear and Control gear

18. MATERIAL SAMPLES AND SHOP DRAWINGS:-

It shall also be the responsibility of the Contractor to submit without any extra charge the samples of the materials/equipment as and when asked by the Architect/Consultant. If the Contractor wishes to use an alternative make due to non-availability of the approved one, he should take the prior approval of the Architect/Consultant. Under such situations the Contractor shall show such promptness as not to hamper the progress of the work.

The Contractor shall submit for Architect/Consultant's approval the shop drawings at approved scale indicating the custom built equipment, L.T. Panels, run of cables and conduits he proposes to install.

19. ELECTRICAL DRAWINGS: -

i) The electrical drawings issued from time to time to the contractor are diagrammatic but shall be following as closely as actual construction and work will permit. The Contractor at his own expenses shall make any deviation from the drawings required to conform to the building construction. The architectural drawings shall take precedence over the electrical drawings as for as the civil and other trades works are concerned.

ii) If there is any discrepancy due to in-complete description, ambiguity or omission in the drawings and other documents relating to this Contract found by the Contractor either before starting the work or during execution or after completion, the same shall be immediately brought to the attention of the Architect/Consultant and his decision would be final and binding on the Contractor.

20. TESTING AND COMMISSIONING: -

The Contractor shall be responsible for testing and commissioning the entire electrical installation described in these specifications and relevant IS specifications and will demonstrate the operation of the systems to the entire satisfaction of the Architect/Consultant and to the Client approval.

21. GUARANTEE

At the close of work and before issue of final certificate of virtual completion by Owner / Consultant, the contractor shall furnish a written guarantee indemnifying the owner against defective materials and workmanship for a period of one year after commissioning. The contractor shall hold himself fully responsible for reinstallation or replacement of defective material free of cost to the owner.

22. COMPLETION DRAWINGS

The contractor shall submit, after the completion of the work, one set of originals and two sets of prints of the As-Fitted drawings/Completion drawings, giving the following information:

a. Run and size of conduits, inspection, junction and pull boxes.

b. Size of conductor in each circuit.

c. Location and ratings of sockets and switches controlling the light/fan and power outlets.

d. Location and details of distribution boards, mains, switches, switchgears and other particulars.

e. A complete wiring diagram as installed and schematic drawings showing all connections in the complete electrical system.

f. Location of telephone outlets, junction boxes and sizes of various conduits.

g. Location of all earthing stations, route and size of all earthing conductors etc.

h. Layout and particulars of all cables.

i. Location of all equipments with dimensions and connections.

23. INSPECTION

All equipment *I* material covered under this specification is liable for inspection by the Owner/ his representative. The vendor shall inform two weeks in advance for inspection to be carried out at the manufacturer's works.The contractor shall furnish data Sheets & other details. Additional information, if desired by the bidder can also be furnished separately.

GENERAL & TECHNICAL

1 POINT WIRING:-

1.1. DEFINITION:-

A point (other than socket outlet point) shall include all work necessary in complete wiring to the following outlets from the controlling switch or MCB. The scope of wiring for a point shall, however, include the wiring work necessary in tapping from another point in the same distribution circuit.

i. Ceiling rose or connector (in the case of points for ceiling/exhaust fan points, pre wired light fittings and call bells).

ii. Ceiling rose (in the case of pendants except stiff pendants)

iii. Back plate (in the case of stiff pendants).

iv. Lamp holder (in the case of goose neck type wall brackets, batten holders and fittings which are not pre wired).

1.2. SCOPE:-

Following shall be deemed to include in point wiring.

i. Conduit/casing and capping as the case may be, accessories for the same and wiring cables between the switch box and the point outlet.

ii. All fixing accessories such as clips, nails, screws, Phil plug, rawl plug etc as required.

iii. Metal switch boxes for control switches, regulators, sockets etc, recessed or surface type, and phenolic laminated sheet covers over the same.

iv. Outlet boxes, junction boxes, pull-through boxes etc, but excluding metal boxes if any, provided with switchboards for loose wires/conduit terminations.

v. Any special block required for neatly housing the connector.

vi. Control switch or MCB, as specified.

vii. 3 pin or 6-pin socket, ceiling rose or connector as required.

i. Connections to ceiling rose, connector, socket outlet, lamp holder,switch etc.

ix. Interconnecting wiring between points on the same circuit, in the same switch box or from another.

x. Protective (loop earthing) conductor from one metallic switch box to another in the distribution circuits, and for socket outlets. (The length of protective conductor run along with the circuits/sub mains is excluded from scope of points)

xi. Bushes conduit or porcelain tubing where wiring cables pass through wall etc.

1.3 MATERIAL :-

The system of wiring shall consist of ISI marked single core PVC insulated flexible copper conductor wires as per IS: 694 amended up to date.

2. MEASUREMENT:-

i. Contractor shall measure the work jointly with the site engineer and prepare measurement sheets in triplicate. Three copies of measurement sheets shall be submitted along with running account bills. Bills received without proper measurements of work shall not be considered submitted.
ii. Should the contractor neglect to measure the work, then the measurement taken by Engineer/Architect or a person approved by the Bank shall be final and binding to him.Such measurements shall be taken in accordance with the mode of measurements wherever specified or as per actual executed quantities.
iii. All authorized extra works, omissions and all variations made without the Engineer/Architect/Bank's knowledge, or subsequently sanctioned by him in writing (with the prior approval of the contractor in writing) shall be included in such measurement.
iv. All bills for the work shall be submitted in the tender price bid format.

2.1. POINT WIRING (OTHER THAN SOCKET OUTLET POINTS) :-

i. Unless and otherwise specified, there shall be no linear measurement for point wiring for light points, fan points, exhaust fan points and call bell points. These shall be measured on unit basis by counting.

ii. No separate measurement will be made for interconnections between points in the same distribution circuit and for the circuit protective (loop earthing) conductors between metallic switch boxes.

2.2 POINT WIRING FOR SOCKET OUTLET POINTS :-

i. The light plug (5A/6A) point and power (15A/16A) point wiring shall be measured on linear basis, from the respective tapping point of live cable, namely switch box, another socket outlet point, or the sub distribution board as the case may be, up to the socket outlet.

ii. The metal box with cover, switch/MCB socket outlet and other accessories shall be measured and paid as a separate item.

iv. The power point outlet will be 15A/5A or 16A/6A six-pin socket outlet.

2.3 GROUP CONTROL POINTS WIRING:-

i. In the case of points with more than one point controlled by the same switch, such point shall be measured in parts i.e.(a) from the switch to the first point outlet as one point, and (b) for the subsequent points each shall be treated as separate point.

ii. No recovery shall be made for non-provision of more than one switch in such cases.

2.4 TWIN CONTROL LIGHT POINT WIRING: -

i. A light point controlled by two numbers of two way switches shall be measured as two points from the fitting to the switches on either side.

ii. No recovery shall be made for non-provision of more than one ceiling rose or connector in such cases.

2.5 MULTIPLE CONTROLLED CALL BELL POINTS WIRING:-

i. In the case of call bell points with a single call bell outlet, controlled from more than one place, the point shall be measured in parts i.e. (a) from the call bell outlet to one of the nearest ceiling roses meant for connection to bell push, treated as one point and (b) from that ceiling rose to the next one and so on, shall be treated as separate point(s).

ii. No recovery shall be made for non-provision of more than one ceiling rose or connector for connection to call bell in such cases.

3. CIRCUIT AND SUBMAIN WIRING:-

3.1. CIRCUIT WIRING:-

Circuit wiring shall mean the wiring from the distribution board up to the tapping point for the nearest first point of that distribution circuit, viz. up to the nearest first switch box.

3.2. SUB MAIN WIRING:-

Sub main wiring shall mean the wiring from one main/distribution switchboard to another and from Distribution Board to Power Outlet/ AC Outlet.

4. MEASUREMENT OF CIRCUIT AND SUBMAIN WIRING:-

j. Circuit and sub main wiring shall be measured on linear basis along the run of the wiring. The measurement shall include all length from end to end of conduit or casing and capping as the case may be, exclusive of interconnections inside the switchboard etc. The increase on account of diversion or slackness shall not be included in the measurement.

ii. The length of circuit wiring with two wires shall be measured from the distribution board to the first nearest switch box in the circuit irrespective of whether the neutral conductor is taken to switch box or not.

iii. When wires of different circuits are grouped in a single conduit/casing and capping, the same shall be measured on linear basis depending on the actual number and sizes of wires run.

iv. When circuit wires and wires of point wiring are run in the same conduit/casing and capping, circuit wiring shall be measured on linear basis depending on the actual number and sizes of wires run in the existing conduit/casing capping.

v. Protective (loop earthing) conductors, which are run along the circuit wiring and the sub main wiring, shall be measured on linear basis and paid for separately, if not included in item.

vi. Except as specified above for point wiring, circuit wiring and sub main wiring, other types of wiring shall be measured separately on linear basis along the run of wiring depending on the actual number and sizes of wires run.

5. SYSTEM OF DISTRIBUTION AND WIRINGS:-

i. Main distribution board shall be controlled by the circuit breaker. Each outgoing circuit shall be controlled by a circuit breaker on the phase or live conductor.

ii. The branch distribution board shall be controlled by a circuit breaker. Each outgoing circuit shall be provided with a MCB of specified rating on the phase or live conductor.

iii. The load of the circuits shall be divided, as far as possible, evenly between the number of ways of the distribution boards, leaving at least one spare circuit for future extension.

iv. The neutral conductors (incoming and outgoing) shall be connected to a common link (multi way connector) in the distribution board and be capable of being disconnected individually for testing purposes.

v. Wiring shall be separate for essential loads (i.e those fed through stand by supply) and non-essential loads throughout.

6. BALANCING OF CIRCUITS:-

The balancing of circuits in three wire or poly phase installations shall be arranged up to

the satisfaction of the Engineer-in-charge.

7. WIRING SYSTEM :-

k. Unless and otherwise specified the wiring shall be done only by the "Looping system". Phase or live conductors shall be looped at the switch boxes and neutral conductors at the point outlets.

ii. Lights, fans and call bells shall be wired in the 'lighting' circuits. 15A/16A socket outlets and other power outlets shall be wired in the 'Power' circuits. 5A/6A socket outlets shall also be wired in the "Lighting" circuit both in residential as well as non-residential buildings.

iii. The wiring throughout the installation shall be such that there is no break in the neutral wire except in the form of linked switchgear.

iv. Surface wiring shall run, as far as possible, along the walls and ceiling so as to be easily accessible for inspection.

v. In no case, the open wiring shall be run above the false ceiling without the approval of Engineer-in-charge.

vi. In all types of wiring, due consideration shall be given for neatness, good appearance and safety.

8. PASSING THROUGH WALLS OR FLOORS:-

i. When wiring cables are to pass through a wall, these shall be taken through a protection (steel/PVC) pipe or porcelain tube of suitable size such that they pass through in a straight line without twist or cross in them on either end of such holes. The ends of metallic pipe shall be neatly bushed with porcelain, PVC or other approved material.

ii. Where a wall pipe passes outside a building so as to be exposed to weather, the outer end shall be bell mouthed and turned downwards and properly bushed on the open end.

9. JOINTS IN WIRING:-

i. No bare conductor in phase and/or neutral or twisted joints in phase, neutral, and/or protective conductors in wiring shall be permitted.

ii. There shall be no joints in the through-runs of cables. If the length of final circuit or sub main is more than the length of a standard coil, thus necessitating a through joint, such joints shall be made by means of approved mechanical connectors in suitable junction boxes.

iii. Termination of multi-stranded conductors shall be done using suitable crimping type thimbles.

10. CONFORMITY TO I.E. ACT, I.E. RULES AND STANDARDS:-

i. All electrical works shall be carried out in accordance with the provisions of the Indian Electricity Act, 1910 and Indian Electricity Rules 1956 amended up to date.

ii. The work shall also conform to relevant Indian Standard codes of practice for the type of work involved.

iii. In all electrical installation works, relevant safety codes of practice shall be followed.

iv. The complete wiring installation shall confirm to IS: 732 amended up to date.

11. GENERAL REQUIREMENTS OF COMPONENTS:-

11.1 QUALITY OF MATERIALS :-

All materials and equipment supplied by the contractor shall be new. They shall be of such design, size and material as to satisfactorily function under the rated conditions of operation and to with stand the environmental conditions at site.

11.2 RATING OF COMPONENTS:-

i. All components in a wiring installation shall be of appropriate ratings of voltage, current and frequency, as required at the respective sections of the electrical installation in which they are used.

ii. All conductors, switches and accessories shall be of such size as to be capable of carrying the maximum current, which will normally flow through them, without their respective ratings being exceeded.

11.3 CONFORMITY OF STANDARDS:-

All components shall conform to relevant Indian Standard specification, wherever existing. Materials with ISI certification mark shall be preferred. However for conduits, wiring cables, piano/tumbler switches and socket outlets, ISI marked materials shall only be permitted.

11.4 INTERCHANGEABILITY: -

Similar parts of all switches, lamp holders, distribution fuse boards, switch gears, ceiling roses, brackets, pendants, fans and all other fittings of the same type shall be interchangeable in each installation.

SWITCHES & RECEPTACLES (Modular Type)

1. CONTROL SWITCHES FOR POINTS:-

i. The switch box or regulator box shall be made of metal on all sides, except on the front. In the case of cast boxes, the wall thickness shall be at least 3 mm and in case of welded mild steel sheet boxes, the wall thickness shall not be less than 1.2 mm (18 gauge) for boxes up to a size of 20 cm x 30 cm, and above this size 1.6 mm (16 gauge) thick MS boxes shall be used. The metallic boxes shall be duly painted with anticorrosive paint before erection.

ii. Where a large number of control switches and/or fan regulators are required to be installed at one place, these shall be installed in more than one outlet box adjacent to each other for ease of maintenance.

iii. An earth terminal with stud & 2 metal washers shall be provided in each MS box for termination of protective conductors and for connection to socket outlet/metallic body of fan regulator etc.

iv. Clear depth of the box shall not be less than 50 mm, and this shall be increased suitably to accommodate mounting of fan regulators in flush pattern.

v. The fan regulators can also be mounted on the switch box covers, if so directed by the Engineer-in-charge.

vi. Control switches (single pole switches) carrying not more than 16 A shall be of Modular type, as specified, and the switch shall be "ON" when the nob is down.

vii. Only MCB's shall be used for controlling industrial type socket outlets.

viii. Control switch shall be placed only in the live conductor of the circuit. No single pole switch or fuse shall be inserted in the protective (earth) conductor, or earthed neutral conductor of the circuit.

ix. All switches, regulators, outlets & other accessories shall be white colour with matching white cover plate. In no case ivory or off-white switches shall be accepted.

2. SOCKET OUTLETS: -

i. Socket outlet shall be of the same type, white Modular type as their control switches. These shall be rated either for 5A/6A or 15A/16A. Combined 5A/15A or 6A/16A six pin socket outlet shall be provided in Rs.power' circuits.

ii. In an earthed system of supply, socket outlets and plugs shall only be of 3 pin type, the third pin shall be connected to earth through protective (loop earthing) conductor. 2 pin or 5 pin sockets shall not be permitted to be used.

iii. Every socket outlets shall be controlled by a switch or MCB, as specified. The control switch/MCB shall be connected on the Rs.live' side of the line.

iv. Outlet boxes for socket outlets (both15A/16A and 5A/6A) points shall be of size 175 mm x 100mm.

v. Unless and otherwise specified, the control switches for the 5A/6A and 15A/16A socket outlets shall be kept along with the socket outlets.

3. SWITCH BOX COVERS :-

Phenolic laminated sheets of approved white shade shall be used for switch box covers. These shall be of white 3 mm thick synthetic phenolic resin bonded laminated sheet as base material and conforming to grade P-I of IS:2036-1974, Secured to the box with counter sunk C.P. Brass Screws. The corners of cover plates shall be at right angle.

SWITCHES & BOXES (Modular Type)

i. The switch box or regulator box shall be made of metal on all sides, except on the front. Since Modular type switches are to be used in the project, hence the boxes shall also be used of the same make and model. The size of box shall be governed by the number of switches/outlets/regulators on the respective board. The boxes shall be with zinc plating and yellow passivation to complies with the rust test as per IS 3854. The boxes should have slotted holes for level adjustments. The boxes shall be fitted with riveted brass earth terminals for earth connections.

ii. Clear depth of the box shall not in a range of 50 mm to 65 mm depending upon the size of board and manufacturer.

iii Control switch shall be placed only in the live conductor of the circuit. No single pole switch or fuse shall be inserted in the protective (earth) conductor, or earthed neutral conductor of the circuit. The switches shall be provided with silver contacts. The neutral should make first and breaks last.

iv. Socket outlet shall be rated either for 5A/6A or 15A/16A. 5/6 Amp sockets shall be of 5 pin type with shutters. Combined 5A/15A or 6A/16A six pin shuttered socket outlet shall be provided in Rs.power' circuits. The earth pin shall be connected to earth through protective (loop earthing) conductor. All sockets shall be provided with safety shutters to allow easy entry of two pin plugs without the need to force the earth terminal by unsafe means. All sockets shall confirm to IS: 1293.

v. Every socket outlet shall be controlled by a switch, as specified. The control switch shall be connected on the Rs.live' side of the line.

Vi The switches and sockets shall be manufactured using engineering plastic to make it fire retardant and highly resistant to impact.

vii.The fan speed regulators shall be of electronic and stepped type

viii. The RJ-45 data socket shall be suitable for cat5/cat 6 data cables.

ix. Gold plated contacts shall be provided in all communication jacks to enhance data and voice transmission.

SWITCHGEAR AND CONTROLGEAR

1. GENERAL ASPECTS:-

i. All items of switchgear and distribution boards (DB's) shall be metal clad type.

ii. The types, rating and/or categories of switchgear and protective gear shall be as specified in the tender schedule of work.

iii. RCCB's, ELCB's and RCBO's where specified, shall conform to the requirements of current rating, fault rating, single phase or three phase configuration and sensitivity laid down in the tender documents.

v. While each outgoing way of distribution board (D.B.) shall be of miniature circuit breaker (MCB) as specified, and of suitable rating on the phase conductor, the corresponding earthed neutral conductor shall be connected to a common neutral terminal block and shall be capable of being disconnected individually for testing purpose.

v. Independent earth terminal block**.**

Every distribution board (single phase as well as three phase) shall have an earth terminal block identical to, but independent from neutral terminal block, to enable termination of protective (loop earthing) conductors (incoming as well as out goings) individually by screwed connection and without twisting.

vi. Earthing terminal (1 for single phase and 2 for three phase) shall be provided on the metal cladding of switches and D.B.'s for body earthing. These shall be suitably marked.

vii. Knock out holes, with or without end plates as per standard design of manufacturers, shall be provided in the metal cladding of switches and D.B.' s for termination of conduits/cables.

vii. Each distribution board shall be provided with a circuit list giving details of each circuit, which it controls, and the current rating of the circuit, and the size of the fuse element.

2. MCB TYPE DISTRIBUTION BOARDS (MCB DB):-

i. MCB DB' s may be of single phase, three phase (horizontal type) suitable for feeding single phase loads or 3 phase (vertical type) suitable for feeding single phase as well as three phase loads, each phase isolation type three phase DB in which each phase can be isolated by a separate circuit breaker or RCCB, as specified. These shall be complete with accessories, but without MCB' s, which shall be specified as a separate item in the tender documents.

ii. The current ratings and the number of ways shall be as specified. Blanking plates shall be provided to close unused ways. These shall be indicated as a separate item in the Schedule of work.

iii. MCB DB's shall be of surface/flush mounting pattern according to the requirement of their location, and shall be suitable to accommodate MCB' s and MCB type isolators and RCCB (ELCB) at incoming in single pole or multi pole configuration, as required.

v. MCB DB's shall be double door type; dust and vermin proof conforming to IP 42, and shall be fabricated out of CRCA sheet steel, 1.6 mm thick, with stove enameled paint finish.

v. In case of Concealed / Recessed D.B.'s, cutting of brick work, providing suitable lintel, making good the wall including plastering etc. with necessary civil work including all Civil material shall be included in contractor's scope for proper completion of work.

vi. MCB DB's shall have removal type end plates with knockouts at the bottom and top, and shall have hinged covers with locking arrangement.

vii. Only the knobs of the MCB's shall protrude out of the front covers through openings neatly machine made for the purpose.

viii. The bus bars used shall be solid electrolytic copper of appropriate sections.

ix. Din bar(s) shall be provided for mounting the MCB's.

x. The complete board shall be factory fabricated and shall be duly pre-wired in the works, ready for installation at site.

xi. The board shall be fully pre wired with single core PVC insulated copper conductors/insulated solid copper links, and terminated on to extended type terminal connectors, suitable for connections to the sizes of the respective conductors.

xii. All incoming and outgoing wiring to the pre wired MCB DB's shall be terminated only in the extended terminal connectors to be provided within the DB. The terminal connectors shall therefore be so provided as to facilitate easy cable connections and subsequent maintenance.

3. MCCB TYPE DISTRIBUTION BOARDS (MCCB DB) :-

i. All MCCB DB' s shall be of three phase suitable for feeding single phase loads or 3 phase loads through SP/TP MCB's, IP 42 enclosure, sheet steel, double door with tinned copper bus bar, neutral bar, earth bar, knock outs etc. The DB's shall be original factory fabricated of approved make.

ii. The current ratings of Incomer MCCB shall be upto 250 amp and the number of ways shall be as specified. Blanking plates shall be provided to close unused ways.

iii. MCCB DB shall be of surface/flush mounting pattern according to the requirement of their location, and shall be suitable to accommodate Four pole MCCB at incomer and SP/TP MCB's at outgoings, as required.

vi. MCCB DB's shall be dust and vermin proof conforming to IP 42, and shall be fabricated out of CRCA sheet steel, 1.6 mm thick, with stove enameled paint finish.

v. In case of Concealed / Recessed D.B.'s, cutting of brick work, providing suitable lintel, making good the wall including plastering etc. with necessary civil work including all Civil material shall be included in contractor's scope for proper completion of work.

vi. MCCB DB' s shall have removal type end plates with knock-outs at the bottom and top, and shall have hinged covers with locking arrangement.

vii. The bus bars used shall be solid electrolytic copper of appropriate sections.

ix. Din bar(s) shall be provided for mounting the MCB's.

4. WORKMANSHIP:-

i. Good workmanship is an essential requirement to be complied with. The entire work of manufacture/fabrication, assembly and installation shall conform to sound engineering practice.

ii. The work shall be carried out under the direct supervision of a first class licensed foreman, or of a person holding a certificate of competency issued by the state Government for the type of work involved, employed by the contractor, who shall rectify then and there the defects pointed out by the Engineer-in-charge during the progress of work.

5. COMMISSIONING ON COMPLETION: -

Before the workman leaves the work finally, he must make sure that the installation is in commission, after due testing.

6. COMPLETION PLAN AND COMPLETION CERTIFICATE:-

i. For all works completion certificate after completion of work shall be submitted to the Engineer-in-charge.

ii. Completion plan drawn to a suitable scale in tracing cloth with ink indicating the following, along with three blue print copies of the same shall also be submitted.

a) General layout of the building.

b) Locations of main switch board and distribution boards, indicating the circuit numbers controlled by them.

c) Position of all points and their controls.

d) Types of fittings, viz. fluorescent, pendants, brackets, bulkhead, fans and exhaust fans etc.

e) Name of work, job number, accepted tender reference, actual date of completion, names of Division/Sub-Division and name of the firm who executed the work with their signature.

7. ADDITION TO AN INSTALLATION:-

An addition, temporary or permanent, shall not be made to the authorized load of an existing installation until it has been definitely ascertained that the current carrying capacity and the condition of the existing accessories, conductors, switches etc affected, including those of the supply Authorities, are adequate for the increased load.

CIRCUIT BREAKERS

A. MINIATURE CIRCUIT BREAKERS (MCB):-

Miniature Circuit Breaker shall comply with IS-8828-1996/ IEC898-1995 amended upto date.
Miniature circuit breakers shall be quick make and break type for 240/415 V AC, 50 Hz application with magnetic thermal release for over current and short circuit protection.
The breaking capacity shall not be less than 10kA at 415V AC.
MCBs shall be DIN mounted.
MCBs shall be current limiting type (class-3).
MCBs shall be C-curve.
MCBs shall have minimum power loss (watts) per pole defined as per the IS/IEC and the manufacturer shall publish the values.
MCBs shall be of self-extinguishing ULV0 grade thermoset plastic material. The housing shall be heat resistant and having high impact strength. The terminals shall be protected against finger contact to IP20 Degree of protection.
All DP, TP, TPN and 4pole MCBs shall have a common trip bar independent to external operating handle.
Mechanical Life shall be 20000 operations and Service life at rated load for In below 32A shall be 20000 and for In above 32A shall be 10000 operations.

B. Earth Leakage Circuit Breaker / Residual Current Circuit Breaker - Current Operated Type (ELCB / RCCB / RCBO)

- **System of operation**

ELCB/ RCCB/RCBO shall work on the principle of core balance transformer. The incoming shall pass through torroidal core transformer. As long as the currents in the phase and neutral shall be the same, no electro motive force shall be generated in the secondary winding of the transformer. In the event of a leakage to earth, an unbalance shall be created which shall cause a current to be generated in the secondary winding, this current shall be fed to a highly sensitive miniature relay, which shall trip the circuit if the earth leakage current exceeds a pre-determined critical value. ELCB/RCCB/RCBO shall be current operated independent of line voltage. Current sensitivity shall be of 30mA at 240/415V AC or as specified in BOQ / drawings and shall have a minimum of 10000 electrical operations. The RCBO shall also provide over load and short circuit protection in addition to the earth leakage protection.

- **Mechanical Operation**

The moving contacts of the phases shall be mounted on a common bridge, actuated by a rugged toggle mechanism. Hence, the closing/opening of all three phases shall occur simultaneously. This also shall ensure simultaneous opening of all the contacts under tripping conditions.

Neutral Advance Feature

The neutral moving contact shall be so mounted on the common bridge that, at the time of closing, the neutral shall make contact. First before the phases; and at the time of opening, the neutral shall break last after allowing the phases to open first. This is an important safety feature which is also required by regulations.

- **Testing Provision**

A test device shall be incorporated to check the integrity of earth leakage detection system and the tripping mechanism. When the unit is connected to service, pressing the test knob shall trip the ELCB/RCCB/RCBO and the operating handle shall move to the “OFF” position.

C. MOULDED CASE CIRCUIT BREAKER (MCCB's)

The rated normal current should be specified at 40°C

1. General

Moulded case circuit breakers shall be incorporated in the switchboard wherever specified. MCCB shall conform to IS: 13947 (Part-2): 1993 or IEC-60947-2 in all respects. MCCB shall be suitable either for single phase AC 230 Volts or three phase 415 volts ± 10%. The rated insulation voltage shall be 600 volts. Suitable discrimination shall be provided between upstream and downstream breakers in the range of 10-20 milli seconds. The MCCBs will have earth fault module (if specifically asked) and front operated.

MCCB shall indicate its suitability for isolation and this should appear clearly on the MCCB with the symbol as specified in standard IS: 13947/IEC 60947.

2. Construction.

The MCCB cover and case shall be made of high strength heat-resistant and flame retardant thermosetting insulating material; operating handle shall be quick make/quick break.The operating handle shall have suitable Rs.ON' Rs.OFF' and Rs.TRIPPED' mechanical indicators notable from outside. Three phase MCCBS shall have a common operating handle for simultaneous operation and tripping of all the three phases.

Suitable arc extinguishing device shall be provided for each contact. **Tripping unit shall be thermal-magnetic type upto 250A and Microprocessor based above 250A (or as specified specifically in Bill of Quantities and drawings)** provided on each pole and connected by a common trip bar such that tripping of any one pole operates all three poles to open simultaneously. Tripping device shall have IDMT characteristics for sustained over load and short circuits.

3. Contact tips shall be made of suitable arc resistant, sintered alloy for long electrical life. Terminals shall be of liberal design with adequate clearances.

4. Accessories

All the accessories shall be mounted from the front and shall be adjustment free. MCCBs shall have the electrical accessories fitted even without removing the circuit breaker from the switchboard so that site changes, if any, can be carried out easily. MCCB shall be provided with the following accessories, if specified in schedule of quantities, such as Under voltage trip, Shunt trip, Alarm switch, auxiliary switches, Rotary and motorized operating mechanism, Plug in and with draw able mechanism etc.

5. Interlocking

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

a) Handle interlock to prevent unnecessary manipulations of the breaker.

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

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

6. Rupturing capacity

The moulded case circuit breaker shall have a rupturing capacity as mentioned against each in Schedule of Quantity at 415 volts. Wherever required, higher rupturing capacity breakers to meet the system short circuit fault shall be used. In absence of any capacity specifically mentioned in the bill of quantities and drawings, following rupturing capacities shall be used –

100 / 125 Amp	: 25 KA
160/200/250 Amp	: 35 KA
300/400/630/800 Amp	: 50 KA

7. The MCCB shall be **current limiting type** and comprise of quick make – break switching mechanism. MCCBs shall be capable of defined variable overload adjustment. For thermal magnetic protection the O/L adjustment should be 75%-100% and for microprocessor-based release the adjustment should be 40%- 100% and S/c for 2 to 12 times .All MCCBs rated 200 Amps and above shall have adjustable magnetic short circuit pick-up.

8. Electrical Features

All MCCB's & shall be selected on the basis of rated current. Four poles MCCBs shall be always supplied with neutral protection. The MCCBs having 400A & should have category B as per the IEC standards to ensure the selectivity. Minimum Electrical & Mechanical Endurance of MCCB Shall be as follows

Rating of MCCB	**Electrical Endurance**	**Mechanical Endurance**
Upto 160 A	7000 Opns	25000 Opns
Above 160 A	4000 Opns	15000 Opns

9. The trip command shall override all other commands. The manufacturer shall provide both the discrimination tables (with test certificates) and let-through energy curves. Line and Load connections shall be interchangeable.

10. Installation

It should be possible to terminate Aluminium cable of required size for the defined current carrying capacity. The requisite size should be made available by means of extended terminals (as a standard offer) in case the direct terminals are not of adequate size. Adequate phase to phase clearance has to be ensured in case of extended terminations.

The circuit breaker should provide the flexibility of terminating line and load from any direction. Manufacturers should test the circuit breaker for this condition and requisite test certificate should be available.

Phase barrier should be provided as a standard feature.

11. Testing

a) Original test certificate of the MCCB as per BS 3871 or JS-C-8370 shall be furnished.
b) Pre-commissioning tests on the switchboard panel incorporating the MCCB shall be done as per standard specifications.

D. AIR CIRCUIT BREAKER

1. General

Air circuit breakers shall be incorporated in power control center and motor control centers wherever specified. ACB shall conform to **IEC60947 / IS: 13947** Part-2 1993 in all respects. ACBS shall be suitable for operation on 660 volts, 3 phase, 50/60 Hz, AC supply. The rated insulation voltage shall be equal to or greater than 1000V.The rated impulse withstand voltage shall be equal to 12kV, so that the device can be used for every installation category, in compliance with the international standards CEI IEC 664-1.

2. Type and construction

Air circuit breakers shall be of enclosed pattern, dead front type with trip free operating mechanism. Air Circuit breakers shall be **withdraw able type with horizontal draw out carriage.**The mechanism shall be mechanical if not specifically mentioned for electrical. The ACBs shall be strong and robust in construction with suitable arrangement for anchoring when in fully engaged or fully drawn out positions. The carriage or cradle on which the

breaker is mounted shall be of robust design made of fabricated steel, supported on rollers. Cradle shall also comprise of main and secondary separable contacts and all draw out mechanisms in a completely fig welded assembly short circuit on top. There shall be no dependence upon the panel board frame for any critical alignment. The withdrawal arrangement shall be such as to allow smooth and easy movement.

The draw out operation shall be possible through a closed door. Three positions of the moving part shall be possible:

1 - Connected / service position - all auxiliary and main circuits engaged
2 - Test position - all auxiliary circuits engaged all main circuits disconnected
3 - Isolated position - all circuits disconnected.

All three positions should be indicated discreetly on the cradle. Safety shutter to be provided as standard
All the current carrying parts of the circuit breakers shall be silver-plated. Suitable arcing contacts shall be provided to protect the main contacts. The contacts shall be of spring-loaded design. The sequence of operation of the contacts shall be such that arcing contacts Rs.make' before and Rs.break' after the main contacts. Arcing contacts shall be provided with efficient arc chutes on each pole. The arc chutes shall be suitable for ready replacement. Self-aligning isolating contacts with automatic shutters to screen the live parts shall be provided. The design of the breaker shall be such that all the components are easily accessible to inspection, maintenance and replacement. The ACB at its rated current shall be suitable for operation in extremely tropical humid climate at 50°C ambient temp. The manufacturer shall declare ideal de-rating charts.

There should be total segregation between the power circuit and control circuit, thus making double insulation and ensuring fitting of accessories while the circuit breaker is in the ON position. It shall be possible to inspect the arcing chamber and main contacts. The ACB shall have metal load bearing structures. The main contacts shall be separate from the arc-breaking contacts. It shall be possible to check the wear of the main contacts with the ACB in its racked-out position, removing the arcing chambers. No mechanical junctions in the main contact shall be there so that losses are minimal.

3. Operating Mechanism

Air circuit breaker shall be provided with a **quick-make, trip-free** operating mechanism. The operating mechanism shall be strain-free spring operated. The operating shall be "handle front of the panel" type. The design shall be such that the circuit breaker compartment door need not be opened while moving the breaker from completely connected, through test, in to the disconnected position. The spring shall be charged automatically during the closing operation. Mechanical Indication of the position of the spring charge shall be provided.

4. Interlocking and safety arrangement

Air circuit breakers shall be provided with the following safety and interlocking arrangements:

i) It shall not be possible for breaker to be withdrawn when in Rs. ON" position.

ii) It shall not be possible for the breaker to be switched on until it is either in fully inserted position or for testing purposes it is in fully isolated position.
iii) The breaker shall be capable of being raked in to Rs.testing' isolated and maintenance positions and kept locked in any of these positions.
iv) A safety latch to ensure that the movement of the breaker, as it is withdrawn is checked before it is completely out of the cubicle.
v) If under voltage release is provided then circuit breaker will close only if it is energized. Under voltage release should have time delay to avoid nuisance tripping for transient voltage failure
vi) The operating mechanism shall provide for raking the breaker in to connect, test and disconnected positions without opening the compartment door.
vii) Mechanical interlocks shall be provided between the operations of different breakers (if specified in Bill of Quantities).

The circuit breaker shall provide as a standard feature, the following mechanical indicator in the front Panel

1 Contact portion indicator (on/off)

2. Stored energy status indicator

3. Trip indicator on fault

5. Rating

The CTs range from 250A to 6300A: all the CTs shall have a structure made of self-extinguishing thermoplastic material. The breaking capacity of the ACB shall be greater than or equivalent to 50kA. The Breaking Capacity of the circuit breaker shall be as indicated in the BOQ with minimum of 50kA for upto 1250A, 65kA for 1600 to 2000A and 80kA for 2500 to 3200A. **Icu=Ics for all ACBs**. Icw rating at 1 sec/3sec should be declared. The minimum Electrical & Mechanical Life of ACB at 415/440V shall be as follows:

Rating of ACB	**Electrical Endurance**	**Mechanical Endurance**
Upto 1600 A	10000 Opns	20000Opns
2000-4000 A	5000 Opns	15000 Opns
Above 4000 A	1500 Opns	10000 Opns

6. Accessories

All the accessories like U/V, shunt opening, shunt closing shall be accessible from the front.

Circuit breakers shall be provided with the following Accessories: -

i) Under-voltage relay for the incoming ACB.

ii) Microprocessor based Overload releases with IDMT characteristics.

iii) Microprocessor based Instantaneous earth fault release.

iv) Alarm switches (if specifically asked for)

v) Auxiliary switches

viii) NO and NC auxiliary contacts rated for 10 Amps at 415 V AC and 6 Amp at 48V DC, in addition to ones already in use for the operation of the breaker and will be used in subsequent interlocks to be incorporated in future.

8. <u>Mechanical indicators</u>

Mechanical indication on the front of the air circuit breaker shall be provided to indicate the following:

- main contacts closed "ON"
- main contacts open "OFF"
- springs charged
- springs discharged
- circuit breaker in "service" position (drawout only)
- circuit breaker in "test" position (drawout only)
- circuit breaker in "isolated" position (drawout only)

9. Mounting

Circuit breakers shall be mounted as per the standard specification of power control centers.

10. Testing

Testing of each circuit breaker shall be carried out at the works as per IEC:60947 and the original test certificate shall be furnished in triplicate. The tests shall incorporate atleast the following:

i) Impulse withstand test

ii) Insulation test
iii) Di-electric rigidity /Insulation test
iv) Mechanical operation checking
v) Thermal protection with a current of 3ith starting from cold conditions.

11. Protection

The ACB shall be with an integral self-powered **microprocessor based current release** for Overload, Short-Circuit and Earth Fault protection which works on true rms values for ensuring accurate protection, if specifically asked for. The protection unit should meet the EMI/EMC requirement as per latest standard. Online Test Fault shall be provided to test healthiness of release and ACB.

12. Setting range of protection release

a) Overload protection shall have adjustable setting from 40% to 100% of the ACBs rated current in steps of 10% and adjustable time setting from 3-18m sec.

b) Short circuit protection shall have adjustable current setting from 100% to 1000% of the overload setting and adjustable time delay setting for fault discrimination from 50-500 m sec.

c) E/F protection if specified will have adjustable current setting from 40% to 100% of ACB rated current and adjustable time setting from 100-800m sec. It shall be possible to charge the release setting on load.

PVC CONDUIT WIRING SYSTEM

1. SCOPE:-

This chapter covers the detailed requirements for wiring work in non-metallic conduits. This chapter covers both surface and recessed types of wiring work.

2. APPLICATION:-

1. Recessed conduit work is generally suitable for all applications. conduit work may be adopted in places like workshops etc. and where recessed work may not be possible to be done. The type of work shall be as specified in individual works.
2. Flexible non-metallic conduits shall be used only at terminations, wherever specified.
3. Special precautions:-

i. If the pipes are liable to mechanical damages, they should be adequately protected.

ii. Non-metallic conduit shall not be used for the following applications:-

a) In concealed/ inaccessible places of combustible construction where ambient temperature exceeds 60^{o}C.

b) In places where ambient temperature is less than 5^{o}C.

c) For suspension of fluorescent fittings and other fixtures.

d) In areas exposed to sunlight.

3. MATERIAL:-

3.1 CONDUITS:-

i. All non-metallic conduit pipes and accessories shall be of suitable material complying with IS : 2509-1973 and IS : 3419-1988. for rigid conduits and IS : 9537(V)-2000 for flexible conduits. The interior of the conduits shall be free from obstructions. The rigid conduit pipes shall be ISI marked.

ii. The conduit shall be circular in cross-section. The conduit shall be designated by their nominal outside diameter. The dimensional details of rigid non-metallic conduits are given in **Table-3.**

iii. No non-metallic conduit less than 20 mm in diameter shall be used.

iv. **WIRING CAPACITY:-**

The maximum number of PVC insulated aluminum/copper conductor cables of 650/1100 V grade conforming to IS: 694-1990 that can be drawn in one conduit of various sizes is given in **table-4**. Conduit sizes shall be selected accordingly.

3.2 CONDUIT ACCESSORIES:-

i. The conduit wiring system shall be complete in all respect including accessories.

ii. Rigid conduit accessories shall be normally of grip type.

iii. Flexible conduit accessories shall be of threaded type.

iv. Bends, couplers etc. shall be solid type in recessed type of works, and may be solid or inspection type as required, in surface type of works.

v. Saddles for fixing conduits shall be heavy gauge non-metallic type with base.

vi. The minimum width and the thickness of the ordinary clips or girder clips shall be as per **Table-5.**

vii. For all sizes of conduit, the size of clamping rod shall be 4.5mm (7 SWG) diameter.

4. INSTALLATION:-

1. COMMON ASPECTS FOR BOTH RECESSED AND SURFACE CONDUIT WORKS.

i. The erection of conduits of each circuit shall be completed before the cables are drawn in.

ii. **CONDUIT JOINTS :-**

a) All joints shall be sealed/cemented with approved cement. Damaged conduit pipes / fittings shall not be used in the work. Cut ends of conduit pipes shall have no sharp edges or any burrs left to avoid damage to the insulation of conductors while pulling them through such pipes.

b) The Engineer-in-charge, with a view to ensuring that the above provision has been Carried out, may require that the separate lengths of conduit etc. after they have been prepared, shall be submitted for inspection before being fixed.

iii. **BENDS IN CONDUITS:-**

a) All bends in the system may be formed either by bending the pipes by an approved method of heating, or by inserting suitable accessories such as bends, elbows or similar fittings, or by fixing non-metallic inspection boxes, whichever is most suitable. Where necessary, solid type fittings shall be used.

b) Radius of bends in conduit pipes shall not be less than 7.5 cm.

c) Care shall be taken while bending the pipes to ensure that the conduit pipe is Not Injured, and that the internal diameter is not effectively reduced.

iv. **PAINTING:-**

After installation, all accessible surfaces of metallic accessories shall be painted.

5. ADDITIONAL REQUIREMENTS FOR SURFACE CONDUIT WORK:-

i. Conduit pipe shall be fixed by heavy gauge non-metallic saddles with base, secured to suitable approved plugs with screws in an approved manner, at an interval of not more than 60 cm, on either side of couplers or bends or similar fittings, saddles shall be fixed at a closer distance from the center of such fittings. Slotted PVC saddles may also be used where the PVC pipe can be pushed in through the slots.

ii. Where the conduit pipes are to be laid along the trusses, steel joists etc. the same shall be secured by means of saddles or girder clips as required by the Engineer-in-charge. Where it is not possible to use these for fixing, suitable clamps with bolts and nuts shall be used.

6. ADDITIONAL REQUIREMENTS FOR RECESSED CONDUIT WORK:-

i. **MAKING CHASE:-**

a) chase in the wall shall be neatly made, and of ample dimensions to permit the Conduit tube fixed in the manner desired.

b) In the case of buildings under construction, the conduits shall be buried in the wall Before plastering, and shall be finished neatly after erection of conduit.

c) In case of exposed brick/rubble masonry work, special care shall be taken to fix the conduit and accessories in position along with the building work.

ii. **FIXING CONDUITS IN CHASE:-**

a) The conduit pipe shall be fixed by means of staples, or by means of non-metallic saddles, placed at not more than 40 cm apart, or shall be fixed by any other approved means of fixing.

b) At either side of the bends, saddles/staples shall be fixed at a distance of 15 cm from the center of the bends.

iii. **ERECTION IN RCC WORK :-**

a) The conduit pipes shall be laid in position and fixed to the steel reinforcement bars by steel binding wires before the concreting is done. The conduit pipes shall be fixed firmly to the steel reinforcement bars to avoid their dislocation during pouring of cement concrete and subsequent tamping of the same.
b) Fixing of standard bends or elbows shall be avoided as far as practicable, and all Curves shall be maintained by bending the conduit pipe itself with a long radius which will permit easy drawing of conductors.
c) Location of inspection/junction boxes in RCC work should be identified by suitable means to avoid unnecessary chipping of the RCC slab subsequently to locate these boxes.

iv. **FIXING INSPECTION BOXES:-**

a) Suitable inspection boxes to the minimum requirement shall be provided to Permit Inspection, and to facilitate replacement of wires, if necessary.

b) These shall be mounted flush with the wall or ceiling concrete. Minimum 65 mm Depth junction boxes shall be used in roof slabs.

c) Suitable ventilating holes shall be provided in the inspection box covers.

v. **FIXING SWITCH BOXES AND ACCESSORIES:-**

Switch boxes shall be mounted flush with the wall. All outlets such as switches, socket outlets etc. shall be flush mounting type, unless otherwise specified in the additional specification.

vi. **FISH WIRE:-**

To facilitate subsequent drawing of wires in the conduit, GI fish wire of 1.2 mm (18 SWG) shall be provided along with the laying of the recessed conduit.

7. BUNCHING OF CABLES :-

a) Cable carrying alternating current, installed in metal conduit, shall always be bunched so that the outgoing and return cables are drawn into the same conduit.

b) Where the distribution is for single phase loads only, conductors for these phases shall be drawn in one conduit.

c) In case of three phase loads, separate conduits shall be run from the distribution boards to the load points, or outlets as the case may be.

8. EARTHING REQUIREMENTS:-

i. A protective (earth) conductor shall be drawn inside the conduit in all distribution circuits to provide for earthing of non-current carrying metallic parts of the installation. These shall be terminated on the earth terminal in the switch boxes, and/or earth terminal blocks at the DB's.
ii. Protective conductors of large size which may not be possible to be carried inside the conduits (as in the case of some sub mains etc.) may be laid external to the conduits and clamped thereto suitably.
iii. Gas or water pipes shall not be used as protective conductors (Earth medium).

TABLE - 3

DIMENSIONAL DETAILS OF RIGID NON-METALLIC CONDUITS.

(All dimensions in mm)

S.No.	Nominal outside diameter (In mm)	Maximum outside diameter (In mm)	Minimum inside diameter (In mm)	Maximum permissible eccentricity (In mm)	Maximum permissible ovality (In mm)
1.	20	$20^{+0.3}$	17.2	0.2	0.5
2.	25	$25^{+0.3}$	21.6	0.2	0.5
3.	32	$32^{+0.3}$	28.2	0.2	0.5
4.	40	$40^{+0.3}$	35.8	0.2	0.5
5.	50	$50^{+0.3}$	45.0	0.4	0.6

TABLE - 4

MAXIMUM NUMBER OF PVC INSULATED 650/ 1100 VOLT GRADE COPPER CONDUCTOR CABLE THAT CAN BE DRAWN INTO RIGID PVC CONDUIT

Nominal cross sectional area of conductor in Sqmm.	20 Mm	25 mm	32 Mm	40 mm
1.50	5	10	14	-
2.50	5	8	12	-
4.00	3	8	10	-
6.00	2	5	8	-
10.00	-	3	5	6
16.00	-	-	3	6
25.00	-	-	2	4

Note :-

The above table shows the maximum capacity ofconduits for a simultaneous drawing of cables.

TABLE - 5

ORDINARY CLIPS OR GIRDER CLIPS.

S.No.	Size of conduit	Width	Thickness
1.	20 mm & 25 mm	19 mm	20 SWG (0.9144 mm)
2.	32 mm & above	25 mm	18 SWG (1.219 mm)

EARTHING

1. SCOPE:-

This chapter covers the essential requirements of earthing system components and their installation. For details not covered in these specifications. IS code of Practice on earthing (IS: 3043-1987) shall be referred to.

2. INSTALLATION:-

1. ELECTRODES:-

i. Plate electrode shall be buried in ground with its faces vertical, and its top not less than 3 m below the ground level. The installation shall be carried out as per standard drawing.

ii. When more than one electrode is to be installed, a separation of not less than 2 m shall be maintained between two adjacent electrodes.

iii. a) The strip or conductor electrode shall be buried in trench not less than 0.5 m deep.
b) If condition necessitate the use of more than one strip or conductor electrode, they shall be laid as widely distributed as possible, in a single straight trench where feasible, or preferably in a number of trenches radiating from one point.

iv. Earth Electrodes shall be kept clear of the building foundation & in no case shall it be nearer than 2 meters from the outer surface of the wall.

3. WATERING ARRANGEMENT:-

i. In the case of plate earth electrodes, a watering pipe 20mm dia. medium class pipe shall be provided and attached to the electrodes. A funnel with mesh shall be provided on the top of this pipe for watering the earth.

ii. The watering funnel attachment shall be housed in a masonry enclosure of size not less than 30cm*30cm*30cm.

iii. A cost iron/MS frame with MS cover, 6 mm thick, and having locking arrangement shall be suitably embedded in the masonry enclosure.

4. EARTHING CONDUCTOR (Main earthing lead):-

i. The earthing conductor shall be securely terminated on to the plate with two bolts, nuts, check nuts and washers.

ii. A double C-clamp arrangement shall be provided for terminating tape type earthing conductor with GI watering pipe coupled to the pipe earth electrode. Galvanised "C" shaped strips, bolts, washers, nuts and check nuts of adequate size shall be used for the purpose.

iii. The earthing conductor from the electrode up to the building shall be protected from mechanical injury by a medium class 15 mm dia GI pipe in the case of wire, and by 40 mm dia, medium class GI pipe in the case of strip. The protection pipe in ground shall be buried at least 30 cm deep (to be increased 60 cm in case of road crossing and pavements). The portion within the building shall be recessed in walls and floors to adequate depth in due co-ordination with the building work.

iv. The earthing conductor shall be securely connected at the other end to the earth stud/earth bar provided on the switchboard by:

a) Soldered or preferably crimped lug, bolt, nut and washer in the case of wire, and,
b) Bolt, nut and washer in case of strip conductor.

c) Earthing Terminal/ neutral point/ earth bus in case of equipments/ sub stations.

5. PROTECTIVE (Loop earthing/earth continuity) CONDUCTOR:-

i. Earth terminal of every switchboard in the distribution system shall be bonded to the earth bar/terminal of the upstream switchboard by protective conductor(s).
ii. Two protective conductors shall be provided for a switchboard carrying a 3 phase switch gear thereon.
iii. All the mountings of industrial type switchboards shall be bonded to the earth stud/earth bar using a protective conductor looping from one to another. Loop earthing of individual units will not be however necessary in the case of cubical type switchboards.
iv. The earth connector in every distribution board (DB) shall be securely connected to the earth stud/earth bar of the corresponding switchboard by a protective conductor.
v. All metallic switch boxes and regulator boxes in a circuit shall be connected to the earth connector in the DB by protective conductor (also called circuit protective or loop earthing conductor), looping from one box to another up to the DB.
vi. The earth pin of socket outlets as well as metallic body of fan regulators shall be connected to the earth stud in switch boxes by protective conductor. Where the switch boxes are non-metallic type, these shall be looped at the socket earth terminals, switch or at an independent screwed connector inside the switch box. Twisted earth connections shall not be accepted in any case.
vii. Double earthing strips in rising mains, bus trunking etc. shall be securely connected to the earth bar/earth stud at the sending end switchboard. In the case of overhead bus bar systems, protective conductors shall be provided in addition to feeder cable armouring connection.

6. EARTH RESISTANCE:-

i. The earth resistance at each electrode shall be measured. No earth electrode shall have a greater ohmic resistance than 5 ohms as measured by an approved earth testing apparatus. In rocky soil the resistance may be up to 8 ohms.
ii. Where the above stated earth resistance is not achieved, necessary improvement shall be made by additional provisions, such as additional electrode(s), different type of electrode, or artificial chemical treatment of soil etc., as may be directed by the Engineer-in-charge.
iii. If the earth resistance is too high and the 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.

7. MARKING: -

i. Earth bars/terminals at all switchboards shall be marked permanently either as "E".
ii. Main earthing terminal shall be marked "SAFETY EARTH - DO NOT DISCONNECT".

CABLES

1. GENERAL

All cables shall be supplied, inspected, laid tested and commissioned in accordance with drawings, specifications, relevant Indian standards specifications and cable manufacturer's instructions. The cable shall be delivered at site in original drums with manufacturer's name clearly written on the drum.

The recommendations of the cable manufacturer with regard to jointing and sealing shall be strictly followed.

The laying of cable shall be done as per IS 1255 amended up to date.

Cable Identification

Cable identification shall be provided by embossing on the outer sheath the following:

(i) Manufacturer's name or trade mark
(ii) Voltage grade
(iii) Year of manufacture
(iv) Type of insulation
(v) Printing of cable length on each meter

Core Identification

Respective cores of power/control cables shall be identified with the following pattern :

2 core	:	red (R), black (BK)
3 core	:	5 core red (R), yellow (Y),blue (BL)
4 core	:	red (R),yellow (Y),blue (BL), black (BK)
5 core	:	red (R), yellow (Y),blue (BL), black (BK) & grey (GY)
7&14 cores	:	cores shall be numbered.

Tests

(i) Shop Tests
The cables shall be subject to shop tests in accordance with relevant standards to prove the design and general qualities of the cables as below:

(ii) Routine tests on each drum of cables.

(iii) Acceptance tests on drums chosen at random for acceptance of the lot.

(iv) Type tests on each type of cable, inclusive of measurement of armour D.C. resistance of power cables.

2. MATERIAL

11 kV HT Cables

The 11 KV cable shall be cross linked polyethylene insulated, GI strip armored, PVC inner and outer sheath (to be extruded type) earthed grade cable. The outer sheath shall be resistant to water, fungus, termite & rodent attacks. Colour of outer sheath shall be black. The cable shall be confirming to IS : 7098 (Part – II) with aluminium conductor as per I.S. 8130.

L T Power Cables

The 1.1 KV cables shall be XLPE insulated PVC sheathed aluminium conductor armoured conforming to IS : 7098 (part - 1) amended up to date or PVC insulated, extruded PVC inner sheath, steel strip armored and extruded PVC overall sheath conforming to 15:1554 (PI).as mentioned in the Bill of Quantities and drawings, laid in trenches, ducts and underground as shown on drawing or as per instruction given by engineer-in-charge.

Control Cables

Control cables shall be of stranded annealed copper conductors with cross section area of 1.5/ 2.5 sq.mm, PVC insulated, colour coded or with core identification, extruded inner sheathed, steel wire armoured and over all PVC extruded outer sheath etc. The cable shall conform to 15: 1554 (P-I).

Cable Termination

a) HT Cable Terminations

Cable termination shall be heat shrinkable type/cold shrink type suitable for sizes as specified in BOQ, XLPE insulated 11 kV (E) grade, and aluminum conductor armoured cables. Termination shall confirm to IS 3573 with latest amendment.

b) L T power, control cable termination

(i) L T cable termination shall be provided with compression cable glands of brass suitable for holding the armour of the cable.

(ii) Lugs shall be crimping type and shall be of copper suitable for copper conductor cable and of aluminum for aluminum conductor cable.

(iii) Termination shall be carried out as per details furnished in this specification.

Compression Glands

Cable glands shall be made of brass casting, machined accurately to the required size with protective coating of nickel.

Cable glands shall be of heavy duty type and shall consist of: gland nipple, neoprene seal for inner sheath, armour clamping cone, gland body, neoprene seal for outer sheath, skid washer, gland body nut.

The Aluminium conductor shall be stranded, grade H4 class 2 as per IS 8130 and copper conductor shall be annealed copper class 2 as per IS 8130.

Technical data sheets for above cables, including all electrical & mechanical parameters shall be furnished with offer.

L. T. PANEL

1. CONSTRUCTION FEATURES

a) Panels shall be indoor, metal clad, modular construction, fix type (except circuit breaker cubicles) air insulated and floor mounted type.

b) Unless otherwise mentioned, panels shall be of single front construction and shall be of dead front type.

c) All panels shall be extensible on both sides.

d) All panels shall be dust proof and vermin proof.

e) The panels shall have horizontal Busbar Chamber at top of the panel even for top cable entry.

f) All panels shall have provision for cable entry from top or from bottom or both as required. The same shall be confirmed to the Vendor during detailed engineering approval of shop drawing of panel manufacturer.

g) All panels including capacitor panels shall be fully compartmentalized with metal! insulating partitions between individual compartments.

h) The Horizontal busbar chamber shall be separate & totally enclosed.

i) Minimum thickness of CRCA MS sheet member shall be 1.6 mm for non load bearing members and 2.0 mm for load bearing members.

j) All panels shall comprise a continuous line up of dead front, free standing vertical sections. The installation of circuit breakers shall be limited to the bottom two tiers only. In two tiers formation two nos. of upto 1000 Amp. breakers can be provided.

k) All doors and cutouts shall be provided with neoprene gaskets.

l) The back doors of the panels shall be double door leaf type where the panels have more than 400 mm width.

m) Strong concealed type hinges shall support all doors.

n) All relays, meters, and switches etc. shall be flush mounted type.

o) All incoming terminals shall be provided with shrouds. Support shrouds shall be transparent and shall be made of SMC/DMC material. However Bakelite/Hylam material is not acceptable and shall not be used anywhere in panels.

p) The complete structure shall be rigid, self-supporting free from vibration, twists and bends etc.

q) The panels housing circuit breaker feeders shall be in single front draw out execution. The incoming & bus coupler circuit breaker feeders shall be in single tier formation while the outgoing circuit breaker feeders may be in double tier formation, unless otherwise specified.

r) A suitable barrier shall be provided between the circuit breaker and the associated control.

s) The number of modules shall be so decided that the cable alleys are not over crowded. However the number of module in any panel shall not exceed six. The minimum size of module shall be 300mm and 225mm for starter and switch fuse / MCCBs feeders respectively. The minimum clear width of cable alley shall be 300mm.

t) In cable alley, outgoing terminals shall be identified with feeder number.

2 BUS AND BUS TAPS

a) The main buses and connection shall be of high grade of aluminium bus bars conductivity aluminium 1 aluminium alloy (Grade EC-91 E), sized for specified current ratings with max, temp. limited to 85 deg.C (35 deg. above 50 deg. ambient temp.).Vertical bus bars shall be designed depending upon the actual feeder requirement. Bimetallic connector shall be provided for connection between dissimilar metals.

b) Busbars and connections shall be fully insulated for working voltage with adequate phase 1 ground clearances. Insulating sleeves for Bus bars and shrouds for joint shall be provided. Minimum clearance of 25 mm is required between phases and between phase & earth.

c) Shrouds for busbars joints tapping points shall be of fiber glass only. Bus insulators shall be flame retardant, track resistant type with high creepage surface and of non-hygroscopic material such as epoxy SMC DMC.

d) Busbars shall be supported and braced to withstand the stresses due to max. short circuit current and also to take care of any thermal expansion. .

e) The busbar size shall be of similar size as of busduct.

3 CHANGEOVER SWITCHES

a) Changeovers switches shall be 4 pole, heavy duty, group operated load break fault make type with AC 23A

duty.

b) The switches shall be capable of successfully withstanding the thermal stress for one sec. caused by the short circuit corresponding to the fault level specified.

c) The switches shall be able to withstand mechanical stresses caused by the peak short circuit currents corresponding fault level specified.

d) The switches shall be provided with operating handle compartment door and shall be so interlocked that on the hinged compartment door and shall be so interlocked that :
   i) The door can be opened only when the switch is in OFF position.
   ii) It shall not be possible to close the switch when the door is open.

e) The switch shall be provided with pad-locking arrangement for 250A and above rating.

f) The switch shall be provided with defeat interlock facilities.

4 FUSES

a) All fuses shall be HRC cartridge link type.

b) The fuses shall be provided with visible indication when they have operated.

c) Rating of the fuses shall be so chosen so as to have co-ordination with switch. Fuses shall preferably mounted directly on plug in type fuse bases & sufficient number of insulated fuse pullers shall be supplied.

d) Fuses and links functionally associated with the same circuit shall be mounted side by side.

Earthing and neutral links in main supply circuits shall be of silver plated copper & of bolted pattern.

5 CONTACTORS

a) Contactors shall be of double break, single throw and electromagnetic and non-gravity type.

b) Contactors shall be suitable for interrupted duty and shall be rated for class AC-3 duty.

c) Main contacts of contactors shall be silver faced.

d) Operating coils of contactors shall be suitable for operation on 220/240V AC, 1 phase, 50 Hz supply.

e) Contactors shall be provided with at least two pairs of 'NO' and 'NC auxiliary contacts.

f) Contactors shall not drop out at voltages down to 70% of coil rated voltages and min. pick up voltage shall be 85%.

6 OVERLOAD RELAYS

a) Overload protection for each motor feeder (wherever required) shall be provided by thermal overload relay on each of the three phases.

b) The relay shall be duly compensated against fluctuations on ambient temp. and frequency and shall have single phasing preventer feature.

c) Relay shall be hand reset type from the front of the cubicle door.

Overload relay for fan applications shall be of heavy duty type with provision of bypassing the same during starting of the fan.

7 CAPACITORS

a) The capacitor shall be of mixed dielectric type rated for 440Volts. Capacitors shall be provided with discharge resistors.The value of discharge resistors should be such that the residual voltage be less than 50V in one minute.

b) Capacitors shall be suitable for prolonged operation at an rms. voltage between terminals not exceeding 1.10 times the rated voltage, excluding transients.

c) Capacitors shall be suitable for continuous operation at an rms. line current not exceeding 1.30 times the current which occurs at rated sinusoidal voltage and rated frequency excluding transients.

d) The maximum continuous reactive output of a capacitor (including any due to flow of harmonic currents) shall not exceed 30% over rated reactive output of a capacitor.

e) Loss in the capacitors shall be kept as low as possible. (Max 0.5W/ KVAR).

f) Wherever capacitor consists of several elements inside the units, each element shall be provided with individual fuses, so that the unit need not be discharged or disconnected (although with moderate reduction in output), if one of short circuit to any of the elements.

8 AUTOMATIC POWER FACTOR CONTROL RELAY

a) Automatic Power factor control relay (APFCR) shall operate its auxiliary relay by sensing the power factor of the plant thru' current and voltage signals.

b) APFCR shall have no. of steps specified in drawings.

c) APFCR shall be provided with Built in PF meter (0.5 lag to 0.5 lead), calibrated setting dial.

d) APFCR shall be suitable for 5A secondary current.

e) APFCR shall be suitable for flush mounting in capacitor panel/MCCs.

f) Current rating of its auxiliary relay shall be compatible with switching and continuous energization of main contactor of capacitors. Otherwise, additional relay shall be provided.

9 COOLING

a) All the Capacitor Panels shall be properly ventilated. If required a small exhaust fan of suitable rating shall be provided on the rear door of the panel, with the opening properly covered with fine wire mesh. The fan shall start/stop automatically along with normal start/stop provision.

b) Louvers shall be provided on the door on rear side with a fine wire mesh.

10 CURRENT TRANSFORMERS

a) Current Transformers shall be cast - resin type .AII secondary connections shall be brought out to terminal blocks where connection will be made.

b) Accuracy class of the current transformers shall be:
   (i) Class 5P20 for protection.
   (ii) Class 1.0 for metering.
   (iii) Class PS for differential Protection & REF.

c) Current transformer shall be provided with test links and shorting on both secondary leads for setting purpose.

d) All current transformers shall be earthed by a separate earth link on terminal blocks.

e) Additional nameplate of CTs*l* PTs shall be provided (if required) at such a place that it shall be possible to find out details of CTs*l* PTs after mounting in the panel.

11 VOLTAGE TRANSFORMERS

a) Voltage transformers shall be cast-resin, fixed type and shall have an accuracy class of 1.0.

b) Low voltage fuses, sized to prevent overload, shall be installed in all ungrounded secondary leads. Fuses shall be suitably located to permit easy replacement while the board is energized.

12 RELAYS

Relays wherever provided shall be of draw-out design with built-in testing facilities. Small auxiliary relays may be in non-drawout execution-.

13 CONTROL AND SELECTOR SWITCHES

a) Control and selector switches shall be of rotary type having enclosed contacts, which are accessible by the removal of cover.

b) Control and selector switches shall be of flush mounted type and on front of panels. .

c) Selector switches shall be of stay-put maintained contact type.

d) Control switches shall be provided with escutcheon plate clearly marked to show the position.

14 INDICATING METERS AND INSTRUMENTS

Indicating instrument (96 x 96 mm) shall be digital meter, switch board type and accuracy class of 1 (1 % full scale ± 1 count).

15 INDICATING LAMPS

a) Indicating lamps shall be of LED type, low watt consumption and provided with appropriate value of resistors. The LEDs shall also have an in-built surge suppressor.

b) Bulbs and lenses shall be interchangeable and easily replaceable from the front of the panel.

16 PUSH BUTTONS

a) All push buttons shall be of the push to actuate the contact type.

b) All push buttons shall be oil tight and shall be provided with adequate no. of contacts.

17 POWER AND CONTROL CABLE TERMINATION

a) Suitable supporting arrangement shall be provided for all power and control cables entering the panel.

b) Removable undrilled gland plate of 3 mm thick of MS for multicore cables and 4mm thick of Aluminium for single core cables sufficient in size to accommodate all compression type, heavy duty brass glands shall be provided.

c) Adequate termination arrangement shall be provided for all power cables which shall be aluminium / copper conductor, PVC insulated, sheathed, armored PVC sleeved overall, heavy-duty cables, 1.1 KV grade. Power cables termination shall be by means of crimping type lugs on conductor cables.

d) The terminal blocks shall be bolted lug type for cables. These shall be protected type and rated for 1100 Volts service. The minimum current rating of terminal block shall be 16 Amp. The construction shall be such that after the connection of cable by means of lugs, necessary clearance and creep age distance are available.

e) Wherever there is more than one equipment connected on the same feeder, separate terminals shall be provided.

18 INTERNAL WIRING

a) All internal wring shall be carried out with stranded copper conductors, PVC insulated, 1100/650 V grade.

b) Min. size of conductor for power wiring shall be 2.5 sq.mm, 1.5 sq.mm for AC control wiring and 4.0 sq.mm. for DC control wiring. Current transformer secondary wiring shall be with 2.5 sq.mm conductor.

c) All wiring shall be run on the sides of the panels and shall be neatly bunched and shall not affect access to equipment mounted in the panels.

d) Wiring shall be terminated on terminal blocks using crimping type lugs and without joints or tees on their runs.

e) Power wiring shall be done either by phase identifying coloured wires or suitably coloured PVC sleeves shall be provided at each end of wire.

The following wiring codes shall be used.

Instrument Transformer	:	Red, yellow or blue depending upon phase with which wire is associated.
A-C phase wire	:	White
A-C Neutral wire	:	Black
Earth connection	:	Green

f) PVC identification ferrules, yellow colour with black engraved letter shall be provided at each end of all control wires marked to correspond with equipment designation & termination numbers.

g) Ferrules provided shall be oil tight and numbered from left to right.

19 TERMINAL BLOCKS

a) Terminal blocks for control wiring shall be 650V grade 10 sq.mm size.

b) Terminal blocks shall be grouped depending on circuit voltage. Different voltage groups of terminals blocks shall be segregated.

c) Terminals blocks shall be numbered for identification and provision shall be provided for terminal labels.

d) Terminal blocks requiring duplication shall be provided with solid bonding links.

e) Terminal blocks for current transformer secondary lead wires shall be provided with shorting, disconnecting *I* earthing facilities.

f) Terminal blocks and control wiring shall be so arranged that only one conductor of external wiring required to be terminated in at each terminal.

20 GROUND BUS

a) A ground bus, rated to carry maximum fault current, shall extend to full length of the panel.

b) The ground bus shall be provided with two-bolt drilling with GJ. bolts and nuts at each end to receive 75X 10 mm G.I. flat. .

c) Each stationary unit shall be connected directly to the ground bus. The frame of each circuit breaker and shall be grounded through heavy multiple contacts at all times.

d) Wherever the schematic diagrams indicate a definite ground at the switchgear, a single wire for each circuit thus grounded shall be run independent to the ground bus and connected thereto.

e) C.T. shall be earthed through removable links so that earth of one circuit may be removed without disturbing other.

f) Frames and noncurrent carrying metal parts of all equipment mounted shall be effectively to earth bus.

g) All hinged doors shall be connected to earth bus by flexible tinned bare copper wire.

h) Instrument and relay cabinets shall be connected to earth by 2.5 sq.mm stranded copper insulated wire 1100 V grade.

21 SPACE HEATERS

Each cubicle shall be provided with thermostat controlled space heaters.

22 AC/DC POWER SUPPLY

a) The panels shall be suitable to receive following power supplies.

AC Supply : Single Feeder

DC Supply : Double Feeder

b) Isolating switch fuse units shall be provided at each switchgear for the incoming supplies, 4-pole, single throw for AC.

c) Bus-wires of adequate capacity shall be provided to distribute the incoming supplies to different cubicles. Isolating switch-fuse units shall be provided at each cubicle for AC supplies.

d) AC load shall be so distributed as to present a balance loading on three phase supply system.

23 NAME PLATES

a) Name plates of anodized aluminium shall be furnished at cubicle and at each instrument, device mounted on and inside the cubicle.

b) Caution notice on suitable metal plate shall be affixed at the back of each vertical panel.

c) Name plates for feeders shall be provided on front and back of the panel.

24 TROPICAL PROTECTION

a) All equipment, accessories and wiring shall have fungus protection, involving special treatment of insulation and metal against fungus, insects and corrosion.

b) Screens of corrosion resistant material shall be furnished on all ventilating louvers to prevent the entrance of insects.

25 PAINTING

a) All surfaces shall be sand blasted, pickled and grounded as required to produce a smooth, clean surface free of scale, grease and rust.

b) After clearing, the surfaces shall be given a phosphate coating followed by 2 coats of high quality primer and stoved after each coat.

c) The panels shall be finished with two coats of Siemens Grey (Shade RAL 7032) powder coated / Polyester enameled.

26 TESTS & INSPECTION

a) The following routine and acceptance tests shall be carried out during final acceptance list.

i) Mechanical operation test.
ii) Electrical operation test.
iii) High voltage test on power circuits.
iv) High voltage test on control circuits.
v) Millivolt test on the circuit breakers.
vi) Millivolt Drop test on Busbar joints

b) All tests shall be performed in the presence of Owner's representative, if so desired by the owner. The contractor shall give at least 15 days advance notice of the date when tests are to be carried out.

c) Contractor shall furnish test certificate indicating that equipment has been tested by their quality control department for compliance of technical specification and approved drawings. The same shall be forwarded to owner! Consultants along with inspection call.

d) These inspections shall however, not absolve the vendor from the responsibility for making good any defect with may be noticed subsequently.

27. The Bank at its discretion may purchase light fixtures and supply it to the contractor for installation. Contractor cannot claim any compensation for supply of fixtures by the Bank.

BATTERY & BATTERY CHARGER

1. BATTERY

General

a) The battery shall be maintenance free type

b) The plates shall be designed for maximum durability during all service conditions including high rate of

discharge and rapid fluctuation of load.

2. BATTERY CHARGER

General

a) The charger shall be natural air cooled, solid state type with full wave, fully controlled, bridge configurations.

b) The charger shall be provided with automatic voltage regulation, current limiting circuitry smoothing filter circuit and soft start feature.

c) Voltage control shall be step-less, smooth and continuous.

d) The charger shall be self-protecting against all A-C and D-C transients and steady state abnormal currents and voltages.

e) Voltage setters shall be provided for setting the output of float boost charge. Setting shall be independent of each other so that setting of one voltage shall not require resetting other.

f) There shall be separate transformers for float and boost charger.

g) Charger A-C input and D-C output shall be electrically isolated from each other and also from panel ground.

h) Isolation shall also be provided between power and control circuits.

i) Batteries shall also be housed into the Battery Charger cubical.

Construction

a) The charger shall be freestanding, floor mounted with sheet steel enclosure with all access from the front.

b) The panel shall conform to the degree of protection IP 42. Minimum thickness of sheet metal used shall be 2 mm.

c) Access door shall be with concealed hinges and neoprene gaskets. Ventilating louvers shall be covered with fine wire mesh.

d) All equipment within the panels shall be arranged in modular units and laid out with sufficient space for easy maintenance.

e) Switches, meters, relays etc. shall be flush mounted on the front of the panels. Nameplates of approved size and type shall be provided for all circuits and devices.

Charger Equipment

a) All power diodes and control rectifiers shall be silicon type. Rectifier Transformer shall be dry type, double wound, with copper conductor and class B insulation.

b) Blocking diodes shall be fully rated and redundant so that failure of a single diode shall not incapacitate the system in any way.

c) Isolating switches shall be heavy duty, load break type, operated by an external handle with provision for padlocking in ON and OFF position.

d) Changeover switch shall be 3 position, 4 pole, load break type with 2 NO + 2 NC auxiliary contacts.

e) Contactor shall be air-break type with thermal overload relays having in built single phase preventor.

f) Fuses shall be HRC type and arranged for easy replacement. Semi conducting device fuses shall be fast-acting.

g) Indicating lights shall be low-watt filament type with series resistor. Both lamp and lens shall be replaceable from front.

h) Meters shall be 96 x 96mm switchboard type, 250 deg. scale, antiglare glass, :!: 2% accuracy with zero adjuster on the front.

Alarms

a) One (1) ten-points alarm facia shall be provided on charger panel complete with proper actuating devices, circuitry and legends.

b) The arrangement shall be such that on occurrence of a fault the corresponding window will light up and stays lighted until the fault is cleared and reset button is pressed.

c) Each time a window lights up, a master relay will get energized to provide group alarm signals for Owner's remote panel.

d) Following minimum annunciation shall be provided:
   i) A. C. Supply failure *
   ii) D. C. Voltage low *
   iii) D. C. Voltage high *
   iv) D. C. System ground *
   v) Charger overload *
   vi) SCR fuse blown
   vii) Filter fuse blown
   viii) D. C. Output fuse blown

e) Alarm points marked with an asterisk (*) shall have electrically separate spare set of contacts wire_ up to the terminal block for Owner's use.

f) Alarm contacts shall be rated 2A at 24V D. C. And SA at 240V A.C.

Outgoing Feeders

a) Each Outgoing feeder shall be provided with double pole switch and with HRC fuses.

b) Outgoing feeders shall be located in separate module forming part of charger panel with separate cable alley for terminated outgoing cable.

Lamp / Space Heaters *l* Receptacles

a) The charger panels shall be provided with:
   - Internal illumination lamp with door switch.
   - Space heater with thermostat control.

b) Lamp, heater circuits shall have individual switch fuse units.

Wiring/ Cabling

a) The panels shall be completely wired-up. All wiring shall be routed through wiring troughs. Wires shall be ferruled at both ends for identification.

b) Panels shall have removable gland plates at the bottom for cable entry. All incoming *I* outgoing cables shall be terminated in suitable terminal blocks.

c) Control terminal blocks shall be box-clamp type ELMEX 10 Sq. mm or approved equal.

Grounding

a) The charger panels shall be fully rated ground bus with two ground terminals, one at each end.

b) Each terminal shall comprise two-bolt drilling with M10 G.I. bolts and nuts to receive Owner's ground connection of 50 x 6 mm G.I. flat.

Tropical Protection

a) All equipment accessories and wiring shall have fungus protection, involving special treatment of insulation and metal against fungus, insects and corrosion.

b) Screens of corrosion resistant material shall be furnished on all ventilating louvers to prevent the entrance of insects.

Painting

a) All surfaces shall be sand blasted, pickled as required to produce a smooth, clean surface free of scale, grease and rust.

b) After cleaning, the surfaces shall be given a phosphate coating followed by 2 coats of high quality primer and stoved after each coat.

c) The panels shall be finished in powder coated Siemens Grey, RAL7032.

Tests

a) All equipment and components there of shall be subject to shop tests as per relevant IS standards. The tests shall included but not limited to:

b) Tests on battery charger.

- Dielectric tests.
- Voltage regulation check from 0 to 100% load with ±10% input voltage variation.
- Ripple content measurement.
- Heat run test on current limiting value.

Test Witness

All tests shall be performed in presence of Owner's representatives, if so desired by the Owner. The contractor shall give at least fifteen (15) days advance notice of the date when tests are to be carried out.

3. REQUIREMENT

Battery

i)	Type	:	Lead Acid
ii)	Nos. of Cells per Battery	:	12
iii)	Battery nominal voltage	:	24 V
iv)	Ten hour rating to 1.85 Volt/Cell at 27 deg. C.	:	300 AH

Battery Charger

i)	Charger	:	Float & Boost
ii)	Type	:	Solid state, rectifier
iii)	Rating	:	40A
iv)	A.C. Input Supply	:	415V, 3ph,4 w/230V, 1Ph., 50Hz., 2 wire.
v)	Ripple content in charger DC output	:	± 1%

vi) Outgoing feeders - 12 Nos : Each consisting of double pole MCB of 32A.

INSPECTION SCHEDULE

Witness of routine / Type test (as per relevant standards/ agreed schedule) of various equipmentS shall be carried out at the works of manufacturer by Owner/ owner's representative. The Contractor shall furnish the following details and freeze this schedule within 2 weeks after placement of LOI in consultation with Owner/ Consultants.

ITEMS	TESTING DATE OF INSPECTION	PLACE	NAME OF MANUFACTURER

NOTE

It is the obligation on the part of Contractor to inform actual date of inspection 2 weeks in advance.

Contractor's engineer shall be present in all inspection.

In some cases, Owner/ Owner's Representative may give waiver of inspection.

In all cases, test certificate shall be furnished by the contractor and the same shall be approved by owner/ Consultant.

…….....

Bidder's Signature

APPROVED LIST OF ELECTRICAL MATERIAL

Description	Brand
11 KV CIRCUIT BREAKER PANEL	ABB / SEIMENS / AREVA
11 KV / 0.4 KV TRANSFORMERS	CROMPTON / KIRLOSKER / AREVA / SEIMENS
BATTERY CHARGING PANEL	KELTRON / NELCO
BATTERIES	EXIDE / AMCO / STANDARD
L T PANEL	NEPTUNE (INDIA) LTD. / ZETA SWITCH GEARS / KRYPTON POWER CONTROL INDIA PVT LTD. / ADLEC SYSTEM / N E C
11 KV Isolator and D O Fuses	AMEI / ELLPRO / STERLING
Capacitor	L & T / DUCATI / EPCOS
APFC relay	L & T KHATAU / DUCATI / SYNTRON
M.C.B. / RCCB / RCBO	LEXIC / HAGER / ABB
Distribution Boards	LEXIC / HAGER / ABB
Switch Fuse Units With HRC fuses	GE / L&T / ABB
Moulded Case Circuit Breaker (MCCB)	ABB (T max) / L & T (D sine)
Air Circuit Breakers	ABB (EMEX/L&T(C POWER)
Current Transformer / Meters / Voltage Transformers / Relays / Starters / Contactors / Selector Switch / Indicating Lamps	L & T / SIEMENS / AUTOMATIC ELECTRIC / CONTROL & SWITCH GEARS / ABB
Change Over Switches	GE / L&T / HH ELCON
Cable Glands and Sockets	SIEMENS
PVC insulated Copper conductor wires	FINOLEX / RR / POLYCAB

Telephone Wires and cables	FINOLEX / (RPG/BIRLA ERRICCSON POLYCAB
Television Coaxial cable	FINOLEX / RR /RPG / L&T
PVC / XLPE Insulated 11 KV / 1.1 KV Cables	UNIVERSAL /FORT CLOSTER / NICCO / FINOLEX/POLYCAB
Switches and Sockets outlets (Conventional piano type)	ANCHOR
Switches and Sockets outlets (Modular type)	LK Fuga / MK / MDS-MOSAIC
Industrial outlet	LEXIC / HAGER / ABB
MIS Conduits and Accessories	B.E.C./AKG/MK
PVC Conduits and accessories	AKG/BEC/CAP/SEIKO / [POLYCAB
Fluorescent Tube Fitting	PHILIPS /WIPRO
Incandescent Light Fitting	DECON/PHILIPS / BAJAJ / WIPRO
Hpmv/hpsv/ halogen Lamp	PHILIPS / WIPRO
Ceiling Fans / Exhaust Fans	CROMPTON / BAJAJ
Floor / Wall Raceways to date	MK/ LK/ MDS
Computer networking – outlet	AMP/SYSTEMAX / LUCENT
Electronic Energy Meters	SECURE / L&T
UPS	EMERSON / POWERWARE / TATA LIBERT
Ceiling Rose holders	ANCHOR
Buzzers/Bell Push bell	ANCHOR
MCB Distribution Board	MOS/LEGRAND/SIEMENS /HAGER
HRC Switch Fuse nits	SIEMENS ABB/GE/L&T
Cable Glands/Lugs	SIEMENS/DOWELLS
Electronic Regulator	MK/ANCHOR/ROMA/DEGRAND/MDS
Contractors	SIEMENS/L&T/ABB/SCHNIEDER
Geysers/water/heater	SPHERE HOT /RACOLD/USHA

NOTE:

Sr. No.	Description
1.	The choice of the final makes shall be made by the owner/ consultant
2.	The samples or Cat.No. of all type of switches & light fittings should be approved before execution.

CONVENTIONAL FIRE ALARM AND PA SYSTEM

SCOPE OF WORK

1.1 The scope of work covers supply, installation, commissioning and testing of Conventional Fire Alarm System meeting the intents of these specifications. The work shall cover.

i. Conventional Fire Alarm Control Panel (FACP)
ii. Conventional Alarm initiating devices
iii. Audio-visual annunciation
iv. All wiring
    a) From alarm initiating devices

SUBMITTALS

2.1 All details comprising the following shall be submitted:

i. System configuration & capability vies a vies the specifications.
ii. Compliance from the specifications.
iii. Makes and catalogues.

FIRE ALARM SYSTEM

3.1 The main fire alarm control panel shall be microprocessor-based signal initiating devices, local and remote operator terminals and all other system-controlled devices.

3.2 Supervise all signaling and notification circuits throughout the system through the circuit interface modules.

iii. Detect activation of any signal initiating devices such as smoke detectors, heat detectors and break glass units and location of alarm condition.

a) Acceptance switch that changes the alarm signal from blinking mode to steady mode and silence all remote alarm sounders.
b) Signal silence switch to silence all the programmed silence able notification appliances.
c) Reset switch to bring all initiating and output devices to normal condition.
d) Test switch to initiate automatic testing of alarm conditions and all such tests shall be displayed and recorded.

The detailed requirements and system capacity are shown in the drawings.

3.3 The FACP shall be modular in construction and shall be enclosed in a sheet-steel rust-inhibited cabinet of appropriate size to accommodate atleast 25% expansion of all modules. The cabinet door shall have a glass window for all display and shall be provided with a key lock.

3.4 The main power supply unit shall operate on 230 VAC 50 Hz meeting the needs of the FACP and notification appliance circuits. The unit shall incorporate a battery charger with duel rate charging facility.

SIGNAL INITIATING DEVICES

4.1 Each detector shall be provided with power LED's and an output connection for remote indication. Both LED will be blinking mode during normal operation. And will be in steady mode indicating an alarm mode.
Detector sensitivity shall automatically compensate for accumulated dust or slow environmental degradation. All detectors shall include a temper proof twist-lock base which shall be common interchangeable for all detectors.

4.2 All detectors shall be low profile with sealed sensing chambers and suitable for stable operation in an ambient temp of 0 to 49C and against 7.5mps air velocities. Detectors shall be optical type enclosed in a heat retardant plastic body. The heat detectors shall operate at 59C with a rate of rise element of 9.5C per minute

4.3 Response indicators shall be LED powered from the Signal-initiating device.

INSTALLATION

5.1 The installation shall be carried out in accordance with the specifications and drawings and complying with IS 2189, any local codes and proprietary manufacturer's instructions. Where the provisions are conflicting, areas of such conflict shall be identified and clearly brought out in the 'Deviations from Tender' Appendix II together with the financial implications, if any.

5.2 All wiring shall be carried out with armored cables as specified in the schedule of work. All junction boxes and conduit accessories shall be galvanized steel.

6.0 TESTING

6.1 The system shall be tested and commissioned by a qualified specialist technician to establish system performance in all its aspects and all such tests shall be witnessed and test readings attested by the Consultant.

6.2 All cabling shall be checked for proper connections and tested for

I) Continuity
ii) Ground faults
iii) Short circuits
iv) Insulation resistance by a 1000V meggar

6.3 Test all Circuits and device for verification trouble/fault signals in the FACP and performance compliance All test results shall be verified and authenticated by the Consultant and shall be included as part of the Instruction manual.

6.4 During the period of verification and testing the contractor should associate atleast 1 person from the client's side for training in all aspects of system operation and maintenance, and fire drill etc.

7.0 MODE OF MEASUREMENT

The mode of measurement shall follow the schedule of work.

PUBLIC ADDRESS SYSTEM

1.0 SCOPE OF WORK

1.1 The scope of work covers supply, installation, commissioning and testing of the Public Address System relating to the Fire Alarm System meeting the intents of the specifications. The system may have centralized or distributed amplifiers.

1.2 The system could be combined with other paging functions or piped music or any other announcements.

2.0 AMPLIFIERS

2.1 All amplifiers shall be suitable for Fire Protective Signaling Systems.

2.2 The power amplifiers associated with FACP shall have adequate continuous (RMS) power output to meet with centralized or distributed configuration as the case may. The unit shall be capable of delivering the rated output watts with less than 0.5% harmonic distortion in the design band width. The amplifier shall have a broad band frequency response of 20 Hz to 20 KHz with a signal to noise ration greater than – 90dB. The output voltage and impedance shall meet with the system requirements. Amplifiers shall be protected against over loads and output shorts and a special thermal overload on the heat sink.

2.3 The distributed audio amplifiers shall be magnetically coupled switch mode type with three input signal sources selectable manually or automatically by the fire alarm system. The amplifier shall incorporate a push to talk switch and paging over ride. Output wattage and volts shall be as shown in the schedule of work or as required to meet the needs of the PA system.

2.4 All amplifiers shall have adequate back up battery support to power the PA System for at least 4 hours. The battery system shall have facility for recharging the battery.

2.5 Power as well as audio amplifiers shall be mounted in suitable wall mounted/floor standing enclosures shall have lockable and removable doors with vision panel, all suitable for fire alarm systems.

3.0 SPEAKERS

3.1 Speakers shall be especially designed for broadcasting high quality, integrated emergency fire alarm signals and voice communications and approved by an appropriate authority for use in such situations. Speakers shall be ceiling or wall mounted as shown in the schedule of work and shall be completed with mounting brackets accessories etc.

3.2 Speakers shall be of high efficiency yielding maximum output at minimum power acress 400 – 4000 Hz frequency range. Speakers shall have a line matching transformer with power – doubling multiple taps and shall yield a sound pressure level of 84 DBA @ 3.0 when on the lowest tap. Speakers shall be mounted in a rugged metal housing with vandal resistant grille.

3.3 Speakers external appearance shall be approved by the Architects.

3.4 Speakers and strobes shall be capable of being mounted on a 100 x 40 mm junction box. There shall be appropriate terminal strips for incoming and outgoing wires, Pigtail type connections are not acceptable.

4.0 P A SYSTEM WIRING

4.1 PA System wiring shall follow the specifications under "conduit wiring".

5.0 Testing and Commissioning

5.1 Entire PA System shall be tested to establish the following.

i. Functionally of the PA System
ii. Acceptable audibility of the public address in all spaces and record sound pressure levels of the Public address vis the ambient noise levels.

6.0 MODE OF MEASUREMENT

6.1 The mode of measurement shall follow the schedule of work.

COMPUTER NETWORKING
SECTION – I INTRODUCTION

1.0 GENERAL REQUIREMENTS:

Computer Net Working System should adhere to relevant and recognized standards.

1.1 The Structural Cabling System shall be a hierarchical star topology utilizing CAT 6 copper cable in horizontal sub system and multi mode fiber optic cable in the backbone subsystem.

1.2 All components within the cabling system shall be from a single manufacture and shall be covered by the manufacturer's system performance warranty. The warranty shall be independent of application and will support all ratified protocols, and the warranty shall be minimum of 25 years.

2.0 DATA CABLING – UNSHIELDED TWISTED PAIR

2.1 Unshielded Twisted pair (UTP) CAT 6 cable shall be used for LAN connectivity to the Desktop. To enable increased performance UTP-CAT 6 cabling should support 100/1000 Mbps Ethernet and ATM 155 Mbps as per IEEE 802.3ab connectivity standards.

2.2 Unshielded Twisted Pair (UTP) CAT 6 cable and other relevant products shall be in accordance with EIA/TIA 568 standards.

2.3 Unshielded Twisted Pair (UTP) CAT 6 cable shall meet developments in applications technology and shall perform for a worst case four-connector channel to support applications that utilize full-duplex transmission schemes, such as Gigabit Ethernet.

2.4 All cables shall be fitted with strain relief boots.

2.5 Contractor shall furnish 25 Year warranty certificate to cover Bandwidth of the specified and installed cabling system and installation costs.

2.6 Cable shall be manufactured by using 24 AWG solid bare coppers with polyethylene insulation and Flame retardant PVC jacket.

2.7 Cable shall be suitable in operating temperature of –20° C to 60° C.

2.8 The cable shall be tested up to 350 MHz frequencies.

2.9 Delay skew should not be more than 25ns/100m.

2.10 Impedance of the cable shall be 100 Ω +/- 15 Ω.

2.11 Following installation practice shall be followed by the Contractor

While laying the cable.

a. Do not place cable near equipment that may generate high levels of electromagnetic interface.
b. Place cabling at a sufficient distance from equipment.
c. Do not over tighten cable ties, use staples or make sharp bend with cables.
d. Tie and dress horizontal cables neatly and with a minimum bend radius of 4 times the cable diameter.

e. Maintain the twist of horizontal and backbone cable pairs up to the point of termination. Do not leave any wire pairs untwisted.
f. Do not create multiple appearances of the same cable at several distribution points (called Bridging Taps)
g. Do not use connecting hardware that is of lower category than the cable being used.
h. Terminate each horizontal cable on a dedicated telecommunications outlet.
i. Use connecting hardware that is compatible with the installed cable.

The contractor shall note that the above installation practices are not exclusive. It is the responsibility of the contractor to ensure that the installation is compliant to required specifications. Installation Practices shall also meet all applicable local and national cades, standards and ordinances. Where a conflict exists between these standards, it is the responsibility of the contractor to detail these conflicts to the consultant prior to installation commencing.

3.0 CAT 6 RJ 45 MODULAR JACK

3.1 Copper outlets shall be presented into work area as an RJ45 connector. The outlet shall have a shuttered cover to prevent the ingress of dust and other contaminates.
3.2 One outlet/Double outlet of required color and type should be provided to each workstation as per the final approval of the consultant.
3.3 All outlets shall be modular type and made out of ABS plastic.
3.4 The outlet shall be provided with icons or circuit identification and labels for poll identification.
3.5 All outlets should include cable management facilities as per standards.
3.6 The modular outlets shall be factory assembled.
3.7 The termination of the installed horizontal cable shall be by insulation displacement connectors.
4.0 UTP JACKS

4.1 UTP Jacks shall be suitable for CAT 6 cable, PCB Based and as per TIA/EIA 568 standards.
4.2 The durability of Modular jack shall be minimum 750 mating cycles and minimum 200 termination cycles for wire terminals.
4.3 Housing of UTP Jack shall be made out of Polyphenylene oxide rated for 94V and wiring block shall be of Poly Carbonate rated for 94 V.
5.0 UTP JACK PANELS
5.1 UTP Jack Panels shall be suitable for CAT 6 cable with 24 port, modular type, PCB based, 1 U height and as per the EIA/TIA 568-B2 standards.
5.2 UTP Jack panel shall have Icons on each of 24 Ports.
5.3 9mm or 12mm labels on each of 24 ports shall be provided as per the final approval of the consultant.
5.4 The durability of Modular jack shall be minimum 750 mating cycles and minimum 200 termination cycles for wire terminals.
5.5 The UTP Jack Panel shall be made out of Powder Coated Sheet Steel with UTP Jack shall be made out of Polyphenylene oxide rated for 94V and wiring block shall be of Poly Carbonate rated for 94 V.

6.0 WORK AREA CABLING

Work area equipment and cables shall be as per ANSI/TIA/EIA-568-A and ISO/IEC 11801.
Equipment Cords are assumed to have the same performance as patch cords of the same type and category.
To ensure consistency of performance, the same manufacturer as the installed cabling shall provide all the work area cables (patch/mounting cords) throughout this project.
The patch cord shall be manufactured out of 24 AWG 7/32, Stranded copper conductor, with PVC insulation, Flame retardant polyethylene jacket and shall have length as mentioned in schedule of quantities as per the standards of CAT 6.
The patch cord shall be provided with matching colored snag-less, elastomeric polyolefin boot.
Housing of the plug shall be of Clear Polycarbonate and the Load Bar shall be of PBT polyester.
Terminals shall be made out of Phosphor Bronze, 50 micron gold plating over selected area and gold flash over

remainder, over 100 micron nickel under plate.
All cables shall be fitted with strain relief boots.
The onsite fabrication of work area cabling shall not be permitted.

7.0 DATA RACKS

7.1 The contractor shall also examine the location of the Data Rack to Ensure the Air Flow around the same and sufficient clearance is available to allow access for inspection and maintenance.

7.2 The specification for patching frames shall match that detailed in UTP cabling.

7.3 The patch panels shall meet or exceed the transmission Performance requirements of ANSI/EIA/TIA 568-A5.

8.0 TERMINATION AND CONNECTORS

8.1 The wiring schedule used at the point of termination should be Complete with ANSI/EIA/TIA 568-A.

8.2 All termination shall be made using CAT 6 connectors and Panels.

8.3 When terminating both ends of the connection should be tested, Labeled and documented according to the requirement of the OEM and site practices.

8.4 All termination should be made by an approval installer so as to Meet warranty.

9.0 LABELING AND COLOR CODING CONVENTIONS

9.1 All Cables shall be labeled so as to ultimately and the end user in The maintenance and administration of the installed cabling system.

9.2 Contractors shall make allowance for labeling of all cables at both Ends and for the full labeling of all patch panels and outlets with a unique circuit identifier.

10.0 INSTALLATION ACCEPTANCE TESTING SPECIFICATIONS

10.1 Installed UTP Cabling system shall be tested with TIA/EIA 568 Level IIE/Level III hand held testers. Each installed UTP drop shall be tested as per the latest revisions of TIA/EIA 568 CAT5e specifications.

10.2 The contractor shall after completion of the installation, submit a Detailed documentation of the cable plant. The documentation shall cover minimum following:

a. As built diagrams of the Network.
b. Test results for UTP
c. Consolidated Bill of Materials with manufacturer's part Nos. and quantities used.
d. Warranty certificate from OEM Supplier.

SECTION – II SUBMISSION

1.0 SUBMISSIONS

Contractor to note that the following Minimum Documents shall be furnished along with the Bid.

1.1 <u>UTP CABLING SYSTEM</u>

a. ETL verification of the Cable as per TIA/EIA 568 B.1 standards.
b. Performance characteristics for Attenuation, Pair to Pair and PS NEXT, ELFEXT and PSELFEXR, Return Loss, ACR and PS ACR for 4 – Connector Channel.
c. Certificate of UL listing.

1.2 UTP JACKS

a. Certificate of UL listing.
b. Performance characteristics for Attenuation, NEXT, PS NEXT, FEXT and Return Loss.

1.3 UTP JACK PANELS

a. Certificate of UL listing.
b. Performance characteristics for Attenuation, NEXT, PS NEXT, FEXT and Return Loss.
c. Certificate for termination pattern as per TIA/EIA 568 A and B.

2.0 After the system is fully supplied, installed, tested, Commissioned, successfully handed over and such certified by the Employer, the contractor should carry out his defects liability responsibilities as specified for a period of one year. During this period the Contractor shall carry out all repairs to the equipment and replace all defective components at his own cost.

3.0 TELEPHONE WIRING

Telephone Wiring should be carried out with 0.5 Sqmm Tinned Copper flexible wire through PVC Cassing Caping / Conduit. And terminated in the Jack on workstation and on the krones in the Krone Junction Box place at Server Room.
The Krone Junction Box should be joint less type.

ACCESS CONTROL SYSTEM

SCOPE OF WORK

1.1 The scope of work shall covers supply, installation, commissioning and testing of entire access control system meeting the intends of the specifications and drawings.

1.2 The system generally covers control of:
i) Normal door entry and exit.
ii) Emergency exits.
iii) Intruder alarms.

1.3 The scope of work shall also cover field training of two of the owner's representatives for a period of 7 working days on the operation and maintenance of the system during normal and emergency conditions.

2.0 STANDARDS

2.1 The systems shall be standard products of adequate field experience and UL and FM listed.

3.0 SUBMITTALS

3.1 The tenderer shall submit along with the tender.

i) A block diagram of the system proposed.
ii) Makes of various components and their catalogues.
iii) Comments on alternate proposals to and variances from the tender specification indicating the financial implication.

3.2 Upon award of the contract the following submittals shall be made

i) Final block diagrams.
ii) Layout drawings of all floors showing runs of conduits and cables.
iii) Layout of security command center (SCC).
iv) Catalogues and selections of all equipment and component.
v) Samples of wiring materials, cards with the in scripts and all visible components.

All submittals shall be got approved before procurement

4.0 SYSTEM FEATURES

4.1 The system shall be PC based distributed processing networking an Operator Station (OS) at the Security Command Center (SCC) with Field Controllers (FC) and Terminal Controllers (TC). The system shall be standard product of at least 10 years of experience providing with a select suite of hardware and peripherals, an integral solution to access monitoring and control, intrusion monitoring and alarm, emergency set-up and alarm, video badging / verification and closed circuit video system control, viewing and alarms.

4.2 The cardholder data, system parameters and operator actions shall be programmed into the OS on windows platform. The cardholder data bank shall have his code No, name, company, residential address, office and residence telephone numbers. The same card shall access the car park when authorized, but a separate data bank for cars shall be created showing make, model, and registration No, color and chassis No.

4.3 The data shall be intelligently down loaded to the network controllers like FC & TC and stored. Decision shall be made at all levels on the basis of the stored data and an on board clock. Should communication fail between the OS and FC & TC, the access control functions shall continue undisturbed and all events during that period shall be stored at the network controller level and up-loaded to the OS when normalcy is restored.

4.4 The system shall archive all events of permitted entries, refused entries, breaking, emergencies, communication loss system faults, system updates etc. All updated and changes in access levels, times and passwords shall be validated by naming the authority, and date and tile stamped. The capacity of the hard drives shall be adequate for at least 500,000 events or as specified, whichever is higher.

4.5 The system shall generate reportage of events, data and the firmware performance in any sequence or manner the operator desires. All reports shall be capable of being displayed, printed or stored for future reviews.

4.6 The system shall provide password protected levels to operators & supervisors and shall enable temporary accesses. All access levels shall be controlled by time periods and system shall provide adequate time slots and holidays schedules. The system shall have the capability of monitoring any card/cards on 'trace mode'.

4.7 Each card holder is to be assigned a code no and identified and sorted as visitor, escort or regular with validity period and access 'to' or 'to and from' Cards of all regular car holders shall have their company logo and photo ID. In the case of regular card holders who are assigned a space in the car park, the system shall include additional data of the car as specified. Visitor profiles shall comprise name, company, visiting person and company. All visitor cards shall have limited time validity.

4.8 Panick bars on emergency staircase doors shall be open able only on emergency release only and forced exits shall be reported as alarms. Guard tour units (GTU) if not activated on scheduled time shall be reported as alarms.

4.9 The system shall have graphic screens showing the locations of various access control and CCTV points in different colours showing points on action so that the operator is able to monitor the whole building from the security command centre. The system shall incorporate a Graphics Use Interface (GUI) for the control and viewing of the CCTV system. During an alarm, the operator shall be able to switch from access control task to alarm investigation using the cameras covering the event area.

5.0 SECURITY COMMAND CENTRE

5.1 The Security Command Centre (SCC) shall act as the hub of all security related matters and operations. The SCC shall house, among others, the following :

i) PC Pentium II 200 mh2 or higher 2 RS 232 ports, 32 M6 RAM, 2 Gb hard disc, 1.4 MD FDD, CD ROM drive, Mouse with pad, 101 key board, Modems, Windows_____OS.
ii) 20" Colour monitor SUGA 1024 x 768 min. Resolution.
iii) 132 Col DM printer.
iv) Break Glass emergency button for all door access mode.
v) Panick / intruder alarm.

5.2 The command centre shall also accommodate the fire alarm, panel, multiplexers, switches, monitors etc. All hardware, shall be part of a custom built console/table with two operator swiveling chairs. 2# SB racks for tape storage, 2# steel cupboards for record storage. The SCC layout shall be compact, functional amd aesthetically designed. All cable entry points shall be maintainable with adequate and easy access.

6.0 FIELD CONTROLLERS

6.1 Field Controllers (FC) shall provide multitasking capability through distributed processing network and permit operator interface through Main Controller in the command centre using IS-232 or RS-485 protocol. The FC shall be capable of communicating with 16 addresses of Terminal Control Units (TCU) and have a minimum of reader capacity and 20000 cards. The field controller shall also be capable of accepting a minimum of 200 supervised inputs and 200 outputs from remote peripherals like PIR's, panick button etc. The FC shall be compatible with Access Control System and its access levels, variation of cards etc.

6.2 The Controller shall have adequate access levels, time zone parameters, antipassback facility and a minimum of 5000 event archiving buffer facility with back-up alert and alarm annunciation and suppression. Provision shall be available for necessary ports for programming, networking and printing.

6.3 In the event of loss of communication, the field controller should be capable of operating stand-alone without degrading the security levels specified. The field controller shall power all terminal controllers and other peripherals with a backup battery for full control operations for 8 hours and memory backup upto 48 hours.

6.4 Field controllers shall be totally enclosed in a galvanized sheet steel box with key lock and tamper switch.

7.0 TERMINAL CONTROLLERS

7.1 The Terminal Controller (TC) shall be capable of supporting two readers and shall also have two ancillary ports. Monitor (door contact) and control points shall be dedicated to each reader supported and shall also have two additional monitor and control points.

7.2 Failure of the system communication shall not degrade the TC in any manner affecting the system security. An adequate buffer memory shall maintain the event archiving capability.

7.3 TC's are either powered from the field controller or separately powered with a battery backup for 8 hour full load operation and 48 hour memory functions.

7.4 TC's shall be sheet steel enclosed and surface or recess mounted with a key operated lock and tamper switch. Wherever located outdoors, the TC's shall have IP 55 enclosure.

8.0 CARD READERS

8.1 General Requirements

8.1.1 Card Readers shall be one of the following types as specified in the schedule of work :
a) Magnetic stripe insertion or swipe.
b) Proximity
c) Key Pad activated
d) Biometric

8.1.2 Readers shall be weather proof, fire and vandal resistant metal enclosure mounted in a single gang galvanized electrical switch box and there shall be no distortion due to mounting on a metal stud or partition. Readers shall be powered from a terminal controller located upto 200 meters running length. Each reader shall provide a bi-directional data link with appropriate signals for

a) Card read
b) Entry Okayed
c) Entry denied
d) Communication loss
e) Reader tamper with active alarm
f) or any other supervision messages

Alarm should be suitable for remote indication cancellation and reset.

8.1.3 Readers may be provided for :

a) entry only & free exit
b) entry& exit through a push button
c) entry& exit through readers

Readers shall be wired from and to the controller, door lock and door contact using minimum of 0.8 mm copper screened cables drawn in galvanized steel concealed conduits.

8.1.4 All card readers shall be compatible with system controller and shall provide supervised communication.

8.2 SWIPE CARD READERS

8.2.1 Swipe Card Readers shall be capable of unerring and repeated reading of the magnetic stripe. Reader shall have non-wearing plastic slot meeting the general requirements and shall read at swipe speed of minimum 0.2 to the maximum of 1.2 mps with Wiegand formatted cards.

8.3 PROXIMITY CARD READERS

8.3.1 Proximity readers for indoor use shall have a read range of 15 to 20 cm or as required. Reader shall be capable of being installed on metal surface without affecting the performance.

8.3.2 Readers for car park shall have extended read range of 60 cm and shall have a weather proof enclosure. Readers shall be metal mountable and shall be mounted on a galvanized and powder coated steel frame with a 25mm diameter galvanized steel pipes for entry of power and communication cables. Readers shall be located in a manner that it is easy to reach and read from the car.

9.0 CARDS

9.1 Cards shall be of the size of a credit card with a key hole and made of a durable plastic. Each card shall have a unique and non repeated user code. Cards shall provide facility for the company logo or Photo ID of the user.

9.2 Cards shall be suitable either for swipe or proximity readers as specified and required. Same card should be capable of being used for car parking also wherever authorized.

10.0 DOOR HARDWARE

10.1 Door Hardware shall be long life UL approved multi-read type employing a stable magnet. The contact shall be corrosion resistant and hermetically sealed for fail-proof operation in dusty and high humid areas. The type of contacts shall be suitable for the door, metal or wooden and the application. The door contacts and the sensors (either the number or the type) shall be suitable for the type of doors (single/double) shown in the drawings.

10.2 The contacts shall be NO or NC as required with an appropriate gap spacing but not less than 15mm. Contacts shall not freeze or get stuck if the door is sparingly used. The contact rating shall be to suit the size of door and the power supply of the access control system. Door locks shall be electromagnetic mortise or cylindrical locks suitable for half hour rated wooden doors. Lock will remain open in ‘fail-safe’.

10.3 Wiring from the door contact and door lock to the controller and/or reader shall be minimum 0.8 mm shielded cable drawn in a concealed galvanized conduit.

10.4 Panic hardware shall be stainless steel bars suitable for single swing half hour rated fire rated wood or steel door complete with approved trim. Door width will be minimum 750 mm and a maximum of 1200mm.

10.5 Door closers shall be indoor/outdoor non-handed surface mounted hydraulically operated units with adjustable keys for regulating closing and latch speed. Door opening force shall be adjustable and for fire doors it shall not exceed 15 ibf (67) for delatching and farce for moving the door.

11.0 VEHICLE BARRIER GATES (VBG)

11.1 The VBG shall consist of an independent heavy duty steel cabinet with a heavy duty steel frame housing the operating mechanism and a microprocessor based control board. The cabinet and the support structure shall be of rust-inhibited steel or galvanized and painted to an appropriate colour.

11.2 The barrier gate shall be of wood swinging on precision bearing from the control cabinet. The gate shall be painted black and white or yellow as required. The gate shall be 3.5m in length and open/close in 5 seconds.

11.3 The control board shall operate from 240V AC 1Ph 50Hz mains supply and shall have its own voltage and frequency conditioner for trouble free operation during supply voltage and frequency variation. Facility shall be available for change over to manual mode in the event of power failure or control mal-function.

12.0 MISCELLANEOUS

12.1 Stiles shall be two way waist high units with a heavy duty durable aluminum hub, hydraulically controlled arm rotation with stainless steel arms and permanently lubricated bearings. The unit shall incorporate a card reader,

12.2 Guard Tour Unit (GTU) shall be a single key operated unit signaling

i) Guard attendance
ii) Overdue alarm and
iii) Discreet emergency alarm

Guard attendance shall register time of attendance and the overdue alarm shall signal non-attendance at the predetermined time. The emergency alarm shall be signaled by the discreet operation of the key in the wrong direction. Any other system meeting the intents is acceptable.

12.3 Hold-up switch (HUS) shall be a discreetly mounted unit with twin push buttons and a reset key. Pressing of both the buttons simultaneously shall set up alarm and locks-in. The HUS can be reset only by authorized person through a key operated switch.

12.4 Metal Detectors (MD) shall be electronic metal detecting devices built into a pass-thru arch (built by others) providing audio-visual signaling.

13.0 INSTALLATION

13.1 The installation shall be carried out in a work like manner. Network controllers shall be recessed in walls wherever possible. Readers shall be mounted in co-ordination with the interior designs. Enclosures for all panels, readers shall have IP 54 class of enclosure and any steel structural members used for mounting the peripherals shall be galvanized after fabrication.

13.2 Wiring shall be through wires drawn through concealed galvanized conduits. Wiring details shown below and on drawings are suggestive and tenderers may modify to suit their systems.

Key pad to Reader	Multi-core shielded
Reader to R. C.	2 Pair shielded

Door lock & door contact to TC	1 Pair shielded or unshielded
TC to FC	2 pair shielded

14.0 ACCEPTANCE TESTING

14.1 The system shall be tested and validated for its function as an integrated security system conforming to the intents of the specifications. The following functional tests shall be carried out in the presence of the engineer-in-charge.

Card Readers
- Card acceptance & entry clearance
- Card rejection
- Measure maximum distance of card reading (Proximity cards)
- Tamper switch

Doors
- Door contact activation
- Door closing forces for delivering & door opening
- Time to door shut and to latch
- panic/Fire escape hardware operation

Terminal Controller
- Communication Failure mode :

Full mode operation
Event recoding

Supervising the monitoring circuits
- Power failure mode

Full mode operation
Event recoding

Supervising the monitoring circuits

Field Controllers
- Same as for Terminal Controllers
- Uploading from TC's

Main Controller (SCC)
- Same as FC's
- Uploading from TC's
- Databank and retrieval

14.2 All the network components shall be tested 100% and results recorded Engineer in charge may make random verification of any of the components. All such verification shall be recorded.

15.0 MODE OF MEASUREMENT

15.1 The mode of measurement shall follow the schedule of work.

AIR CONDITIONING SYSTEM

1.0 INTRODUCTION

These specifications spell out the complete requirement for the proposed Air-Conditioning System for facility of NIA, New India Center.
The interior of the facility is being done by consultant Architect M/s. Design Ideas, Mumbai. The facility is having the most modern interior correspondingly the equipment offered should also have it's own aesthetic values to suit the kind of the interior.
And therefore, such offers, indicating of highly efficient system, will be preferred.
The H.V.A.C. TENDER consists of HIGH WALL MOUNTED SPLIT/ CASSETE UNITS, WINDOW UNITS and modification of existing ducting to suit the newly designed Interiors.
The tender documents describe the Scope & Extent Of Work, Commercial Terms & Conditions, Specifications, Equipment Schedules, Bill Of Quantities, etc. It also comprises of scheme drawings. Tender submission for the job will be in two-bid system. The first part shall be techno-commercial bid in a separate envelope inside the envelope, name of work etc.
The system will be exposed to people from all walls of life and should be very safe against any type of hazard. The equipment should be designed for complete personal safety and ease of operation and maintenance.
The system will be catering to a most modern facility accordingly the system offered shall be suitable for continuous trouble free operation.
The facility is having no planning for ceiling fans accordingly the system selected should be highly efficient and trouble free with minimum trouble shooting time requirement.

In the event of an order being placed, the Contractor shall supply four copies each of the following within TWO WEEKS from the date of placement of the order-

a. Complete installation drawings showing details of the Indoor & Outdoor units, Refrigerant pipes and their sizes, electrical circuit diagrams, air distribution system etc.
b. Instruction books for operation, maintenance and servicing of all components.
c. List of recommended spares for two years of operation. M/s. Design Ideas ,Architects. will provide all the working drawings. However, for items of proprietary nature, working drawings and as built drawings shall be provided by the contractor, which will have to be approved by the Employer / Consultants.

Note

Before taking up the installation work at site the supplier should ensure that the installation drawings are approved by the Employer and Consultants.

2.0 ERECTION

This specification provides for the complete erection including minor civil works like wall cutouts for pipes, ducts etc. However, RCC foundations will have to be provided by the Employer.
The tenderer shall make his own arrangements for the storage of materials & their safe custody at site. The Contractor shall make his own arrangements for providing accommodation for his workmen at site.
The Contractor shall make good all damages to the Purchaser's building, property, equipments and articles, how so ever arising from the erection of the equipment. The Contractor shall indemnify and hold harmless the employer against all claims in respect of injury to any person how so ever arising out of the erection of the equipment in the course of such installation.
The Contractor shall discharge all his obligations under the Indian Workman's Compensation Act & E.S.I. in so far as it affects workmen in his employment.
The Contractor shall make his own arrangements for procuring the necessary labour, skilled and unskilled. He

should conform to all local government laws and regulations concerning labour and their employment.
The Contractor and his employees will submit to the regulations in force for controlled entry into the premises where the air conditioning equipment is to be installed.

2.1 TRAINING OF PERSONNEL

The tenderer shall undertake to extend free training in operation and maintenance of Air Conditioning System offered by them to two technical persons of NIA , mumbai. at their works for a period of 15 days and 15 days at the site of Employer. A certificate in this regard will have to be obtained from the Employer by the tenderer. The expenditure in respect of journey and stay necessary for this training will be borne by the successful tenderer. The choice of dates for training is to be decided in consultation with the Employer.

3.0 GENERAL

In order to avoid correspondence and clarification at a later date, tenderers are requested to indicate clearly all technical details and information asked for in the tender document.
Absence of any information on item will be assumed to be negative reply.

3.1 COMPLETENESS OF CONTRACT

All items whether specifically mentioned or not but which are usually required to make a complete working system and to ensure safe and satisfactory operation are to be provided by the Contractor without any extra charge. All appliances, apparatus, labour or material which may complete the work in accordance with the intent or purpose of the specifications shall be considered to be in the scope of work of the Contractor and shall be furnished without extra charge, as if fully described and called for in these specifications and shown in the drawings.

3.2 SPECIFICATIONS

The tenderer shall be deemed to have satisfied him before tendering as to the correctness of the capacities offered after making his own independent calculations. He must guarantee and demonstrate that the installation shall maintain the required indoor design conditions.
The specifications, drawings and other parts of this contract are to be considered as explanatory to each other or should anything appear in the one that is not described in the other or should any discrepancy or any misunderstanding arise on account of such discrepancy, or inconsistency, the site instruction given by the consignee shall prevail. The contractor shall execute the work according to such instructions/explanations given by the different part of this contract, even though such works are not specifically shown and described therein.

3.3 GUARANTEE

The tenderer shall guarantee against manufacturing and installation defects of all equipment supplied by him and carried out by him for a period of 12 months from the date when the equipment is accepted & taken over by the Employer for running purposes as specified. The tenderer shall confirm that he is agreeable to give this guarantee.

3.4 INSURANCE OF WORK

The tenderer will insure entire equipment and materials for transit / storage during erection & up to commissioning against losses, damages, due to fire, earth-quake, war, floods, insurrections etc. No claims will admissible on this account.

3.5 ITEMS INCLUDED IN THE CONTRACT

a. Entire equipment under supply as mentioned in the specification and shown in the drawings including installation, painting (as per the color code mentioned in Annexure-I), trial commissioning, final adjustments and testing.

b. Complete electrical work, including equipment wiring, control wiring, control panels etc. as specified. Employer shall make power with main switch available at main switchboard only. Further wiring from main switchboards to air conditioning equipment shall be in your scope of work.
c. Earthing sets and earth conductors.
d. Drain piping suitably insulated where necessary to the drain points in the equipment rooms, as per drawing.
e. First fill of refrigerant, oil or other contingent material.
f. Any loss of refrigerant, oil etc. due to the defects of the equipment or installation system during guarantee period shall be made good.
g. Operation of system until the time, system is handed over.

3.6 CO-ORDINATION

a. Work shall be carried out in confirmation with specifications, accompanying drawings and with the requirements of the general architectural and structural plans after approval by the Employer. The Contractor shall be responsible for taking actual measurements at site and effecting variations in the work in details, if required, to meet the site conditions. Such deviations shall however be subject to the approval of the Employer.
b. The Contractor shall also co-operate with other Contractors employed by the employer, compare plans, specification & time schedules & shall forward to the Employer copies of all correspondence & drawings so exchanged, failure to check plans and conditions will render the Contractor responsible for bearing the cost of any subsequent change.

3.7 DRAWINGS & LITERATURE / DOCUMENTATION AS PER ANNEXURE ATTACHED

a. Before proceeding with the work, the Contractor shall submit the following documents in duplicate -

i. Descriptive leaflets for all the equipment viz. indoor units, outdoor units, instrumentation Data, Electrical Components, Controls etc. having details of Capacity, Power Consumption, Efficiency, Performance Curves, best duty points, electrical details, mechanical details, dimensional details, operating weight etc.
ii. General layout and assembly drawings.
iii. Foundation drawings / frame details for all equipment.
iv. Operational and maintenance manuals / instruction book.
v. Trouble shooting details.
vi. All working drawings other than Consultants drawings.
vii. Detailed BAR CHART with activity schedules.
b. Approval by the Employer on the drawings shall not relieve the Contractor of any part of his obligation to meet all the requirements of the contract or of the correctness of his drawings.

The Contractor shall be responsible for and pay for all alterations of the work due to discrepancies or omission in the drawings or other particulars supplied by him, whether the Employer has approved such drawings.
c. Six copies of the comprehensive manual for use by the Employer before & during erection and subsequent operation & maintenance of the system shall be furnished after approval of the Contractor's drawings.
d. The Contractor shall furnish and install in the machine room a neatly prepared set of operating instructions securely framed.
e. The Contractor shall furnish information required in the tender document.

3.8 VARIATION OF WORK

The Employer shall have the power from time to time during the course of the work, by notice in writing to instruct the Contractor to make any alteration, omission, addition or variation in the work (herein after referred to as variation).
The difference in the cost of such variation shall be added to or deducted from the contract price as the case may be in accordance with the rates available in the contract, and if in the opinion of the contractor the variation would prevent him from meeting any of his obligations or guarantees in the contract, he shall give the same in writing failing which he shall not be entitled to any modifications in his obligations.

The variation required should never the less be carried out. The matter in difference shall be settled by arbitration. The Employer shall give a reasonable notice to the Contractor to enable him to make arrangements for variation in work required by him.

3.9 NEGLIGENCE

If the Contractor shall neglect to execute the work with the due diligence or shall contravene the provisions of the contract, the Employer may give notice in writing to the Contractor, calling upon him to make good the neglect or contravention complained of.
If the Contractor fails to comply with such notice within a reasonable period, the Employer shall have the option and be at liberty to determine the contract and to take the work wholly or in part out of the Contractor's hands and complete it either by himself or his agents at a reasonable price. The Employer shall then be entitled to retain any balance payment which may otherwise be then due on the contract.
The cost of execution of such work as aforesaid will be adjusted against the payment due to the Contractor. If the cost of execution shall exceed the balance due to the Contractor, the Employer shall be at liberty to dispose off any of the Contractor's material or consumption system that may be at site and apply the proceeds for payment of the difference of such cost and recover the balance by process of law, or from any moneys due to the Contractor.

3.10 PROGRAM OF WORK & PROGRESS SCHEDULES

The Contractor shall submit along with the offer detailed schedules showing the program and the sequence in which the Contractor proposes to carry out the work with dates and estimated completion times for various parts of the work.
Such schedules shall be approved by the Employer before starting the work and shall be binding on the Contractor. If so required by the Employer, the Contractor shall furnish weekly progress reports.

3.11 INITIAL INSPECTION

a. The equipment offered shall be inspected by Employer/Consulting Engineers at site or at the Contractor's / Manufacturer's premises as per conditions.
b. The Employer or his authorized representatives shall have full power to inspect drawings of any portion of the work or examine the materials and workmanship of the system at the Contractor's works or at any place from which the material or equipment is obtained. Acceptance of any material or equipment shall in no way relieve the Contractor of his responsibilities for meetings the requirements of specifications.
c. All types of routine and type tests shall be carried out at the works of the Contractor or the manufacturers of the components. The Employer shall be free to witness any or all tests if he so desires. If required by the Employer, the Contractor shall permit his representative to be present during any of the tests.
d. Quality plan to be approved by Employer & Consultants.

3.12 EXTRA ITEM

Any kind of extra work not specifically mentioned in the bill of quantity and also other than the variable items, shall be approved based on nearest rates available for any other items closed to the nature of the work of the extra item or by rate analysis or by cost + 15% margin as approved by us.

3.13 COMPLETENESS OF ERECTION & COMMISSIONING OF THE SYSTEM & INSPECTION DURING ERECTION

a. Inspection during erection
The Employer is at liberty to inspect the system during installation and the Contractor free of cost shall remedy defects found.

The Contractor shall furnish all instruments and services needed for the tests. Any defects and deficiencies that are noticed during these inspections will have to be attended by the Contractor from time to time.

b. Completeness of erection & commissioning

Only after the entire installations are satisfactorily completed and the defects found during inspections rectified, the system will be ready for commissioning and then will be subjected to run at least 48 hours to demonstrate its satisfactory performance. The ODU capacities, inside conditions and IDU measurements of DB, WB of return and supply air will be checked. Only then the system will be deemed fit to pass on to seasonal tests.

3.14 SEASONAL TESTS & TAKE OVER

A. "INITIAL TEST" for Air-conditioning Equipment-

The System ready for seasonal tests of summer & monsoon. The contractor shall arrange to carry out various initial tests as detailed below in the presence of & to the complete satisfaction of the Employer or his representative. Any defects or shortcoming found during the tests shall be speedily rectified or made good by the Contractor at his own expenses.

The initial tests shall include but not be limited to-

i. Test & check the proper functioning & settings of switchgear, starters, contractors, safety controls and electrical motors etc, to ensure their proper functioning.
ii. Check the system against leaks in different circuits, alignment of motors, V-belt adjustment, control setting & all such other tests, which are essential for smooth functioning of the system.
iii. No load test to be carried out.
iv. Operate and check the proper functioning of all Components viz, compressors, pumps, air handling units, water softening plant etc.
v. Check and adjust the water flow in the system to the original design through such components viz, chiller and cooling coils etc.
vi. Check air distribution system and provide design air flow in all areas by adjusting the grilles, diffuser and dampers whether specifically shown on the drawing or not.
vii. Check the performance of the equipment on cooling cycle in summer and monsoon taking hourly DB and WB readings in all rooms non-stop for 72 hours (3 days) for trial test.
viii. The initial test performs in the above manner, shall be concluded with reports specifying completeness of all supplied equipments.

B. "CONTINUOUS TEST" for Air-conditioning Equipment-

In addition to the "Initial Tests" the Contractor shall also give continuous running tests of the system i.e. during peak summer and monsoon, when the ambient conditions are close to the design ambient conditions. Each test shall be for (3) three continuous days non-stop in case the System is normally used for 24 hours, otherwise, for the duration of the normal use of the system for six consecutive days. The first summer test may be taken on the completion of the installation and satisfactory commissioning provided the ambient temperature and

Humidity are near their peaks. The Employer / Consultant will provide 3-Days notice for conducting the tests.

The Contractor shall provide all necessary tools, instruments, gauges, flow meter, anemometer etc., as may be required for conducting the various tests. He shall also provide necessary lubricants, refrigerant gas etc. and required personnel for the tests. However, the Employer shall provide water and power for the tests.

C. "PERFORMANCE TEST" -

After erection of various air handling units and fan coil Units, all the units shall be tested for their rated capacity. Following parameters have to be assured by the contractor-

i) TR PRODUCED:

A) By airflow, temperature & humidity of air.

B) By water circulation.

ii) CFM specified at given temp. & R. H. conditions.

iii) Static pressure.

iv) Electric power consumption for each equipment.

v) Any other utilities required shall also have to be measured compared to the committed consumption.

vi) Consumption of items whatsoever nature, not specified in the tender shall be considered as extra consumption and will disqualify the performance test.

vii) Delta T and Delta P to be checked and noted.

viii) Canvass Temperature - °C / °F

Grille Temperature - °C / °F

Return Air Temperature - °C / °F

3.15 REJECTION OF DEFECTIVE SYSTEM

a. If the completed system or any portion thereof before it is taken over is found defective or fails to fulfill the intent of the specifications, the Contractor shall on receipts of notice from the Employer forthwith make defective system good. Should he fail to do so within a time considered reasonable by the Employer, The Employer may reject and replace at risk, and expense to the Contractor, the whole or any portion of the system, which is defective or fails to fulfill the requirement of the contract.

b. The Employer shall have the right to operate all equipment, if in operating condition, whether or not such equipment have been accepted as complete and satisfactory.

3.16 TAKING OVER

After completion of the installation and satisfactory commissioning of the system, the same shall be taken over by the Employer.

3.17 WARRANTY

Period of 12 months begins from the date of take over.

3.18 CLEAN-UP OF THE WORK SITE

During erection the Contractor shall at all times keep the working and storage areas free from waste or rubbish. On time-to-time, as directed by Employer in Charge, he shall remove all temporary structures, debris, insulation bitumen, EPS wastage and leave the premises neat and clean in a satisfactory condition.

3.19 WORK AND SERVICES TO BE PROVIDED BY THE EMPLOYER

Unless otherwise agreed, the Employer shall provide the following work and services to the Contractor for carrying out the erection work.

a. All major masonry/building work such as construction of platform and air handling unit rooms, foundation for all equipment trenches for pipes, cables, masonry shafts and ducts. The Contractor shall provide minor masonry work such as breaking and making good of openings for pipes and cables. The Contractor shall carry out chipping of holes and grouting of bolts/anchors.

b. The Employer shall provide raw water connection to the expansion tank and cooling tower basin.

c. Electrical cable of sufficient length up to the entire switchboard shall be supplied and laid by the Employer with

suitable earthling. The Contractor shall connect the cable to the incoming side of all the panels on the main switch, which shall be supplied by him.

d. False ceiling and boxing for concealing pipes etc.

e. Electrical power for welding machines for site work.

f. Wooden frame for grilles and diffusers.

3.20 WORK AT SITE

Access to the work shall be allowed only to the Contractor and his duly appointed representatives. The Contractor shall not object to the execution of work by other Contractors or tradesman and shall afford them every facility for execution of their works simultaneously with his own.

3.21 DEFECT LIABILITY

a. The Contractor shall guarantee that all material, machinery and components, supplied, fabricated, designed and installed by him shall be free from defects due to faulty material and/or workmanship and that the system shall perform satisfactorily, and the efficiency of the system and all the components shall not be less than the values laid down in the specifications and the capacities shall be at least equal to those specified. The period of the guarantee shall be twelve (12) months from the date of commissioning of one month after the successful final test whichever is later, during which period any or all components found to be defective shall be replaced or repaired free of charge and shortcoming found in the system as specified shall be removed at no extra cost.

The Contractor shall make good any loss of refrigerant and oil at his own cost. The Contractor shall provide the necessary personnel and tools for fulfilling the guarantee.

b. If the defects are not remedied within a reasonable time, the Employer may proceed to get the defects remedied at the Contractor's risk & expenses without prejudices to his right.

c. The Contractor shall without any cost to the Employer carry out during the guarantee period all routine and special maintenance of the system and attend to any defects that may arise in the operation of the system.

3.22 IMPORT LICENSE

The Employer shall not provide any import license and / or permit for controlled material.

3.23 CONTRACTOR'S CONDITIONS OF CONTRACT

Conditions of contract in Contractor's offer will be treated as null and void unless specifically agreed by the Employer in writing.

3.24 SAFETY

All equipment shall be complete with approved safety devices wherever a potential hazard to personnel exists and with provision for safe access of personnel to and around equipment for operational and maintenance functions.

These items shall include not only those usually furnished with elements of machinery but also covers, guards, crossovers, stair ways, ladders, platforms, handrails etc. which are necessary for safe operation of the system. The

tenderer shall include for all safety devices including but not limited to the following items-

a. Belt Guards

Belt guards shall be designed with approved provision to facilitate belt inspection, adjustment, replacement and general servicing.

b. All couplings are to be covered with an approved guard, fabricated from welded plate and structural steel.

c. Access Ladders and Platforms

Provisions shall be made for access ladders (particularly for cooling tower) and platforms with handrails as necessary to provide operator's safe access to inspection.

2.0 GENERAL DESCRIPTION / BASIS OF DESIGN

5.1 SCOPE

The work stated in these specifications together with Consultant's drawings, cover the design, manufacture, testing performance of manufacturer's work, delivering goods at site, handling at site, installation, commissioning & carrying out performance tests at site of the complete equipment required for the HVAC System for M/s. NIA, Cooperage.

5.2 BASIS OF DESIGN

Project : M/s. NIA New India Center

Application : Comfort Air-Conditioning & Active Ventilation.

ROOF

The exposed roof of the building will be insulated by air conditioning contractor / insulation contractor in such a manner so as to provide an overall transmission factor of 0.12 BTU / hour-FT2 / or better.

WORK TO BE DONE BY AIR CONDITIONING CONTRACTOR

The successful air conditioning contractor will provide complete air conditioning & ventilation system work as detailed in the tender BOQ and as specified in the technical specification.

5.3 POWER SUPPLY

415 V, 3 Ph. 7 Neutral 50 c/s, 4-wire A.C. elec. Power supply including earthing at the main panel will be made available by the Employer.

5.4 DESCRIPTION OF THE WORK TO BE CARRIED OUT

The successful tenderer's scope shall be carrying out complete high and low side work as per BOQ. The scope of work includes Supply, Installation, and Testing& Commissioning of system.

The units shall be located as per tender drawings. The electrical power required for outdoor units shall be made available at the main electrical panel supplied by you as required, this panel shall be suitable for outdoor application & confirming IP-55 construction. For Indoor units & ventilation fans single phase power required shall be provided at units from Floor Distribution Board however required control cabling between indoor and

outdoor units shall be done by you. The power and water required for installation, erection and commissioning of the system shall be made available by client.

3.0 SPECIFICATION OF EQUIPMENT / MATERIAL AND INSTALLATION STANDARDS

6 REFRIGERANT PIPING

The indoor and outdoor units shall be connected with refrigerant piping. All piping connections for the units should be performed inside the unit. The refrigerant piping should be insulated with Tubular Nitrile rubber of minimum 12 MM thickness. Lastly, cover up the pipe sections with the help of 36 G Aluminium sheets on straight pipes and 28 G Al. sheet on bends, tees, valves etc.

DRAIN PIPING

Condensate from the evaporator unit shall be drained through properly installed drain piping designed to prevent any accumulation of condensate in the drain pan.

Drain piping shall be made of Kitec type for pipe sizes upto 1" dia and of G. I. for pipe sizes larger than 1" dia of 6 Kg/Sq. cm. pressure rating with water tight threaded connections, leading from the room unit to a suitable drain point. Complete drain piping shall be made leak proof and water tight by means of precise installation and the use of leak proof sealant / adhesives. Insulation of drain piping should be tubular Nitrile rubber of 12.5 mm thickness.

TESTING

1. After completion all such system shall be tested for leakage.
2. The entire air distribution system shall be balanced to supply the air quantities as required in various zones and rooms to maintain the specified room conditions. The final shall be recorded and submitted to the Consultant for approval before acceptance and taking over of the entire system by the Employer.

PAINTING

Angle iron flanges, stiffeners, hangers and supports shall be painted with 2 coats of anti rust primer and those remaining uncovered shall be further painted with 2 coats of synthetic enamel paints of black color.

6.4 ELECTRICAL WORK

The electrical work will be carried out as per IE rules. The Employer will provide incoming cable with earthing near split units panel supplied by the contractor. The further distribution including power cabling (1100 V Gr.), control cabling (650 V Gr.) and earthing GI shall be carried out by the contractor. The electrical panel required for all the split units will also be provided by the contractor. The power cabling will be of aluminium whereas the control cabling will be of copper. The electrical work will be carried out by the contractor as per the approved drawings.

ANNEXURE – I

1.0 TESTING OF AIR CONDITIONING SYSTEM

1.1 Routine and types tests for various items of equipment shall be performed at the contractor's work and the test certificates furnished. Functional test shall be conducted at site.

1.2 The performance test to determine whether OR not the full indent of the specification is met shall be conducted by the contractor. After notification to the Employer's that the installation has been completed and the plant has run continuously for a period of at least two weeks, the contractor shall conduct under the direction of the Consultant's and in the presence of Employer's representatives test, such test as specified to establish the capacity of various equipment supplied and installed by the contractor.

1.3 The contractor shall operate test and adjust the air conditioning system units, fans, motors, all air conditioning appliances including adjustment of regulators, dampers etc.

1.4 All test equipment, labour, operating personnel, oil and refrigerant required for this test shall be furnished by the contractor to enable the plant to be put in continuous running test for a period of 3 days after all other tests and adjustments hove been made.

The contractor will be provided with electrical power for testing by the client. The performance test shall be conducted during peak summer and peak monsoon.

2.0 PROCEDURE

2.1 Design Conditions

The inside and outside conditions will be recorded for 48 hrs. (2 days) duration on hourly basis.The outside and inside Dry Bulb and Wet Bulb temperatures shall be recorded by the means of a sling psychrometer with mercury thermometers. The relative humidity shall be computed from the psychometric chart.The inside Dry Bulb Temp. And relative humidity shall fall within the specified limits.

2.2 CAPACITY OF THE SYSTEM

The following aspects shall be checked before conducting the performance tests

1) The outside conditions shall be as close to the design values as possible. The tests shall be arranged during the peak summer and monsoon.

2) The internal loads of various spaces shall be close to the design values as far as possible.

3) The system shall be fully loaded and the temperatures stabilized.

4) Hourly readings of airflow shall be recorded b a calibrated flow meter.

5) Hourly readings of pressure, temperature, electrical current. Voltage and power factor shall be properly recorded.

The capacity of the system and various other equipment and accessories shall be ascertained as follows.

2.3 Cooling coil of Indoor units

The flow of air over the cooling coil will be measured by recording the velocity of air across each filter placed before the cooling coil. The velocity shall be measured by means of end anemometer.

4.0 FUNCTIONAL TESTS

4.1 Electrical equipment

i) All the cables shall be tested for continuity and absence of cross phasing, Insulation resistance between the phase conductors and earth shall be measured with the help of a 500 v megger,

ANNEXURE – II

MODE OF MEASUREMENT

1.0 The following measurement code shall apply to this contract

1.1 PIPING

a) Piping will be measured in running lengths (meters)

b) No special measurement of bends, elbows, reducer, expanders, tees, cross etc. will be made. All such fittings/accessories will be treated as normal piping.

c) The length of the piping including accessories and fittings will be measured along the enter line of piping.

B) Electrical Work

a) All cables shall be measured in running lengths as finally installed at site. No wastage measurement will allow.

b) Control Cable / wiring for a plant inside the plant room shall be treated as a lump sum item.

c) All measuring instruments indicating lamps etc shall form part of the equipment specified and no separate measurement shall be made for such items.

Note – Contractor should note that all the measurement should be carried out strictly as per mode of measurement stated above. However, all the work should be carried out as per relevant I. S. codes for the work.

SCHEDULE OF APPROVED MAKES

Note: The Contractor should obtain prior approval from Architects before placing orderfor any specific material / agency.

LIST OF RECOMMENDED MATERIAL OF CIVIL & FURNITURE WORK

1	COMMERCIAL PLY (MR-303)	Greenply/ Anchor / Samrat/ Century/Kutir
2	FLEXI PLY (MR-303)	Greenply/ Anchor / Samrat/ Century/Kutir
3	LAMINATES (1.00 mm thk)	Greenlam / Advance /Aica / Dorby mica / Royal Touch/ Marino.
	0.8 mm thk. Laminate	Century/ Heritage / Durian
4	VENEER	Greenlam / Durian / Kutir
5	WOOD (Well Seasoned)	C.P.T.W. / Malayasian /African
6	SCREWS, NAILS & OTHER ACCESSORIES	GKW/Nettle Fold or Equivalent.
7	BRASS HINGES (Heavy Duty)	Kich/haffle/Hettich/Doorset/Enox or equivalent
8	DRAWER SLIDING FITTINGS (TELESCOPIC)	Kich/haffle/Hettich/Doorset/Enox or equivalent
9	HARD WARE	Kich/haffle/Hettich/Doorset/Enox or equivalent
10	DRAWER SHUTTER / LOCK	Kich/haffle/Hettich/Ebco or equivalent
11	BALL CATCH	Magnetic (M.2.) / Brass
12	DOOR LOCK / HANDLES	Kich/haffle/Hettich/Doorset/Enox or equivalent
13	DOOR CLOSUER	Dorma/Ozone/Enox/Doorset/Haffele Or equivalent
14	FLOOR SPRING	Dorma/Ozone/Enox/Doorset/Haffele Or equivalent
15	ADHESIVE	Fevicol/Araldite/Anchor or Equivalent
16	STAINLESS STEEL	Salem / Japan 16 gauge thick.
17	GLASS TINTED / MIRROR	Saint Gobian / Asahi India
18	GLASS TINTED	Saint Gobian / Asahi India
19	MELAMINE ACRYLIC POLISH	Asian / British Paint / Fevelite.
20	ALUMINUM GRILL	Alumgrill

21	P.V.C. Flooring	Hanwha / Armstrong / L.G.
22	WOODEN LAMINATE FLOORING	Pergo/Armstrong/Euro or equivalent
23	FALSE FLOORING	D.G. / NEP Floor

PAINT

1	PLASTIC EMULSION	Asian/Nerolac//Berger or equivalent
2	SYNTHETIC ENAMEL PAINT	Asian / Nerolac / British Paint.
3	TEXTURE PAINT	Birla / Nitco / Spectrum
4	CEMENT PAINT	Snowcem, Nitcocem, Birla, ICI, Asian, Nerolac, British.
5	ALUMINUM METAL FALSE CEILING	Armstrong/Unimech/AMF
6	FIBRE MINERAL FALSE CEILING	Hunter Douglas / AMF
7	ALUMINUM DOOR & WINDOW SECTION	Jindal / Indal
8	UPHOLSTERY	Golden / Vimal / Orkay / Raymond / Champagne.
9	WOOD PRESERVATION	Asian Paints / British Paint / Pest Control of India
10	VERTICAL BLINDS	Vista, Mac, Luxaflux, Aerolux.
11	VENETIAN BLINDS	Vista, Mac, Luxaflux, Aerolux.
12	CEMENT	Ultratech/ACC/JK Cement/Ambuja
13	SUN CONTROL FILM	Lunar / Birla 3M
14	STAINLESS STEEL SINK	Nirali / Diamond.
15	PLANTS (Artificial)	China / Taiwan.
16	PICTURES	Selection from Sadguru& Paint Rhythm.
17	AIR CURTAIN	Air Pack / Crompton / Russel.
18	CARPET	Unitex/Armstrong or equivalent
19	CASTORS	Relaxo / Paramount.
20	CERAMIC TILES/ (Flooring)	HR Johnson/Kajaria/RAK or equivalent
21	CERAMIC TILES (Dado)	HR Johnson/Kajaria/RAK or equivalent
22	VITRIFIED FLOORING	HR Johnson/Kajaria/RAK or equivalent
23	GRANITE TILES	South Quarrys (Banglore / Manglore)
24	“U” FOAM	Prince / Supreme / Swastik.
25	POLYURETHANE FOAM	Sleepwell
26	SOFT BOARD	Jolly Board
27	GLASS WOOL	Fibre Glass / Pilkington.
28	ALUMINUM COMPOSITE PANEL	Al-Strong / Alucobond / Allu-bond/Flexi Bond/Alto-bond
29	TOUGHENED GLASS	Saint-Gobain/Indo Asahi/Modi or equivalent
30	ACRYLIC SOLID SURFACE	Dupont/ Merino/ Hi-Mac or equivalent

LIST OF MAKE FOR PLUMBING WORKS

S.no	Material		Brand/ Manufacturers OR EQUIVALENT
1	Stainless Steel Sink	:	Nirali
2	Sanitary Ware	:	Hindware/Jaquar
3	Plastic seat cover of W.C	:	Hindware/Jaquar
6	Centrifugally /Sand cast iron pipes & fittings	:	Neco, Hepco
7	G.I. Pipes	:	Jindal-Hissar, Tata, Prakash-Surya B.S.T., SAIL,
8	G.I. Fittings	:	Jindal-Hissar, Tata, Prakash-Surya B.S.T., SAIL,
9	Gunmetal Valves	:	Zoloto, Leader,
10	Brass stop & Bib Cock	:	Hindware/Jaquar
11	Ball valve with floats	:	Zoloto, Leader, Sant, Jayco
12	Stoneware pipes & Gully Traps	:	IS Marked pipes
13	R.C.C. pipes	:	IS Marked pipes
14	D.I. Manhole Covers	:	RIF, NECO,
15	Water Tank	:	Sintex, Polycon, Uniplast
16	Mirror	:	Golden, Atul, Modi guard ,Gujrat Guardian
17	Hand drier	:	Kopal, Automat, Euronics
18	PVC flushing cistern	:	Parryware, Hindware,Jaqvar

19	Insulation of Hot water pipes	:	Vidoflex insulation, Superlon insulation or equivalent
20	PVC Rain Water Pipes.	:	Supreme, Prince, Finolex. Astral
21	Sluice valve / NRV	:	Kirloskar, Kilburn, Zoloto ,Castle,
22	Water supply pumps	:	KIRLOSKAR, WILO, GRUNDFOS
23	UPVC pipes & fittings	:	FInolex , Prince, Supreme, Astral
24	Chlrorinator	:	ALFA, USA, Ion exchange, Sigma DH Combine Inc.
25	HDPE Solution tank	:	WATCON, ION EXCHANGE, Water Supply Specilist P (Ltd)
26	C.P Flush Valves	:	Jaquar, Seiko, Nelson
27	C.P Angle Valves, bib cock	:	, Jaquar, Seiko ,Nelson
28	Level controller	:	Femac or equivalent
29	Drainage Pumps	:	Grundfos, KSB, Kirloskar
31	R.O System	:	Thermax, Aqua Process, Ion-Exchange, Akar- Impex, Polycon Technologies, Fontoos
32	PE-AL-PE	:	Kitec, Jindal, NEXGEN
33	HDPE pipes and fittings	:	Oriplast, So-Soon, Finolex
34	Infrared Sensor operated Urinals	:	Jaquar, Euronics,U-tec
35	Grab Bars	:	Marino or equivalent
36	CPVC pipe	:	Prince, Supreme,Finolex, Astral
37	Solar Panel	:	Tata BP, BHEL, EMMVEE
38	Copper Pipe	:	Raj Co., Maxflo
39	Copper Fittings	:	Viega, IBP
40	Lab drainage	:	Viega or Equivalent as approved.
41	Lab Fittings	:	Vijay, Viega, or equivalent
42	CP Grating for Floor Trap		Chilly,Cardin, Cammry
43	UPVC Over Head Water Tank		EURO, SYNTEX, DIPLAST

LIST OF MAKE FOR ELECTRICAL WORKS

SR. no	Material	Brand/ Manufacturers OR EQUIVALENT
1	CABLES ISI MARK, 1100V (GRADE FR)), XLPE	KEI, POLYCAB, RRKABLES
2	WIRES: 1100V/660V GRADE FRLS	KEI, RRKABLES,FINOLEX, POLYCAB,
3	PVC CONDUITS & ACCESSORIES	PRECISION, SUPREME,AKG
4	6A / 16A MODULAR SWITCHES & SOCKETS, ISI MARK	CRABTREE ,M.K.INDIA, LEGRAND
5	DISTRIBUTION BOARDS, MCB's – 10.0KA	LEGRAND, HAGER, SCHNEIDER
6	ELCB/RCCB/RCBO – 10.0KA.	LEGRAND, HAGER, SCHNEIDER
7	ELETRICAL FITTINGS	PHILIPS, WIPRO
8	HRC SWITCH FUSE UNITS	GE, L&T, SIEMENS, ABB
9	CABLE GLANDS & LUGS	BRACO, DOWELS.
10	INDUSTRIALSOCKETS	LEGRAND,SCAME, NEPTUNE
11	FLOURESCENT TUBES & BULBS	PHILIPS, OSRAM.
12	CONTACTORS	L&T,MERLINGERIN, LEGRAND
13	ACB / MCCB	L&T, LEGRAND, HAGER, SCHNEIDER
14	C.T	INDCOIL, MECO
15	CAPACITOR	SUBODHAN, L&T
16	P.F. RELAY	TRINITY, ENERCON, SECURE, L&T
17	ALUMINIUM RACEWAYS	JINDAL, INDAL.
18	MANUAL CHANGE OVER SWITCH	L&T,MERLINGERIN, LEGRAND
19	RG59 OUTLETS	KEI, RRKABLES,FINOLEX, POLYCAB, RAJANIGANDHA
20	RACEWAYS / CABLE TRAYS	PROFAB,ASIAN,SHIVSHAKTI
21	PANEL ACCESSORIES	L&T, SIEMENS, MG,GE
22	LOAD MANAGERS & EM	TRINITY , HPL ,ENERCON,SECURE,
23	TVSS/ SPD	LIBERT(ASCO),LEGRAND,SCHNEIDER

APPROVED MAKES OF MATERIALS OF AIR-CONDITIONING

Sr No.	Material	Brand/ Manufacturers OR EQUIVALENT
1.	VRF Systems	HITACHI / Daikin / Mistubushi
2.	Indoors Hi-Wall & cassette type unit	HITACHI / Daikin / Mistubushi
3.	Ductable / Splits / Window Air-conditioners	HITACHI / Daikin / Mistubushi
4.	Grilles & Diffusers.	Cosmos / Air Master / Dynacraft / Air Product
5.	Air Handling Units.	Nutech / HPS / Carryaire
6.	Collar / Volume Dampers	Cosmos / George Rao / Carryiare / Air Master.
7.	Propeller Exhaust fans	GEC/ crompton
8.	Centrifugal fan / Inline / Axial	Kruger / COMEFRI / NICOTRA /NADI
9.	Motors	Siemens /ABB/ Crompton/ AUE
10.	Starter / contactor	Siemens /L& T / Cutler Hammer
11.	Air Filter	Air tech / Johan flower / Pure Air
12.	Insulation fiber glass	UP Twiga / kimco
13.	Expanded Polystryene	Beardsell / Lloyd
14.	Phenotherm / Nitrile Rubber	Hylam/Superlon/Armaflex/Trocellen
15.	GSS Sheets	Jindal/SAIL
16.	Vibration isolation	Dunlop / Cushy Foot / Resistroflex
17.	Control cable	Finolex / CCI / Polycab / Universal
18.	Power cable	ICC/Asian cables / Polycab / /Incab/Siemens/Universal
19.	HRC fuses	EE/L & T / Siemens
20.	Timer	Siemens/ L & T/EE/Cutler Hammer
21.	Termining block	Elmex
22.	G.I. sheets	Tata /SAIL/Jindal
23.	Copper Refrigerant Piping	Mandev Tubes / Rajco / Indigo Metalloys / Janya.
24.	Refrigerant Piping Insulation	Vidoflex / Supreme
25.	PVC Drain Pippe	Prince / Supreme
26.	Thermostat	DAN Foss/RANCO/ Cutler Hammer

27.	Humidistat	Penm/Honeywell/RANCO
28.	Solenoid valve	Sporlan
29.	Thermostat expansion valve	Sporlan /Danfoss/ ALCO
30.	Air Flow Control Regulators.	Aldes / Trox.
31.	Flexible Insulated Ducts	Bailiwick India.
32.	Indoor Air Quality (Air Ozone Injection System)	Ruks /Trimed.

Primary Details of the Bidder

Name of the Bidder	
Address	
Email id	
Contact Details	
Year of Establishment:	
Status of the Firm : Proprietary / Partnership / Pvt. Ltd./Pub. Ltd.	
Registration number and date with Registrar of Companies/Firms :	
PAN Card Number :	
GST Number :	
Name Of the banker	
Account Number	
IFSC Code	
Type of account	

MANDATORY INFORMATION REQUIRED FOR PREQUALIFICATION OF THE BID

S.No.	Eligibility Criteria for the Bidder	Complied (Yes/No)	Documents Required(tobe uploaded)
1	The bidder should be on empanelment with banks/Financial Institutions/Insurance Companies/PSU		Valid Empanelment letter.
2	Current solvency certificate from your Banker only for notless than 50% of estimate value :		Banker Certificate only
3	Value of the total work done till date		Supporting document
3.1	At least particulars of minimum 1 successfully completed similar work during last seven years amounting to 80% of estimate value or more: Successful completion Certificate from clients is mandatory.		Successful completion Certificate from clients
	OR		
3.2	At list particulars of minimum 2 successfully completed similar works during last Seven years amounting to 50% of estimate cost or more: Successful completion Certificate from clients is mandatory.		Successful completion Certificate from clients
	OR		
3.3	At list particulars of minimum 3 successfully completed works during last Seven years amounting to 40% of estimate cost or more: Successful completion Certificate from clients is mandatory.		Successful completion Certificate from clients
3.4	Whether Solvency certificate (for minimum **Rs. 40 Lacs)** enclosed (Valid till completion of work)		
3.5	Annual Turn-over during the last 3 financial years (**in Rs. 50 Lacs/-**) (Attested by Chartered Accountant)		i) FY YEAR 2020-2021 Rs_____ ii)FY YEAR 2021-22 Rs_____ iii)FY YEAR 2022-23 Rs_____
4	For electrical work, valid license from State Government ismust. Subletting is allowed for only Electrical, data cablingand Lighting Fixtures. Sub contractor's license can also be submitted for this purpose but final liability of work will beof main Contractor only.		Valid electrical license from State Government
5	Have you in past carried out any works for Financial Institutes/Nationalized Banks/ PSUs or its subsidiaries?		Successful completion Certificate from clients

6	Have you been ever disqualified or blacklisted or levied penalty by the Organization/Bank/PSUs in past for non-fulfilment of the contractual obligations. If yes, please provide details in brief.		Self-declaration on letter head of bidder

Bidders meeting the above mentioned criteria are eligible to submit their bids alongwith supporting documents. If the Bid is not accompanied by all the required documents supporting eligibility criteria, the same would be rejected.

I/We confirm that to the best of our knowledge this information is authentic and accept that any deliberate concealment will amount to disqualification at any stage.

Note: Similar works means, the vendor should have completed comprehensive work consisting of furniture work, false ceiling work, modular work stations and electrical, data cabling, computer wiring, Distribution board/panel board & lighting fixtures wok being the selection criteria.
Seal and Signature of the Bidder/s.

Date:

Place:

Annexure-1-(Technical Bid)

THE NEW INDIA ASSURANCE CO. LTD

S.No.	ESSENTIAL/MANDATORY DOCUMENTS/CRITERIA			
1	**Name and Address of the contractor**			Address proof to be attached(mandatory)
2	**PAN No & GST**			Copy of each to be attached (mandatory)
3	**Tender Fee (Rs 1770/-)**			Scanned copy to be attached online and hard copy to be submitted to office (MSE are exempted) (MSE must submit scanned MSE certificate for claiming exemption) (mandatory)
4	**EMD (Rs 1,50,0000/-)**			Scanned copy to be attached online and hard copy to be submitted to office (MSE are exempted)) (MSE must submit scanned MSE certificate for claiming exemption) (mandatory)
5	**Similar Works (Interior furnishing works)**			Certificates/work completion certficates to be attached for similar work (merely work orderswill not be considered) (mandatory) [Please note that the qualifying value should correspond to one single work /two single works/three single works *(i.e. the bidder should not combine value of different small works to show as value of single work]*
	1 similar work amounting to 80% ofestimated value	**2 similar works amounting to 50% of estimatedvalue**	**3 similar works amounting to 40% of estimated value**	
6	**Self declaration regarding not disqualified /not blacklisted byany organization /bank in the past**			To be attached (mandatory)
7	**Balance sheet / Profit & Loss Statement for the last 3 years. (** **to be attached herewith)**			To be attached (mandatory)

Date:- **Place:-**

ANNEXURE - 2

(SECURITY DEPOSIT-BANK GUARANTEE PROFORMA)

To,

The Deputy General Manager,

3rd Floor, New India Center,

Dr. Babasaheb Ambedkar Chowk,

Cooperage Road, Colaba,

Mumbai, Maharashtra 400001

WHEREAS

M/S , (hereinafter called "the Contractor") has undertaken,in

Pursuance of TenderReferenceNo.....dated to undertake workstitled

"......"

AND WHEREAS it has been stipulated by you in the said Tender that the Contractor shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein, as security for compliance with the contractor's performance obligations in accordance with the contract.

AND WHEREAS we have agreed to give the contractor a guarantee:

THEREFORE, WE hereby affirm that we are Guarantors and responsible to you, on behalf ofthe Contractor, up to a total of Rs.....(in words.....) and weundertake to pay you, upon your first written demand declaring the contractor to be indefault Under the Tender and without cavil or argument, any sum or sums within the limit of Rs /-

(Amount of Guarantee) as aforesaid, without your needing to prove or to show grounds orreasons for your demand or the sum specifiedtherein.

This guarantee is valid until the.....

Signature and Seal of Guarantors (Contractor's Bank) Date:

Address

ANNEXURE - 3

ARTICLES OF AGREEMENT

(**On STAMP PAPER of Rs.200/-**)

ARTICLE OF AGREEMENT made this .....day of **TWO THOUSAND TWENTY FOUR (2024)** BETWEEN the **The New India Assurance Co. Ltd.**, a company incorporated and registered under the Companies Act, 1956 and having its registered Regional office at The New India Center, (DO 120400 & DO 121000, Conference & Meeting Rooms)**, Fourth Floor, New India Center, Dr. Babasaheb Ambedkar Chowk, 17-A, Cooperage Road, Colaba, Mumbai, Maharashtra 400001**. hereinafter called "Employer" (which expression shall include its successors and assigns wherever the context or meaning shall so require or permit, of the one part and .... (hereinafter called the "Contractor") (which expression shall include its successors and assigns wherever the context or meaning shall so require or permit) of the other part.

WHEREAS the Employer is desirous of carry out the Proposed Civil, Interior Furnishing, Electrical, Air Conditioning, Networking and Allied work (on Turnkey Basis) at **Fourth Floor, New India Center, Dr. Babasaheb Ambedkar Chowk, 17-A, Cooperage Road, Colaba, Mumbai, Maharashtra 400001**.

as mentioned, and has got drawings, specifications and the bill of quantities prepared by their Architects/Consultants, which have been signed or on behalf of the parties hereto.

AND WHEREAS the Contractor has agreed to execute upon and subject to the conditions set forth herein and to the conditions set forth in the special conditions and in the Bill of Quantities and conditions of contract (all of which are collectively hereinafter referred to as "The said terms & conditions", the works, shown upon the said drawings and/or described" in the said specifications and included in the said bill of quantities at the respective rates therein set forth amounting to the sum as therein arrived at or such other sum as shall become payable there under (herein after referred to as the said "contract value").

NOW IT IS HEREBY AGREED AS FOLLOWS:

01. In consideration of the said Contract Value to be paid at the times and in the manner set forth in the said terms & conditions; the contractor shall upon and subject to the said terms & conditions execute and complete the works shown on the said drawings, and described in the specifications and/or bill of quantities.

02. The Employer shall pay the contractor The Said Contract Value or such other sum as shall become payable at times and in the manner specified in the said terms & conditions.

03. The said terms & conditions and Appendices thereto shall be read & construed as forming part of this Agreement

and the parties hereto shall respectively abide by submit themselves to the said terms & conditions and perform the agreements on their part respectively in the said terms & conditions contained.

04. The contract is neither a fixed lump sum a contract nor a piece work contract but is a contract to carry out the work in respect of the entire work as defined in the contract documents to be paid for according to actual measured quantities at the rates contain in the bill of quantities or as provided in the said contract documents.

05. The contract shall afford every reasonable facility for the carrying out of all works relating to DG Sets in the manner laid down in the said conditions, and shall make good any damages done to walls, floors, etc. after the completion of such works.

06. The Employer reserves to itself the right of altering the Drawings and nature of the work by adding to or omitting any items of work or having portions of the same carried out without prejudice to this Contract.

07. Time shall be considered as the essence of this Contract and the Contractor hereby agrees to commence the work from date of Letter of Acceptance and to complete the entire work within **8 WEEKS** subject nevertheless to the provision for extension of time.

08. All payments by the Employer under this contract will be made only at Mumbai.

09. All disputes arising out of or in any connected with this agreement shall be deemed to have arisen at Mumbai and only court in **MUMBAI** shall have jurisdiction to determine the same.

10. That the several parts of this Contract have been read by the Contractor and fully understood by the Contractor. The Contractor shall not be entitled for the payment for the quantities beyond the tendered quantities unless ordered for by specific written instructions from the engineer.

IN WITNESS WHEREOF THE Employer and the Contractor have set their respective hands to these presents and two duplicates hereof the day and year first hereinabove written. (If the contractor is a partnership or an individual).

IN WITNESS WHEREOF the Employer has set its hand to these presents through its duly authorized official and the Contractor has caused its common seal of to be affixed hereunto and the said two duplicates/has caused these presents and the said two duplicates hereof to be executed on its behalf, the day and year first hereinabove written (If the Contractor is a company).

Signature Clause

SIGNED & DELIVERED by the **The New India Assurance Co. Ltd.** by the hand of

Shri_____

(Name and Designation)
_____ in
the presence of
(1)_____

Address_____

(2)_____

Address_____

Witness

SIGNED AND DELIVERED BY _____ in the presence of

If the party is a partnership firm of an individual should be signed by all or on behalf of all partners.

(1) _____

Address _____

(2) _____

Address _____
Witness

THE COMMON SEAL OF _____
Was hereunto affixed pursuant to the resolutions passed by its Board of Directors at the meeting held on _____ in the presence of

(1) _____

(2) _____

Directors who have signed these presence in token thereof in the presence of

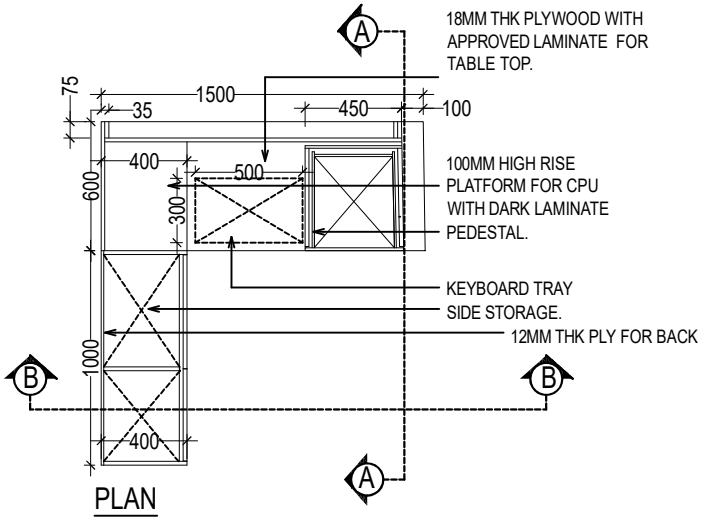
If the contractor signs under its common seal the signature clause should tally with the sealing clause in the Articles of Association.

(1) _____

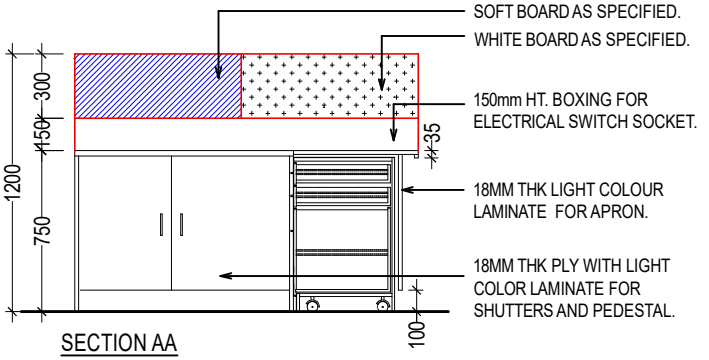
(2) _____

SIGNED AND DELIVERED by the contractor by the hand of Shri _____
And duly constituted attorney

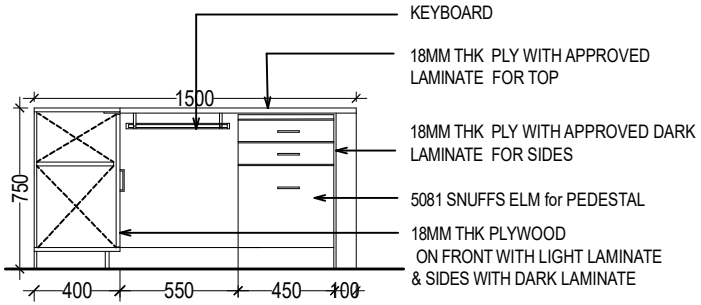
If the Contractor is signing by the hand of power of attorney whether a company or individual.



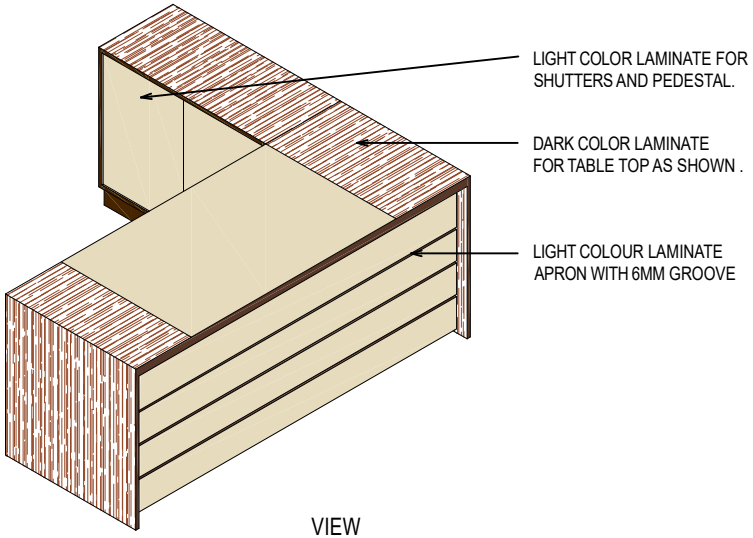
PLAN



SECTION AA



SECTION B



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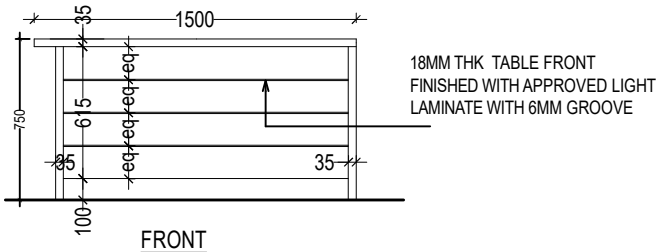
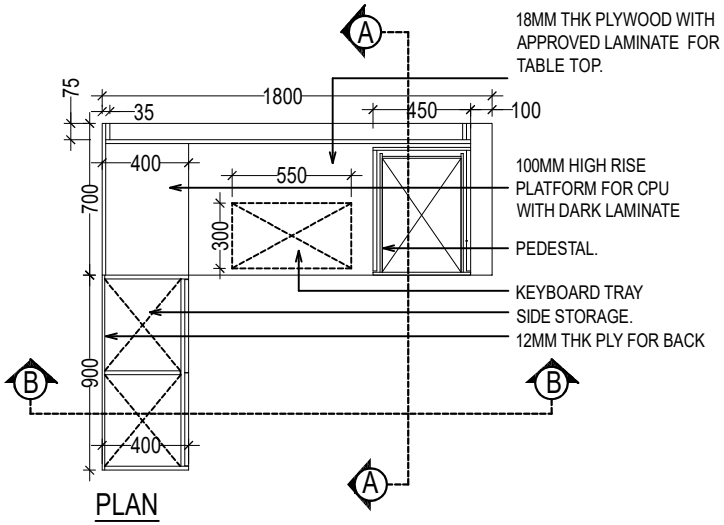
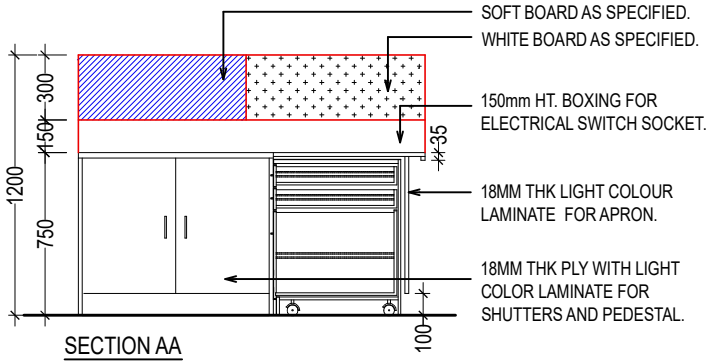


FRONT
ELEVATION

RECEPTION 1



PLAN



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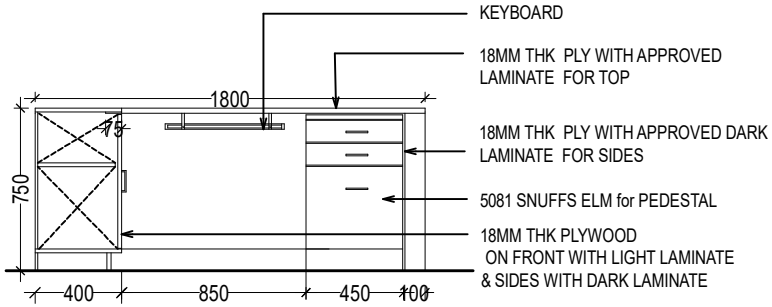

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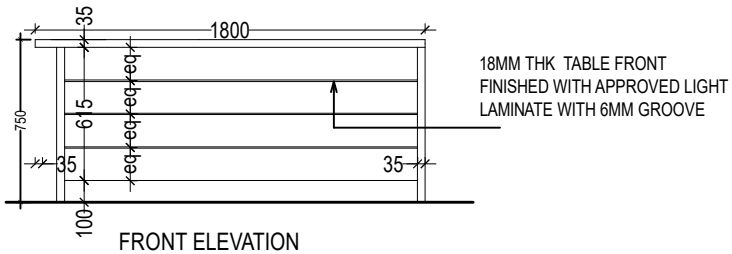
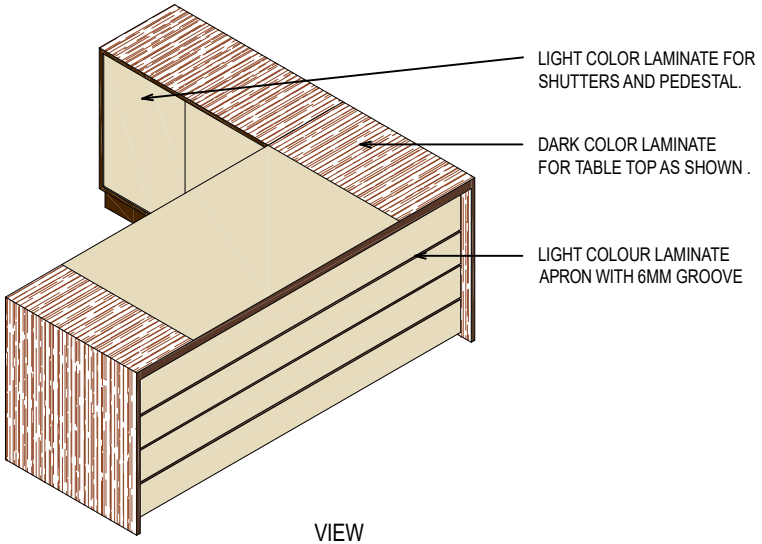
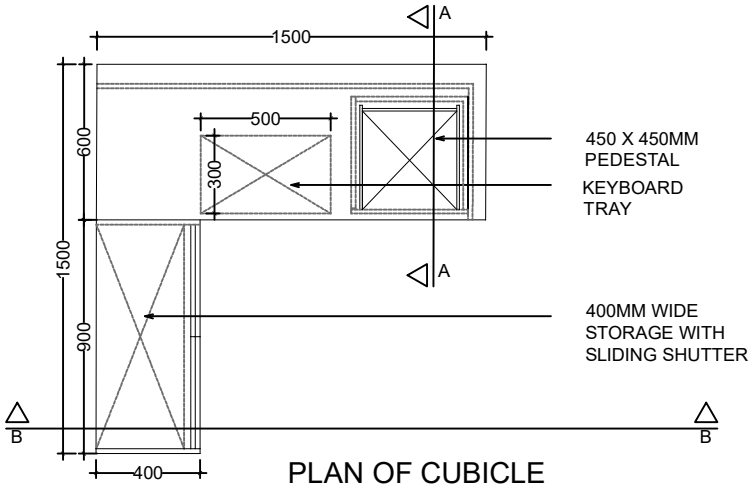


FRONT ELEVATION

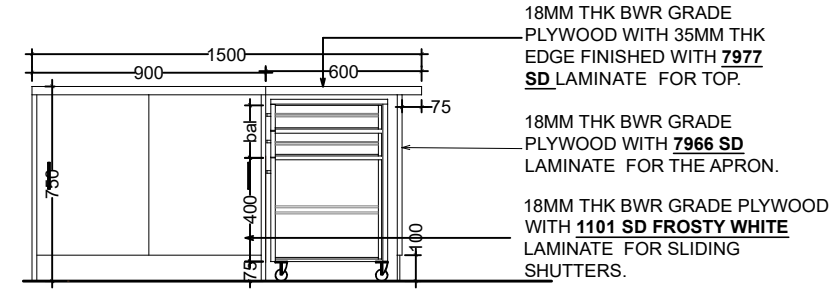


VIEW

CABIN TABLE DETAIL



PLAN OF CUBICLE TABLE



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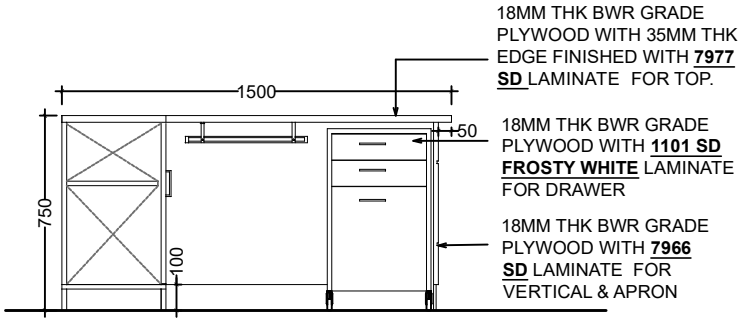
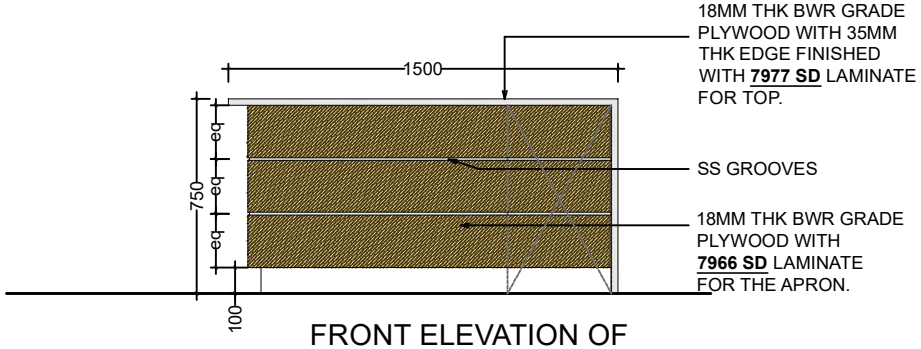
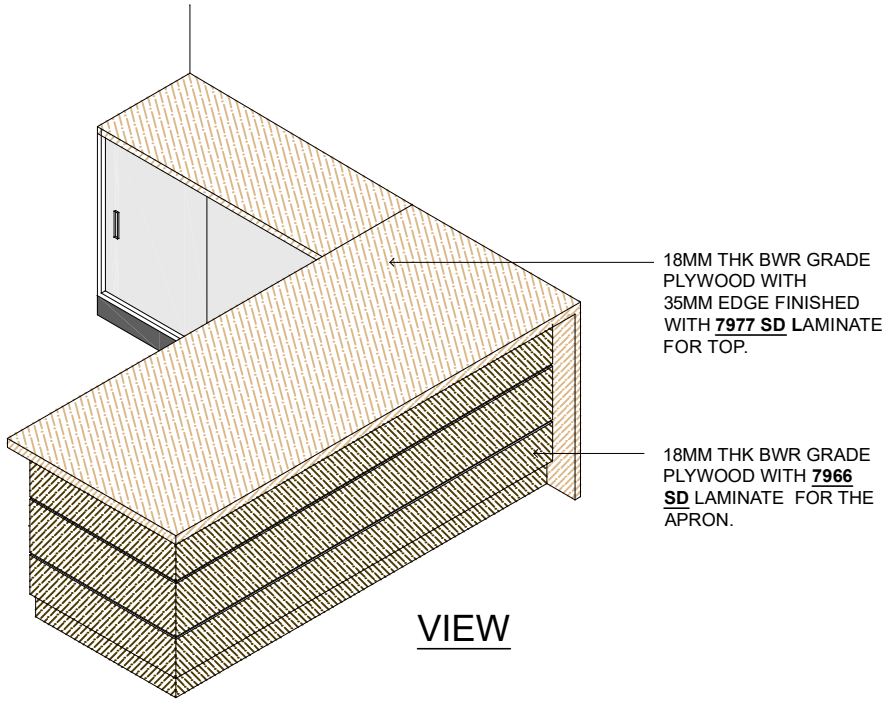


SECTION BB



FRONT ELEVATION OF CABIN TABLE



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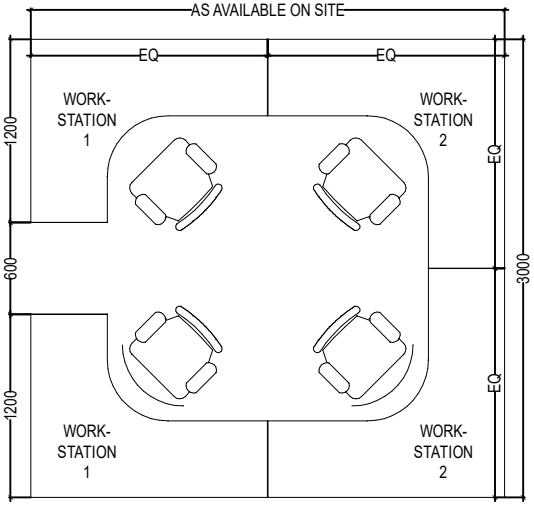
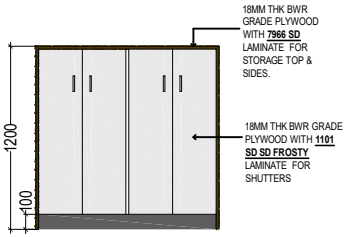
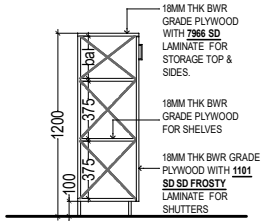


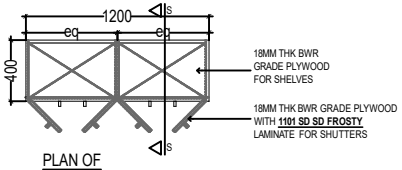
PLAN OF
WORKSTATION UNIT



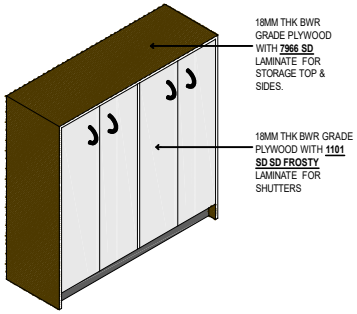
ELEVATION OF
STORAGE

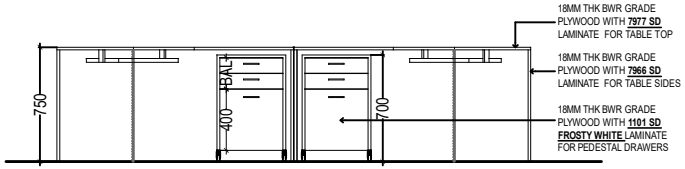


SECTION SS

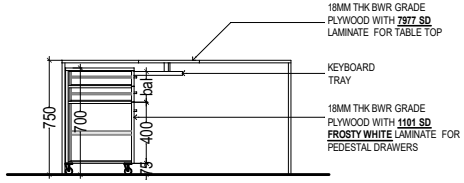


PLAN OF
STORAGE

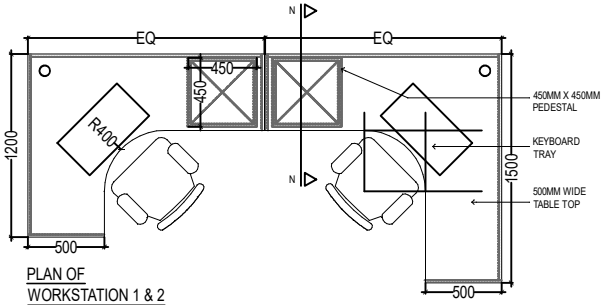




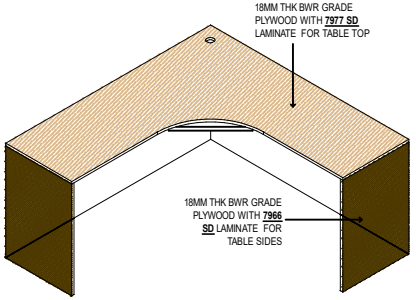
ELEVATION OF
WORKSTATION 1 & 2

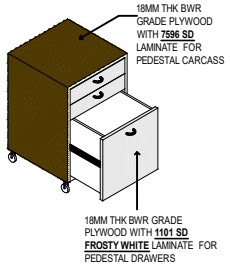


SECTION NN



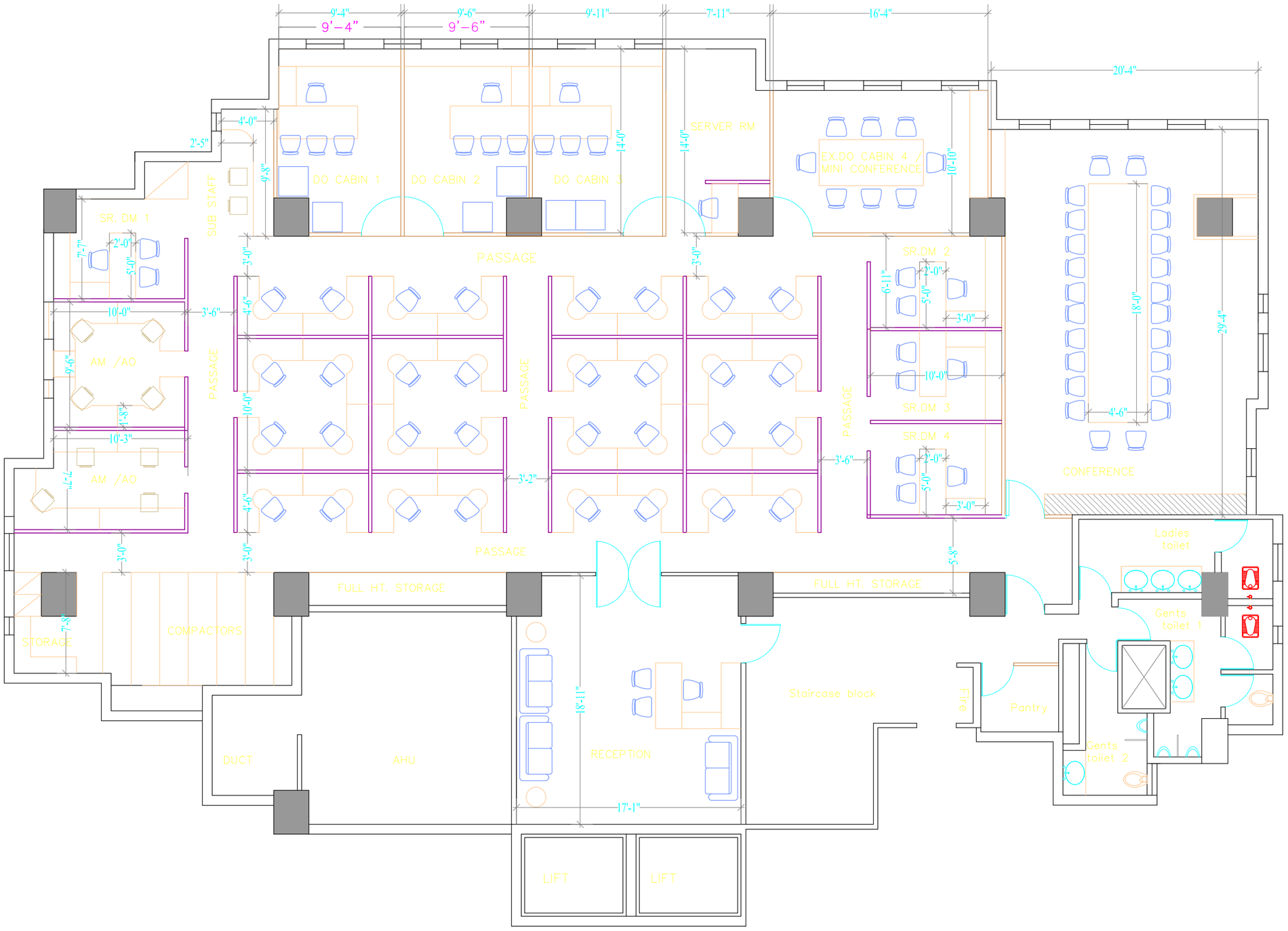
PLAN OF
WORKSTATION 1 & 2





DI/NIA/NIC/4TH flr. R1

DESIGN DEVELOPMENT



AREA

CONFERENCE ROOM	546 Sqft.	SERVER ROOM	101 Sqft.
EX. DO CABIN 4/MINI CONFERENCE	173 Sqft.	OPEN OFFICE (AM /AO, COMPACTORS & PASSAGES)	1931 Sqft.
DO CABIN 1	124 Sqft.	L SHAPE WORKSTATIONS Nos.	21 Nos.
DO CABIN 2	128 Sqft.	STRAIGHT WORKSTATIONS Nos.	19 Nos.
DO CABIN 3	137 Sqft.	LADIES TOILET	81 Sqft.
Ex.DO CABIN4 / MINI CONFERENCE	173 Sqft.	RECEPTION AREA	317 Sqft.
Sr. DM 1	71.25 Sqft.	GENTS TOILET 1	92 Sqft.
Sr. DM 2	69.4 Sqft.	GENTS TOILET 2	48 Sqft.
Sr. DM 3	69.15 Sqft.	PANTRY	30 Sqft.
Sr. DM 4	69.40 Sqft.		

NO.	DESCRIPTION	DATE	DRAWN BY

REVISIONS

DATE	DRG. NO.	REV. NO.	NO. OF PRINTS

DISTRIBUTION OF PRINTS

Date	30-03-2023
Scale	1/8"=1'-0"
Drawn	CK
Checked	PP
Approved	PP
SHEET SIZE	A2- 594 mm x 420mm
File Name	

CLIENT

NEW INDIA CENTER

PROJECT

INTERIOR RENOVATION OF 4th FLOOR, NEW INDIA CENTER, MUMBAI.

DESIGN IDEAS

2,SREE RANG BUILDING, GROUND FLOOR,
OPP BANK OF BARODA, CHANDAVARKAR ROAD,
CENTRAL MATUNGA, - 400 019.
TELE : 24118778,24131712

NORTH

Sheet Title

FLOOR PLAN

4TH FLOOR
FURNITURE LAYOUT

Project No.

Dwg. No. DI/NIA/NIC/4TH flr

Rev. No. R-0

DI/NIA/NIC/4TH flr. R1

DESIGN DEVELOPMENT

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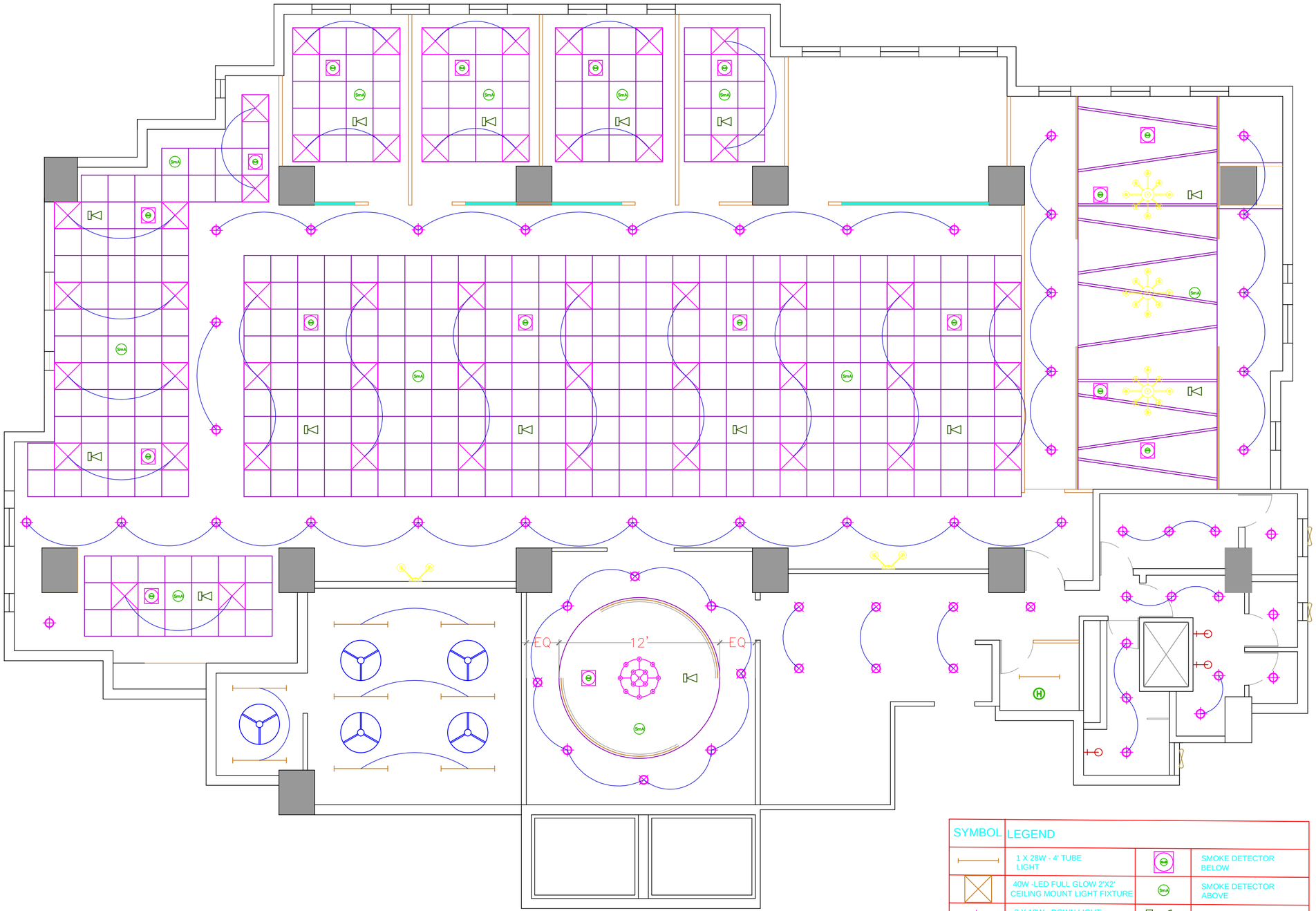

SYMBOL	LEGEND		
	1 X 28W - 4' TUBE LIGHT		SMOKE DETECTOR BELOW
	40W -LED FULL GLOW 2'X2' CEILING MOUNT LIGHT FIXTURE	SMA	SMOKE DETECTOR ABOVE
	2 X 18W - DOWN LIGHT FIXTURE		SPEAKER
H	HEAT DETECTOR		CHANDELIER
	GYPSUM CEILING		SWITCH BOARD
	GRID CEILING		CONCEALED LIGHT
SB	SWITCH BOARD		EXHAUST FAN

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Date	27-05-2024
Scale	1/8"=1'-0"
Drawn	CK
Checked	PP
Approved	PP
SHEET SIZE	A2- 594 mm x 420mm
File Name	

CLIENT

NEW INDIA CENTER

PROJECT

INTERIOR RENOVATION OF 4th FLOOR,
NEW INDIA CENTER, MUMBAI.

DESIGN IDEAS
2,SREE RANG BUILDING, GROUND FLOOR,
OPP BANK OF BARODA, CHANDAVARKAR ROAD,
CENTRAL MATUNGA, - 400 019.
TELE : 24118778,24131712

NORTH

Sheet Title: FLOOR PLAN
4TH FLOOR
FALSE CEILING LAYOUT

Project No.

Dwg. No. DI/NIA/NIC/4TH flr

Rev. No. R-0

DI/NIA/NIC/4TH flr. R1

DESIGN DEVELOPMENT

NO.	DESCRIPTION	DATE	DRAWN BY

REVISIONS

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DISTRIBUTION OF PRINTS

	1X5A RAW + 2X5A UPS + 1X DATA
	SINGLE I/O FACE PLATE (DATA POINT)
	15 AMP POINT
	5 AMP POINT
	TELEPHONE

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Scale	1/8"=1'-0"
Drawn	CK
Checked	PP
Approved	PP
SHEET SIZE	A2- 594 mm x 420mm
File Name	

CLIENT

NEW INDIA CENTER

PROJECT

INTERIOR RENOVATION OF 4th FLOOR, NEW INDIA CENTER, MUMBAI.

DESIGN IDEAS

2,SREE RANG BUILDING, GROUND FLOOR,
OPP BANK OF BARODA, CHANDAVARKAR ROAD,
CENTRAL MATUNGA, - 400 019.
TELE : 24118778,24131712

NORTH

Sheet Title: FLOOR PLAN

4TH FLOOR
ELECTRICAL LAYOUT

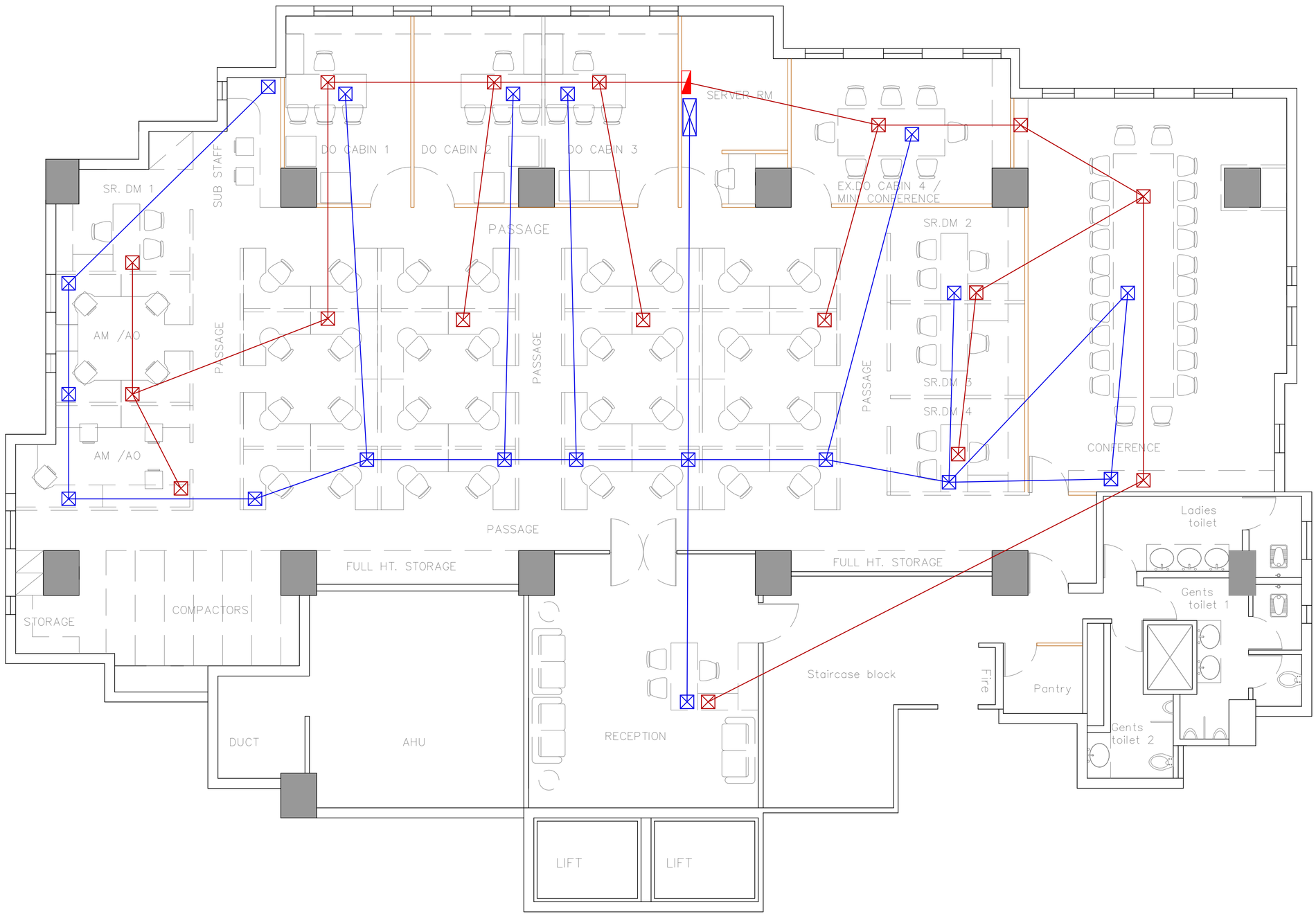
Project No.

Dwg. No. DI/NIA/NIC/4TH flr

Rev. No. R-0

DI/NIA/NIC/4TH flr. R1

DESIGN DEVELOPMENT



LEGEND

	DATA RACK
	ELECTRICAL DB
	POWER JUNCTION BOX
	DATA JUNCTION BOX
	POWER RACEWAY
	DATA RACEWAY

NO.	DESCRIPTION	DATE	DRAWN BY

REVISIONS

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DISTRIBUTION OF PRINTS

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Drawn	CK
Checked	PP
Approved	PP
SHEET SIZE	A2- 594 mm x 420mm
File Name	

CLIENT

NEW INDIA CENTER

PROJECT

INTERIOR RENOVATION OF 4th FLOOR, NEW INDIA CENTER, MUMBAI.

DESIGN IDEAS
2,SREE RANG BUILDING, GROUND FLOOR,
OPP BANK OF BARODA, CHANDAVARKAR ROAD,
CENTRAL MATUNGA, - 400 019.
TELE : 24118778,24131712

NORTH

Sheet Title: FLOOR PLAN
4TH FLOOR
ELECTRICAL RACEWAY LAYOUT

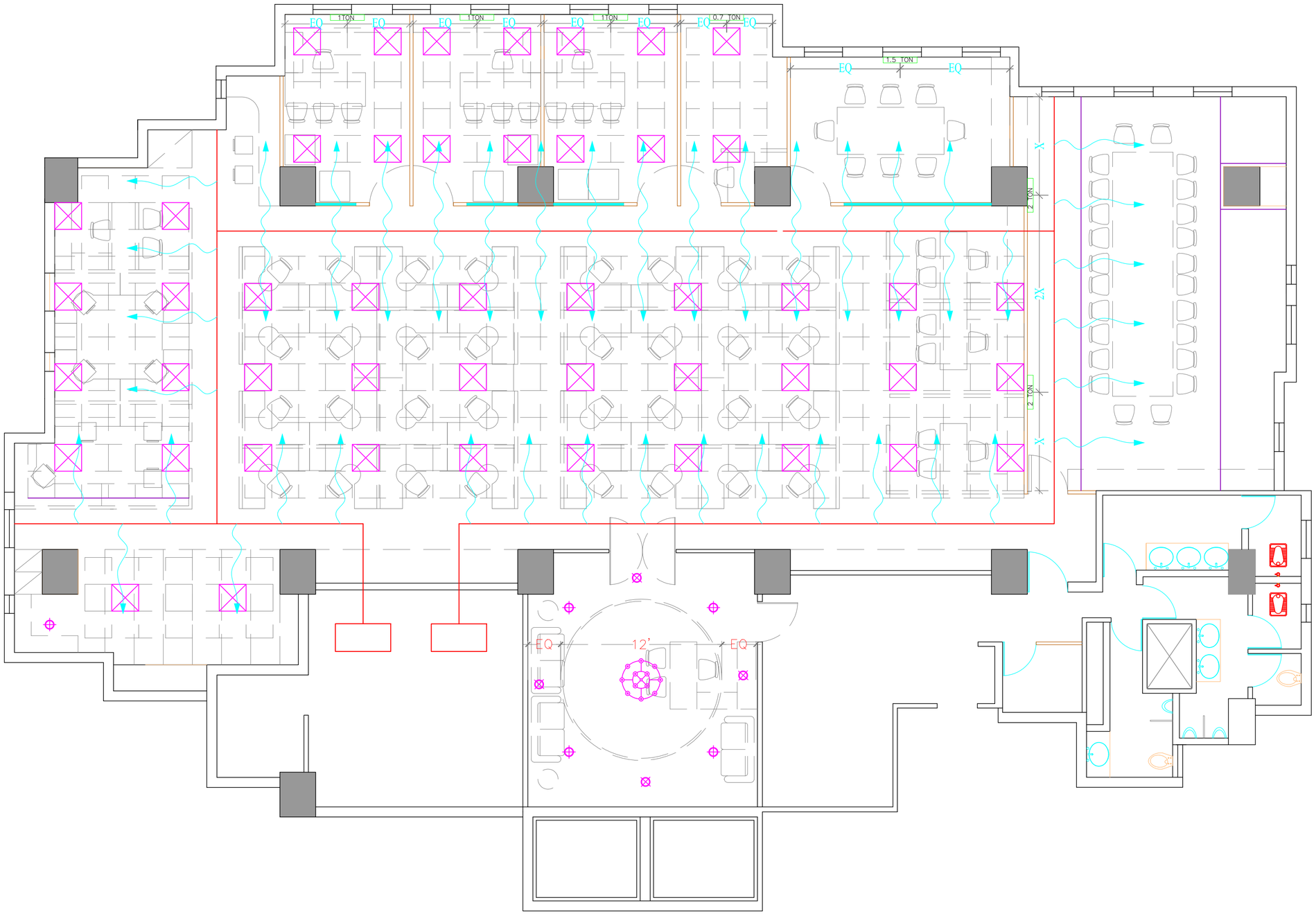
Project No.

Dwg. No. DI/NIA/NIC/4TH flr

Rev. No. R-0

DI/NIA/NIC/4TH flr. R1

DESIGN DEVELOPMENT



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Scale	1/8"=1'-0"
Drawn	CK
Checked	PP
Approved	PP
SHEET SIZE	A2- 594 mm x 420mm
File Name	

CLIENT

NEW INDIA CENTER

PROJECT

INTERIOR RENOVATION OF 4th FLOOR, NEW INDIA CENTER, MUMBAI.

DESIGN IDEAS

2,SREE RANG BUILDING, GROUND FLOOR,
OPP BANK OF BARODA, CHANDAVARKAR ROAD,
CENTRAL MATUNGA, - 400 019.
TELE : 24118778,24131712

NORTH

Sheet Title: FLOOR PLAN

4TH FLOOR
AC DUCTING LAYOUT

Project No.

Dwg. No. DI/NIA/NIC/4TH flr

Rev. No. R-0

INTERIOR FURNISHING WORK FOR 4TH FLOOR NEW INDIA CENTER AT COOPERAGE			
	COST SUMMARY INCLUDING GST		
SR	ITEM DESCRIPTION	AMOUNT	GST
A	CIVIL & FURNITURE WORK		
B	ELECTRICAL WORK		
C	CCTV, SMOKE DETECTION & PA SYSTEM WORK		
D	AIR CONDITIONING WORK		
	HIGH SIDE		
	LOW SIDE		
E	CHAIRS		
	TOTAL COST		
	TOTAL WITH GST		
	Design Ideas		

BILL OF QUANTITIES

RETROFITTING & REPAIR WORK AT NEW INDIA CENTER, COOPERAGE, BOMBAY

FOURTH FLOOR BOQ

SR. NO	DESCRIPTION	QTY.	UNIT	RATE (Rs.)	AMOUNT (Rs.)
I	**CARPENTARY WORK**				
	FULL HT/ LOW HT. STORAGE				
1	Providing and fixing storage units of full height/ Low height as per drg. Internal Depth of storage to be of 400 mm clear They shall consist of ¾" thk.BWR IS 303 BWR IS 303. ply top, sides, bottom, shelves and shutters. The bottom of the storages shall be at 3" from FFL. The top of storages shall touch the false ceiling level or 7'-0" ht. A back side of ¼" thk. BWR IS 303 ply shall be provided. ¾" thk. BWR IS 303. Ply shutter with self closing hinges of hafele make(full ovel open) & PVC lipping /T.W Lipping matching with approved laminate on all the edges. Division of the shutters shall be made equally according to the length of the storages. All the external surfaces shall be finished with 1.0mm thk. Laminate (suede finish) of approved make. ¾" thk. BWR IS 303. Ply shelves supported on battens at 16" interval shall be provided.Alternatively three drawers 8" deep will be provided alongwith shelves as per drawing and directions. All inner surfaces shall be finished with 0.8 mm white laminate of approved make including the shutters. Rate shall be inclusive of all necessary approved fittings like hinges(Hafele make), locks(Godrej make/Vijayan), 6" long brushed finish handles(kich -neki make-CHR103),tower bolts,magnets ,Steel strips ,S.S rods for hangers (2 nos) etc and any miscellaneous hardware items No drawers to be considered in Full Height storage item.	225.96	Sqft.		
2	Same as above but with Veneer finish with melamine polish on exposed surfaces instead of Laminate finish	0.00	Sqft.		
3	Same as above but with Granite top instead of veneer	48.42	Sqft		
4	Providing and fixing over-head storages which consist of ¾" thk. BWR IS 303 . ply shutter with self closing heavy duty hinges of hafele make(full ovel open) & PVC lipping matching with approved laminate on all the edges.. They shall consist of ¾" thk. BWR IS 303. Ply top, sides and bottom and ¼" thk. BWR IS 303 ply back. A ¾" thk. Ply pelmet shall be provided below the storage to house the tube light. All the external surfaces shall be finished with 1.0mm thk. Laminate (suede finish) of approved make. Division of the shutters shall be made equally according to the length of the storage. All internal surfaces shall be finished with 0.8 mm white laminate including the shutters. Rate shall be inclusive of all necessary approved fittings like hinges(Hafele make), locks(Godrej make/Vijayan), tower bolts and any miscellaneous hardware items.	48.42	Sqft.		
5	Same as above but with Veneer finish with melamine polish on exposed surfaces instead of Laminate finishBasic price of Veneer to be Rs.75/-per sqft.	0.00	Sqft.		
	Note : The pelmet for tubelights (if made) will not be considered as separate item or in the measurements.				

SR. NO	DESCRIPTION	QTY.	UNIT	RATE (Rs.)	AMOUNT (Rs.)
6	Providing and fixing ¾" thk. BWR IS 303 ply shutters with required powder coated alluminium pipe frame work filled with C. P. Teak wood , skirting gap as shown in the drg. shall be maintained. Division of shutters shall be made equally according to the length of the counter. Shutters shall be hinged to the framework and finished with 1.0mm thk. Laminate (suede finish) of approved shade from outside, applied with approved oil paint from the inside and covered with proper pvc lippings matching with approved laminate on all the edges. Rate shall be inclusive of all necessary approved fittings likehandles , hinges(Hafele make), ball catch and any miscellaneous hardware items. Rate to also include for Aluminum powder coated grill for ventilation of size about 300 x 150 mm of approved design & color.	56.49	Sqft.		
7	Providing and Fixing 6mm T.W lipping on corner or walls for edge protection.Rate inclusive of groove etc and all necessary hardware.	100.00	Rft.		
8	Providing & fixing full/ Low height Laminate finish hollow partitions 90 mm thick made out of Al tubuler frame 50 x 38 x 1.2 mm at 600 mm c/c horizontally & vertically, anchored to the floor & the slab on top with skin on both sides of 12 mm thick Calcium Silicate board + 9 mm thick BWR IS 303 grade plywood. The partition to have 48 Kg/cum density, 50 mm thick glass wool insulation in between and to be finished with 1.0 mm thick laminate on both sides. The cost to include that for all necessary hardware, adhesives, fixtures & fittings. All exposed edges to be finished with wooden beadings 12 mm thick of width matchingthe thickness of the partition. All exposed wood work to be finished with melamine polish. The cost to also include that for fixing the laminate in patterns with wirenail grooves as per design.	50.00	Sqft.		
9	Providing & Fixing in position, Partition made from 12mm thick Calcium Silicate from both sides on 50 x 30 mm GI frame at 600 c to c vertically with GI Channel runner at top, bottom & intermediate at ceiling level, having of 800 gsm synthetic wool 50 mm thick in between, including cost of required Cut-Outs & Scaffolding, as per Architectural & Acoustical Design & Instructions & Complete in all aspects including all materials labour,finishing etc complete. Cost to include that for providing & fixing 100 mm high, 12 mm thick plywood skirting & band at 750 mm from floor, with laminate finish 1.0 mm thick. The cost to also include that for 75 x 12 mm Plywood edge banding for low ht partition edge with laminate finish.	2188.58	Sqft.		
10	Providing & fixing Glass Partition with 8 mm thick clear glass fixed on a TW frame of size 65 x 38 mm of height varying from 900 to 2100mm. The cost to include that for TW verticals at max 900mm c/c and horizontals at about 1050mm c/c. The glass to be fixed with TW beading of size 12 x 12mm. All exposed wood work to be finished in melamine polish of approved shade and colour. The glass partition to have frosting pattern in 3 M make frosting film about 30 % of glass area.	135.58	Sqft.		
11	Providing & fixing full height Laminate finish Wall panelling/ ceiling (with additional supports for hanging from slab) 60 mm thick made out of Al tubuler frame 50 x 38 mm at 600 mm c/c horizontally & vertically, anchored to the wall with skin of 9 mm thick Bison board + 6 mm thk BWR grade IS 303 plywood. and to be finished with 1.0 mm thick laminate. The cost to include that for all necessary hardware, adhesives, fixtures & fittings. All exposed edges to be finished with wooden beadings 12 mm thick of width matching the thickness of the partition. All exposed wood work to be finished with melamine polish. The cost to also include that for fixing the laminate in patterns with wirenail grooves as per design.	1066.53	Sqft.		
12	Same as above but for 9 mm thick Bison board (Cement sheet) instead of Plywood & Paint fiish instead of Laminate	50.00	Sqft.		

SR. NO	DESCRIPTION	QTY.	UNIT	RATE (Rs.)	AMOUNT (Rs.)
13	Dismantling the existing Board Room table (approx size 18' x 5') carefully including the cost of stacking properly. The salvageable material shall be handed over to NIA & the debris shall be cleared as per local municipal laws. No extra payment shall be granted for this apart from the tender rate.	1.00	LS		
14	Same as above but for work stations	30.00	Nos		
15	Providing & fixing 100% polyester 600 grams/ sq meter weight, fire rating NFPA 701/ BS 5867 Part 2, Doble Layer Roller Blinds fixed on Aluminum powdercoated track with approved fabric of approved shade & colour as per manufacturers specifications and as per the directions of the engineer in charge. Basic Price of blinds Rs 150/- per Sqft	658.51	Sqft.		
16	Providing & fixing Soft board panelling in 12 mm thick Soft board mounted on 6 mm thick BWR grade IS 303 ply with fabric covering on top. Basic price of Fabric Rs 250/- per RM (1.2 m width).	100.00	Sqft.		
	Common specifications for items 16 to 19				
	Providing & Erecting Board Room Table of width 1.35 meters & heigth 0.75 meters made as following. The top to be out of 18 mm thick IS 303 (BWR Grade) plywood thickened at edges to 36 mm (2 x 18mm) & having an edge moulding in NBTW of size 50 x 50 mm, profiled to shape. The top to be rested on vertical supports at every 1.5 meters center to center of size 0.6 x 0.75 m, made out of Aluminum frame of size 50 x 50 mm with 9 mm thick IS 303 (BWR grade) ply skinning on both sides. The vertical exposed edge to be covered with profiled NBTW moulding of size 75 x 38 mm. The table to have an apron from the inside made out of 18 mm thick IS 303 (BWR) grade plywood with a recessed skirting of size 100 mm recessed by 75 mm. Provision to be made under the table top for Electrical raceway on size 150 x 100 mm in a form of an L pelmet with removable arrangement for electrical wire mamagement, made out of 18 mm thick BWR grade plywood. The table to have provision for fixing of electrical & data switches / microphones, etc. all exposed plywood work to be finished with 1.5 mm thick special finish Laminate in proper line & level. The cost to include that for all fittings & fixtures, hardware, adhesive, etc complete.				
17	Board Room Table of size 1.35 m width x 0.75 m (ht) as per drawing & design	20.00	Rft		
18	Executive's/ Reception Table @ 1800Lx900Dx750HT Providing & Fixing of Table @ 1800Lx900Dx750HT - TOP & GABLE END to be made of Membrane finish with soft water fall edges & curved panel & Decorated Anodized section MODESTY PANEL to be made of 18 mm thick Prelaminated particle board with PVC edge band as per drawing	4.00	Nos		
19	Free Standing Table @ 1500Lx600Dx750HT Providing and fixing Table of Size 1500 x 600 x 750 mm. Top: made from 25 mm MDF board with 1 mm thick Laminate finish. All edges are covered by 2 mm. Thk. PVC edge bands glued by hot melt glue applied by auto edge banding machine. Legs : C Shape made from CRCA Sheet with Powder Coat finish. Modesty panel : Made from 18mm both side prelaminated particle boards.All edges are covered by 0.8mm PVC edge bands glued by hot melt glue applied by auto edge banding machine.KEYBOARD TRAY (WITHOUT MOUSE TRAY) :- Metal Powder Coated - Black Color, CPU TROLLEY :- Metal Powder Coated - Black Color, 3 DRAWER PEDESTAL UNIT having overall size 392L x 450D x 680Ht. mm. with central lock and key. Drawers and body are complete metal with powder coat finish, facia in 18 mm MDF board with 1.0 mm thick Laminate finish.	4.00	Nos		

SR. NO	DESCRIPTION	QTY.	UNIT	RATE (Rs.)	AMOUNT (Rs.)
20	Conference Table @ 1800 x 900 x 750 mm Ht. Providing & Fixing of Main Table @ 1800Lx900Dx750HT - made up of 18+18mm Thick MDF top with PVC Membrane finish and waterfall edge profile. Aluminium Anodizied finish beeding of 4mm thich is running all over the table top edge. Gable ends is Aerofoiled Shape with front edges in PVC Membrane finish and rest in Prelaminated MDF with batton structure. Gable ends should be hollow from inside for the provision of passing electrical and Data wiring. , MODESTY PANEL:- to be made of 18 mm thick Prelaminated particle board with PVC edge band Access Flap:- For Wire manager 1 Nos.		Nos		
21	Free Standing Table @ 1350Lx600Dx750HT Providing and fixing Table of Size 1200 x 600 x 750 mm. Top: made from 25 mm MDF board with 1 mm thick laminate finish & PVC edge banding. All edges are covered by 2 mm. Thk. PVC edge bands glued by hot melt glue applied by auto edge banding machine. Legs : C Shape made from CRCA Sheet with Powder Coat finish. Modesty panel : Made from 18mm both side prelaminated particle boards.All edges are covered by 0.8mm PVC edge bands glued by hot melt glue applied by auto edge banding machine.KEYBOARD TRAY (WITHOUT MOUSE TRAY) :- Metal Powder Coated - Black Color, CPU TROLLEY :- Metal Powder Coated - Black Color, 3 DRAWER PEDESTAL UNIT having overall size 392L x 450D x 680Ht. mm. with central lock and key. Drawers and body are complete metal with powder coat finish, facia in 18 mm MDF board with 1.0 mm thick Laminate finish.	5.00	Nos		
22	Same as above but for 1500 x 1500 mm L shaped work station	38.00	Nos		
23	Same as above but for Credestal @ 1200Lx450Lx650HT Providing & Fixing of LOW HEIGHT CREDESTAL @ 1200L X 450D X 650H :- To be made out of Membrane Finish (2 Openable Shutter & 3 Drawer Pedestal in between)as per drawing.	8.00	Nos		
24	Same as above but for Pedestal Unit @ 420Lx450Dx650HT Providing & Fixing of PEDESTAL @ 420Lx450Dx650HT :- To be made out of Complete Membrane consist of three Drawers as per drawing.		Nos		
25	Providing & Supplying fully upholstered Sofa sets with each seat 600 mm wide & 750 mm deep & 400 mm seat height, 900 mm back height. The base frame to be made out of Salwood sections of size 75 x 40 mm with 50 mm wide Latex wedding stretched over the frame touching each other. This wedding to have a covering of Protective Liner, High Density foam, 32 Dns Soft foam, Memory foam, protective Liner & pure Leather Upholstery on top (in successive order). All exposed wood work to be in TW & finished in Melamine polish	10.00	seats		
26	Providing & Installing Center/ Corner table made out of 18 mm thick BWR grade (IS 303) plywood as top & vertical supports with 1.0 mm thick Laminate finish with TW lipping on exposed edges with french polish. The top to have 12 mm thick glass about 450mm dia with bevelled edges encased in a cut out in the top as per design & directions.				
a	Corner Table of 600 mm diamater & 400 mm height	2.00	Nos		
b	Center Table of 750 mm diamater & 400 mm height	5.00	Nos		
27	Providing & Fixing Back painted glass of thickness 6 mm fixed on Laminate Panelling with wooden beading of size 1" x 1" size, french polished.	100.00	Sqft.		
28	Providing & fixing L type pelmet in cabins/ conference over windows out of 18 mm thick BWR grade plywood with 1.0 mm thick laminate finish on top. The edges to be finished with 12mm	96.84	Sqft.		

SR. NO	DESCRIPTION	QTY.	UNIT	RATE (Rs.)	AMOUNT (Rs.)
29	Providing & fixing S shaped TV unit shelf fixed on the wall/ partition of length 10' x 15" wide made out of 2 nos 12 mm thick Flexible ply sheets joined together in S shape & finishd with veneer with melamine polish.	1.00	Nos		
	TOTAL FOR CARPENTARY				
II	**DOORS**				
1	Providing & Fixing solid core flush door in single leaf 35 mm thick Regular matching type of exterior grade as per detailed drawings, approved face veneer on both sides without glazing and venetians, all necessary beads, mouldings and lipings on edges of the shutter of matching width, brass oxidised fixtures and fastenings with mortise lock, Stainless Steel grade 304 Alan Key type "H"Handles 300 mm long handles on both sides, sleek type door closer/ Floor spring, dead lock, door stopper, etc and finishing with melamine polish, etc complete. 3-0" x 7'-0"	178.50	Sqft.		
2	Providing & Fixing Door Frame with Jamb lining as per drawing Second glass Sal wood for doors, windows, fan lights, etc including all mouldings, rebating, holdfasts, and finishing with one coat of primer & 2 coats of melamine polish complete. Country Teak wood frame Size 0.90m x 2.10m Ht	2.83	Cft.		
3	Providing and fixing frameless fully glazed 12mm thk toughened float glass fixed with necessary patch fittings(Dorma make) including cutting, making holes, cutouts in the glass of required shape and size to acBWR IS 303odate fittings and fixing the fittings in floors, soffits, jams including necessary fixtures, srews, sealent wherever required and SS cover over patch fittings. Rate shall include necessary etching film / LOGO, approved patch fitting locking systems, 1 pair of 12" long S. S. (C Shape) Handles of approved make, floor springs, and any necessary hardware items.(DORMA MAKE Top Pivot - PT 24, Top Patch Fittings - PT 20, Bottom Patch fittings - PT 10, Floor Spring - BTS 75 V, Corner lock with strike plate and Euro Profile Cilinder - US 10, Handle - TG 9300 EQ - S 25mm dia X 300mm length)	126.00	Sqft.		
	TOTAL FOR DOORS				
III	**FLOORING**				
1	Providing and fixing 800 x 800 mm VITRIFIED Tiles of approved make, 1st quality & shade and pattern as shown in the drg. In CM 1:4 in proper line and level and also using 3mm approved spacers for maintaining the grid lines. Rate shall be inclusive of providing and laying necessary backing material and joint filling compound of the same shade of the tiles.Approved mke shall be Johnson/Nitco/Kajaria or equivalent. Basic price of Vitrified tiles to be Rs.75/-per Sqft+taxes.	3335.60	Sqft.		
2	Same as above but for Premium type of tiles of size 1200 x 1200. Basic Price Rs 100/- per sqft + taxes	322.80	Sqft.		
3	Providing, laying & removing POP on the existing/ new laid flooring for the protection of tiles/slabs with base covering plastic. POP covering is not required to be laid for the new flooring (as the contrctor needs to take care of new flooring at his own cost till handing over the possession).	3658.40	Sqft.		
4	Providing and laying Premium Anti Skid ceramic tiles of RAK/ Kajaria/ Nitco/ Asian or equivalent make having size 30 cm x 30 cm confirming I.S.15622/2006 (group D IIA) and 7 to 8 mm thick for flooring in required position laid on a bed of 1:4 cement mortar including cement float, filling joint with white/colour cement slurry cleaning curing etc. complete. Basic Price of Tiles Rs 60/- per Sqft	317.42	Sqft.		

SR. NO	DESCRIPTION	QTY.	UNIT	RATE (Rs.)	AMOUNT (Rs.)
5	Providing & laying 12 to 18 mm thick engineered wood flooring in slats 150 mm wide tongue & grooved into each other, made out of base of 10 to 16 mm thick HDF/ plywood with to finish of 2 mm thick hardwood skinning of approved type, color & shade including finishing with melamine polish in required coats.The rate to include for necessary backing in foam sheet as approved by the manufacturer, glue for fixing & skirting, end capping beading, etc.(Basic price of wooden flooring to be Rs.250/-per Sqft+taxes.)		Sqft.		
	TOTAL FOR FLOORING				
IV	**SKIRTING AND DADO**				
	VITRIFIED TILE SKIRTING				
1	Providing and fixing approved shade of Vitrified tiles as per pattern for dado/ skirting 100 mm high from FFL using CM 1:4 in proper line and level as directed by the Architect as shown in the drawings. The rate shall include necessary backing material, water proofing and joint filling compound of the same shade as that of the Vitrified tiles. All sanitary fittings shall be located on the joints or junctions of the tiles. Basic price of Vitrified tiles to be Rs.75/-per Sqft+ taxes.	548.76	Sqft.		
2	Providing and laying ceramic tiles having size 30 x 60 cm. confirming to corresponding I.S. for dado and skirting in required position with readymade adhesive mortar of approved quality on plaster of 1:2 cement mortar including joint filling with white/ colour cement slurry cleaning curing etc. complete. Basic Price Rs 60/- per Sqft	1291.20	Sqft.		
3	Providing and laying Artificial Marble of 18 to 20 mm thick for flooring etc. On C.M. 1:6 including filling joints with polymer base filler nosing the sharp edges wherever necessary, curing, etc.	371.22	Sqft.		
	TOTAL FOR SKIRTING AND DADO				
V	**GRANITE WORK**				
1	Providing and laying telephone black / Amba White / Cadburybrown / Ruby red / Ocean Brown granite stone of 18 to 20 mm thick for door frame/ dado/ window boxing etc. On C.M. 1:6 including filling joints with polymer base filler nosing the sharp edges wherever necessary, curing, etc. complete.	335.07	Sqft.		
2	Same as above but for cladding on walls with slabs of average size about 0.9 x 1.2 m. The granite joints to be finished in a "V" groove pattern. The corner edges to be also in a right angle "V" grrove pattern. Rate inclusive of all necessary hardware and accesories with round edges hand polished.	83.93	Sqft.		
3	Providing and constructing granite kitchen/ Wash basin platform with fixing of stainless steel sink/ wash basin 600 mm x 450 mm size as per detailed drawing including vertical both side polished kadappah stone 25 to 30 mm thick supports with kadappah top 35 to 40 mm thick and polished granite 16 to 20 mm top with side strips of granite at front and both sides of platform raised with two vertical granite supports 15 cm height and top granite of 75 x 40 cm including cutting, opening for sink of required size in kadappah as well as granite etc. complete.	42.00	Sqft.		
	TOTAL FOR GRANITE WORK				
VI	**FALSE CEILING & WALL FINISHING WORK**				

SR. NO	DESCRIPTION	QTY.	UNIT	RATE (Rs.)	AMOUNT (Rs.)
1	Providing and applying POP Punning on walls and columns (average 6 mm thk). The rate shall include scrapping, levelling and preparing the surface. The rate shall be inclusive of all types of grooves above the skirting, around the window and door frames. The modular tiled ceiling to be of Prima Dune regular type of Armstrong makes with silloihte grid.	2275.74	Sqft.		
2	Providing and fixing false ceiling at all height including providing and fixing of frame work made of special sections, power pressed from M.S. sheets and galvanized with zinc coating of 120 gms/sqm (both side inclusive) as per IS : 277 and consisting of angle cleats of size 25 mm wide x 1.6 mm thick with flanges of 27 mm and 37mm, at 1200 mm centre to centre, one flange fixed to the ceiling with dash fastener 12.5 mm dia x 50mm long with 6mm dia bolts, other flange	1475.03	Sqft.		
	of cleat fixed to the angle hangers of 25x10x0.50 mm of required length with nuts & bolts of required size and other end of angle hanger fixed with intermediate G.I. channels 45x15x0.9 mm running at the spacing of 1200 mm centre to centre, to which the ceiling section 0.5 mm thick bottom wedge of 80 mm with tapered flanges of 26 mm each having lips of 10.5 mm, at 450 mm centre to centre, shall be fixed in a direction perpendicular to G.I. intermediate channel with connecting clips made out of 2.64 mm dia x 230 mm long G.I. wire at every junction, including fixing perimeter channels 0.5 mm thick 27 mm high having flanges of 20 mm and 30 mm long, the perimeter of ceiling fixed to wall/partition with the help of rawl plugs				
	at 450 mm centre, with 25mm long dry wall screws @ 230 mm interval, including fixing of 12 mm thk gypsum board to ceiling section and perimeter channel with the help of dry wall screws of size 3.5 x 25 mm at 230 mm c/c, including jointing and finishing to a flush finish of tapered and square edges of the board with reBWR IS 303ended jointing compound , jointing tapes , finishing with jointing compound in 3 layers covering upto 150 mm on both sides of joint and two coats of primer suitable for board, all as per manufacturer's specification and also including the cost of making openings for light fittings, grills, diffusers, cutouts made with frame of perimeter channels suitably fixed, all complete as per drawings, specification and direction of the Engineer in Charge but excluding the cost of painting.The cost to include that for fixing the Gypsum board in patterns & shapes as per drawings & creating alcoves for concealed lighting. The cost to also include that for vertical drops behind the concealed lighting alcoves.				
3	Providing and fixing tiled false ceiling of approved materials of size 595x595 mm in true horizontal level, suspended on inter locking metal grid of hot dipped galvanized steel sections (galvanized @ 120 grams/ sqm, both side inclusive) consisting of main "T" runner with suitably spaced joints to get required length and of size 24x38 mm made from 0.30 mm thick (minimum) sheet, spaced at 1200 mm center to center and cross "T" of size 24x25 mm made of 0.30 mm thick (minimum)	2647.50	Sqft.		

SR. NO	DESCRIPTION	QTY.	UNIT	RATE (Rs.)	AMOUNT (Rs.)
	sheet, 1200 mm long spaced between main "T" at 600 mm center to center to form a grid of 1200x600 mm and secondary cross "T" of length 600 mm and size 24x25 mm made of 0.30 mm thick (minimum)sheet to be interlocked at middle of the 1200x600 mm panel to form grids of 600x600 mm and wall angle of size 24x24x0.3 mm and laying false ceiling tiles of 0.5 mm thick GI Precoated perforated metal sheets of size 600 x 600 in the form of trays of approved texture in the grid including, required cutting/making, opening for services like diffusers, grills, light fittings, fixtures, smoke detectors etc. Main "T" runners to be suspended from ceiling using GI slotted cleats of size 27 x 37 x 25 x1.6 mm fixed to ceiling with 12.5 mm dia and 50 mm long dash fasteners, 4 mm GI adjustable rods with galvanised butterfly level clips of size 85 x 30 x 0.8 mm spaced at 1200 mm center to center along main T, bottom exposed width of 24 mm of all T-sections shall be pre-painted with polyester paint, all complete for all heights as per specifications, drawings and as directed by Engineer-in-charge.				
4	Providing and fixing A.C. Trap doors of above mentioned sizes consisting of 19mm thk. BWR ply IS 303 shutters. The pair of shutters shall be with MILKY WHITE 1 mm laminate on both sides fitted in frame of 2" x 1 ½" Sal wood sections finished with enamel paint to match with the ceiling. The frame need to be suppoted from the ceiling as per directions of Bank/ Architect. Rate shall be inclusive of necessary fittings like hinges (Heavy Duty type), tower bolts, locks, etc.	25.00	Sqft.		
5	Providing & Applying wall paper of approved type, color & pattern on existing finished wall with approved fixing solution in proper line & level. The cost to include that for all wastages in cutting as per the size available on the site.	100.00	Sqft.		
6	Providing & Fixing Translucent False Ceiling made out of frame work of Teak wood batten frame of size 50 x 38 mm at 600 mm c/c supported from the ceiling slab by Aluminum frame of size 50 x 38 mm. The panels to be made out of 6 mm thick Acrylic sheet Laser Cut in the given pattern & this sheet to be fixed on another 6 mm thick Acrylic sheet. This panel to be supported on the wooden frame as above. All wooden frame work to be finished in French polish.	0.00	Sqft.		
7	Providing & Installing False ceiling made out of rafters of size 100 x 38 mm fabricated out of 2 x 18mm thick IS 303 plywood sheets 100 mm wide stuck to each other & clad with matching veneer sheet (basic price Rs 75/- per sft) on all sides with melamine polish of approved shade & color. The rafters to be spaced at about 300 mm c/c including fixing the same to the sides/ ceiling slab on top.	96.84	Sqft.		
	TOTAL FOR False Ceiling &Wall Finishing				
VII	**PAINTING**				
1	Providing & applying Royale Luxury Emusion paint on walls, columns & ceilings. The rate shall include scrapping, levelling & preparing the surface. Primer coat + (minimum) 2 coats to get evenly spread quality finish (roller finish) of approved make , quality & finish shall be provided.	3750.77	Sqft.		
2	Providing & applying 1st quality oil paint of approved make, quality & shade. The rate shall include scrapping, levelling & preparing the surface with primer quote.	100.00	Sqft.		

SR. NO	DESCRIPTION	QTY.	UNIT	RATE (Rs.)	AMOUNT (Rs.)
3	Providing & applying a coat of textured finish on walls and columns. The rate shall include scrapping, levelling & preparing the surface. Primer coat + (minimum) 3 coats of approved make, quality & shade shall be provided. Basic price of Texture paint to be Rs.65/-per Sqft+ taxes.	50.00	Sqft.		
4	Providing and applying french polish of required finish to previously polished wooden surfaces including knotting, preparing the surface, scaffolding, etc complete as directed	50.00	Sqft.		
5	same as above but for Wax Polishing	50.00	Sqft.		
6	Providing & applying melamine polish of required finish to wood work by spray machine including knotting and preparing the surface by scrapping, applying french polish, scaffolding if required, etc complete	50.00	Sqft.		
	TOTAL FOR PAINTING				
VIII	**DISMANTLING & DEMOLITION**				
1	Dismatling flooring in floors laid in cement mortar including disposing off the unserviceable material outside institute premises as per local municipal corporation byelaws for thickness of tiles 10mm to 25mm	6187.00	Sqft.		
2	Dismatling aluminium /gypsum partitions ,doors ,windows,fixed glazing and false ceiling inclusding disposal of unserviceable surplus maetrial outside institute premises as per local municipal corporation byelaws and stacking of serviceable material as directed by engineer	7263.00	Sqft.		
3	Demolishing brick work manually/ by mechanical means including stacking of servicable material & disposal of unservicable materialoutside institute premises as per local municipal corporation byelaws as per direction of Engineer-in-charge.	50.00	Cuft.		
	TOTAL FOR DISMANTLING & DEMOLITION				
IX	**CIVIL WORK**				
1	6" THK BRICK WALL WITH PLASTER				
	Constructing 115 mm thk. Brick wall in 1:6 cement mortar. Brick used shall be of best quality kiln burnt, having sharp edges & giving clear ringing sound when struck against each other. The rate shall be inclusive of plastering the walls with ¾" thk. 1:4 cement plaster on both sides. A 4 ½" R.C.C. Patli Beam shall run horizontally @ 3'-0" c/c. The rate shall be inclusive of any scaffolding required, curing etc, complete.	242.10	Sqft.		
2	9" THK BRICK WALL WITH PLASTER	25.00	Sqft.		
3	Providing internal cement plaster 12mm thick in single coat in cement mortar 1:4 without neeru finish to concrete or brick surfaces, in all positions including scaffolding and curing etc. complete	711.77	Sqft.		
4	ANTI TERMITE TREATMENT				
	Providing antitermite treatment to the sides of flooring of the existing building as per I.S. 6313 (Part-III) by punching holes 6mm dia. drilled at a distance of 30cm. centre to centre and injecting one percent of chlorodane emulsion concentrate at the rate of 50 ml per hole and sealing by filling putty etc. complete covering 2 years guarantee on bond paper.	100.00	nos		
5	Providing Holes/Sleeve in wall 75 m dia for Air conditioning pipes .PVC pipe of 75 mm to be inserted in the said hole.End caps on both sides to be provided.A minimal slope to be maintained towards outside to prevent any leakage .	10.00	Nos		

SR. NO	DESCRIPTION	QTY.	UNIT	RATE (Rs.)	AMOUNT (Rs.)
6	Providing and fixing in position. (as per I.S.1868 / 1982) Aluminium sliding window of two/ three/ four tracks with rectangular pipe having overall dimension 63.50 x 38.10 x 1.02 mm at weight 0.547 kg/Rmt. and window frame bottom track section 61.85 x 31.75 x 1.20 mm at weight 0.695 kg/Rmt. Top and side track section 61.85 x 31.75 x 1.30 mm at weight 0.659 kg/Rmt. The shutter should be of bearing bottom 40 x 18 x 1.25 mm at weight 0.417 kg/Rmt. Inter locking section 40 x 18 x 1.10 mm at weight 0.469 kg/Rmt. And handle section 40 x 18 x 1.25 mm at weight 0.417 kg/Rmt. and top section 40 x 18 x 1.25 mm at weight 0.417 kg/Rmt. As per detailed drawings and as directed by Engineer in charge with all necessary Aluminium sections fixtures and fastenings such as roller bearing in nylon casting and self locking catch fitted in vertical section of shutter including 5 mm thick plain glass with all required screws and nuts etc, complete. With powder coating with box	681.75	Sqft.		
7	Providing and laying in trenches 20 mm dai. CPVC pipe including necessary excavation, fittings. Refilling trenches etc.complete.	164.00	Rft.		
8	Providing and laying in trenches 50mm dai. CPVC pipe including necessary excavation, fittings. Refilling trenches etc.complete.	25.00	Rft.		
9	Providing and fixing 10 cm PVC nahani trap with grating etc. complete.	9.00	Nos		
10	Providing and fixing coloured glazed earthenware lipped flat back/corner type urinal with PVC 5 liters flushing cistern with fittings,capacity with fittings, inlet pipe and stop tap, brackets for fixing the cistern, P.V.C. flush pipe with fittings including lead soil pipe, lead trap and soil pipe connection up to the outside face of the wall.	3.00	Nos		
11	Providing and fixing White glazed with bottle trap earthenware Wash Hand Basin of 55x40 cm size including cold water piller taps, brackets, rubber plugs and brass chain, stop tap, chromium plate bottle trap and necessary pipe connections including UPAC waste pipe and trap upto the outside face of the wall, making good the damaged surface, testing etc. complete.	5.00	Nos		
12	Providing and fixing 75 mm dia stabiliser pipe/ P.V.C. soil vent/waste pipe and with necessary fixtures and fitting such as bends, tees, single junctions, slotted vent, camps etc. complete	50.00	Rft.		
13	Providing and fixing 100 mm dia stabiliser pipe/ P.V.C. soil vent/waste pipe and with necessary fixtures and fitting such as bends, tees, single junctions, slotted vent, clamps etc. complete.	50.00	Rft.		
14	Providing and fixing European type wall-hung white water closet of approved make with push valve concealed type with cover plate 32mm size of approved make including soil pipe, vent pipe up to outside face of wall ,100mm dia. G.I. plug bend inlet pipe all fittings, cuttingand making good walls, floors etc. complete.	4.00	Nos		
15	Providing and fixing in walls/ ceiling/ floor 15 mm dia. CPVC pipe with necessary fittings, remaking good the demolished portion etc. complete. Including removing existing pipe line if necessary and conveying and stacking the same in PWD chowky or as directed etc. complete.	100.00	Rft.		
16	Providing and fixing in walls/ceiling/floor 20 mm dia. CPVC pipe with necessary fittings, remaking good the demolished portion etc. complete. Including removing existing pipe line if necessary and conveying and stacking the same in PWD chowky or as directed etc. complete.	50.00	Rft.		

SR. NO	DESCRIPTION	QTY.	UNIT	RATE (Rs.)	AMOUNT (Rs.)
17	Providing and fixing in walls/ ceiling/ floor 50 mm dia. CPVC pipe with necessary fittings, remaking good the demolished portion etc. complete.	25.00	Rft.		
18	Providing and fixing stainless steel sink of size 600 x 510 x 200 mm incluidng coupling, outlet pipe, elbow and other necessary fitting, finishing etc. complete.	1.00	Nos		
19	Providing and fixing C.P. Angular stop clock with wall flange of Jaquar Vignette make continental including necessary sockets/union nut etc. complete.	13.00	Nos		
20	Providing and fixing C.P.Two way BIB cock with Health Faucetof approved make continental including necessary sockets/union nut etc. complete.	4.00	Nos		
21	Providing and fixing C.P. pillar cock long neck with aerator of approed make including necessary sockets/union nut etc. complete.	1.00	Nos		
22	Providing & fixing CP Toilet Paper Holder of approved Type & Design (Jaquar or Equivalent)	4.00	Nos		
23	Providing & fixing Kimberly Klark or Equivalent Liquid Soap Dispenser of approved design & type	2.00	Nos		
24	Providing & Fixing CP Towel Ring of approved type & Design (Jaquar or Equivalent)	2.00	Nos		
25	Providing & fixing Jaquar or equivalent Double Coat Hook	4.00	Nos		
26	Providing and laying cement concrete flooring 40 to 60 mm thick with M15 cement concrete laid to proper level and slope in alternate bays including compaction, filling joints, marking lines to give the appearance of tiles of 30 cm x 30 cm or other size laid diagonally /square etc finishing smooth (with extra cement) in any colour as directed and curing etc. complete. With Natural Sand	1000.00	Sqft.		
27	Providing and fixing mirror (900x600mm) of superior glass (of approved quality) with 12 mm marine ply backing and mirror screws .Rate inclusive all necessary hardware ,rough grout etc .The mirror to be fixed on tiled surface in proper line and level as per directions of Site Engineer.	36.00	Sqft.		
28	Providing and Fixing Sink Cock with Raised J shaped Swinging Spout (Table mounted model/Wall mounted VGN-27173B) Jaquar make or eq.Rate inclusive of all necessary hardware.	1.00	Nos		
29	Providing and Fixing S.S grating nahani trap cover of approved make . Rate inclusive of all necessary hardware etc	9.00	Nos		
30	Providing and Fixing S.S Towel Rack with lower hanger.Jaquar make AHS -1581 or equivalent.Rate inclusive of all necessary hardware.	2.00	Nos		

SR. NO	DESCRIPTION	QTY.	UNIT	RATE (Rs.)	AMOUNT (Rs.)
31	Waterproofing Treatment to existing Toilet and bathrooms by using Polymeric cementitious membrane of approved make & approved by Engineer in charge and replacing the existing waterproofing treatment. Break open the existing I.P.S. and brick bat coba of the toilet and bathroom areas to expose the bare slab. (If there are cracks on the bare slab open the crack in V Groove and fill it with P.M.M. and if there are lots of honeycombs and identified ba d patches of concrete the same should be grouted by grouting procedures). Clean the entire surface thoroughly and over this prepared surface, apply three coats of polymeric waterproofing coating having a breathable non toxic acrylic polymer liquid of approved make & approved by Engineer in charge over this waterproofing treatment, provide and lay brick bat coba of average 112 mm thickness	317.42	Sqft.		
	Total for Civil Work				
	TOTAL FOR CIVIL & INTERIORWORK FOR 16TH FLOOR				
	GST at 18%				
	Total with GST				
	Design Ideas				

RETROFITTING & REPAIR WORK AT 4TH FLOOR NEW INDIA CENTER, COOPERAGE, MUMBAI					
CHAIRS BOQ					
SR	**ITEM DESCRIPTION**	**QTTY**	**UNIT**	**RATE**	**AMOUNT**
	providing & supplying Chairs with 5 pronged Metal powder coated/ Rigid PVC stand with Rigid PVC heavy duty castors, with Adjustable Gas lift, Synchro Tilt with Lockable arrangement at extreme positions, adjustable handles, Fabric/ Artificial leather upholstry (Basic price of upholstry Rs 350/ Rm of 1.2 m width), Rigid PVC back of approved type & size.				
1	High back for Board/ Cabins	24.00	Nos		
2	Medium Back for side seating	20.00	Nos		
3	Medium Back for Staff seating	60.00	Nos		
4	Low Back for visitors	12.00	Nos		
	TOTAL				
	GST AT 18%				
	TOTAL WITH GST				

RENOVATION WORK AT NEW INDIA CENTER 4TH FLOOR					
ELECTRICAL BOQ					
Sr No	**Item Description**	**Qtty**	**Unit**	**Rate**	**Amount**
1	SITC of Primary Electric Light Point including the cost of 2 x 1.5 Sqmm + 1x 1.0 Sqmm FRLS copper wire from the electrical light fitting to the switch board, pulled & laid in 20 mm dia PVC conduits (shared) & the cost of 6A modular switch with concealed box & cover plate (Shared) as per drawings & directions. Length of Primary point about 10 meters	80.00	Nos		
2	Same as above but for Secondary Light point looped from the above mentiioned Primary point. Distance from primary to secondary point about 10 feet	100.00	Nos		
3	SITC of Primary 5A Power Point including the cost of 2 x 2.5 Sqmm + 1x 1.5 Sqmm FRLS copper wire from the 5A Socket to the switch board, pulled & laid in 20 mm dia PVC conduits (Shared) laid under floor by cutting chases in the tiled floor & concealing the same with cement mortar 1:6 in proper line & level & the cost of 6A modular switch/ Socket outlet with concealed box & cover plate (Shared) as per drawings & directions	120.00	Nos		
4	Same as above but for Secondary power point looped from the above mentiioned Primary point.	80.00	Rft		
5	SITC of Primary 15A Power Point including the cost of 2 x 4 Sqmm + 1x 2.5 Sqmm FRLS copper wire from the 15A Socket to the switch board, pulled & laid in 20 mm dia PVC conduits (Shared) laid under floor by cutting chases in the tiled floor & concealing the same with cement mortar 1:6 in proper line & level & the cost of 16A modular switch/ Socket outlet with concealed box & cover plate (Shared) as per drawings & directions	12.00	Nos		
6	Same as above but for Secondary power point looped from the above mentioned Primary point.	12.00	Nos		
7	Supplying and erecting underfloor junction box of size 300mm x300mm x55 mm. with flush finish powder coated appearance having knock outs for UPVC duct entry of size 60x25 mm and 95x35 mm ducts complete as per specification no. WG-MA/UFB .	20.00	Nos		
b	Same as above but for size 200 x 200 mm	20.00	Nos		
c	Same as above but for size 150 x 150 mm	5.00	Nos		
8	Supplying & erecting mains with 2x2.5 sq.mm.and earth wire 1.5 sq.mm FRLS PVC copper wire in rigid PVC conduit min.20mm dia.	1476.00	Rft		
9	Supplying & erecting mains with 2x4 sq.mm.and earth wire 2.5 sq.mm FRLS PVC copper wire in rigid PVC conduit min.20mm dia	2187.00	Rft		

10	Supplying & erecting mains with 2x6 sq.mm.and earth wire 4 sq.mm FRLS PVC copper wire in rigid PVC conduit min.20mm dia	788.00	Rft		
11	Supplying and erecting Telephone point including modular type telephone socket one gang with safety shutter ISI mark approved make duly erected on provided plate and box with wiring connections complete with wiring in CAT 6 cable laid in 20 mm dia PVc conduits (Shared) from outlet to Krone box (Length about 20 meters)	25.00	Nos		
12	Supplying and erecting modular type computer point with Jack RJ 45 with safety shutter ISI mark approved make duly erected on provided plate and box with wiring connections complete with wiring in CAT 6 cable laid in 20 mm dia PVC conduits (Shared) from out let to Switch/ Server & including patching the same at both ends & labelling. (Length about 20 meters)	60.00	Nos		
13	Supplying and erecting 6 to 32 A SPMCB suitable to fix in 1 module of modular switch in provided box complete & dulyconcealed with necessary material and connected.	2.00	Nos		
14	Supplying & erecting telephone cable 10 pair with 0.5 mm dia. laid in provided PVC casing / conduit asper specification No. WG-TW	164.00	Rft		
15	Supplying, erecting & commissioning Junction box suitable for 10 pairs as per specification No. WG-TW	1.00	Nos		
16	Supplying and erecting FR grade, PVC armoured multimode armoured multimode Optical Fibre Cable with 6 fibres, with core dia 50/125 µm (OM3) suitable for 1 GBps ethernet distance at 850 nm of wavelength, on wall/ceiling or laid in provided pipe/trench as per specification No. WG-COC/OFC LSZH	50.00	Rft		
17	Dismantling the existing light, fan, bell, clock, independent plug point, wiring including circuit mains of all types along with accessories etc.complete as per specification No: WG-DM/PW	200.00	Nos		
18	Dismantling the existing Telephone / Lan / Wan / TV cables and wires of all sizes along with casing-capping / conduit complete as per specification No: WG-DM/PW	1200.00	Rft		
19	Dismantling the existing Aluminium/copper mains,submains wiring upto 10 sq.mm. along with accessories etc.Complete as per specification No: WG-DM/PW	200.00	Rft		

20	Supplying and erecting square shaped CRCA / die-cast aluminium powder coated housing LED Panel light 600X600mm of PREMIUM RANGE suitable for upto 45 to 48 W with provision for plane front frame with translucent cover fixed to the housing complete	30.00	Nos		
21	Supplying and erecting square shaped CRCA / die-cast aluminium powder coated housing LED Panel light 250X250mm of PREMIUM RANGE suitable for upto 18 to 20 W with provision for plane front frame with translucent cover fixed to the housing complete	75.00	Nos		
22	Supplying and erecting T5 14/18 W energy efficient fluroscent tube.	10.00	Nos		
23	Supplying and erecting T8 Fluroscent tube day light 1200mm 36 W	10.00	Nos		
24	Supplying erecting testing & commissioning of 40W dimmable LED chandelier type fitting including all fittinngs & fixtures (Basic Price of Chandelier Rs 10,000/- per fitting)	5.00	Nos		
25	Supplying erecting testing & commissioning of 20W LED wall mounted bracket/ picture light type fitting including all fittinngs & fixtures (Basic Price of Chandelier Rs 2,000/- per fitting)	10.00	Nos		
26	Supplying and erecting metal clad distribution board approved make 415/500V, 6 way, 32A. per way & neutral bar connector complete erected on iron / G.I. frame/ wooden plank or Board as per specification No. SWSWR/ MDB	2.00	Nos		
27	Supplying and erecting metal clad distribution board approved make 415/500V, 8 way, 32A. per way & neutral bar connector complete erected on iron frame/ wooden plank or Board as per specification No. SW-SWR/MDB	1.00	Nos		
28	Supplying and erecting metal clad distribution board approved make 415/500V, 4 way, 32A. per way & neutral bar connector complete erected on iron frame/ wooden plank or Board as per specification No. SW-SWR/MDB	2.00	Nos		
29	Supplying, erecting & marking SPN MCB 6Ato 32A, C-series (for motor/power/ Lighting) in provided distribution board as per specification No. SW-SWR/MCB	72.00	Nos		
30	Supplying, erecting & marking TPN MCB 32A to 63A, C-Series in provided distribution board as per specification No. SW-SWR/MCB	8.00	Nos		

31	Supplying & erecting original 1.25 mm CRCA sheet metal enclosures with 20A. 2 pin plug & earth socket and 20A. 3 pin plug top with 20A/30A single pole MCB complete erected on angle iron frame.	2.00	Nos		
32	Providing & erecting 4 Pole MCCB upto 200A, 415V capacity with S.C. rating 25 kA (Ics=100% of Icu), thermal setting with provided leads on iron frame/wooden board as per specification No. SW-SWR/MCCB	1.00	Nos		
33	Supplying, erecting & terminating PVC armoured cable 3½ core 35 sq mm aluminium conductor with continuous 5.48 sq mm (12 SWG) G.I. earth wire complete erected with glands & lugs, on wall/ trusses/pole or laid in provided trench/ pipe as per specification no. CB-LT/AL	75.00	Rft		
34	Supplying & erecting Siemens type brass cable glands for 3½ core 35 sq mm for PVC armoured cable as per specification No. CB-GL	2.00	Nos		
35	Supplying & erecting crimping type aluminium lugs for cable 35 sq mm complete as per specification No. CB-CL/AL	2.00	Nos		
36	Supplying, erecting & terminating FR XLPE insulated, galvanised steel formed wire armoured (strip) cable 1100 V, 3½ core 185 sq. mm. aluminium conductor complete erected with glands & lugs, on wall/ trusses/pole or laid in provided trench/ pipe as per specification no. CB-LT/AL	150.00	Rft		
37	Supplying & erecting single compression type brass cable glands for 3½ core 185 sq mm for XLPE armoured cable as per specification No. CB-GL	2.00	Nos		
38	Supplying & erecting crimping type aluminium lugs for cable 185 sq mm complete as per specification No. CB-CL/AL	2.00	Nos		
39	Providing earthing with Copper earth plate size 60 x 60 x 0.315 cm with funnel with a wire mesh for watering and brick masonry block C.I. cover with minimum 25 kg of maintenance free earth conductivity enhancing mineral earthing compound complete with all materials, testing & recording the results as per specification no ESE -LA		Nos		
40	Supplying and erecting G.I. strip of required size used for earthing on wall and/or any other purpose with necessary GI clamps fixed on wall painted with bituminous paint in an approved manner with joint required. as per specification No (EA-EP).	5.00	Kg		

41	Supplying and erecting Annealed bare copper wire of high purity of different sizes used for earthing on wall with necessary copper clamps fixed on wall/cable/conduit with screws in an approved manner.	50.00	Kg		
42	Providing, fixing, testing & commissioning open LED lighting strip, 20 W/ Rm of approved type & make as per directions.	100.00	Rft		
43	Providing, fixing, testing & commissioning Neon Flex LED lighting strip, 20 W/ Rm of approved type & make as per directions.	50.00	Rft		
44	Providing, Fixing, Testing & Commissioning HDMI cable including connectors at both ends	100.00	Rft		
45	Providing, Fixing, Testing & Commissioning RG 6 cable including connectors at both ends	100.00	Rft		
46	SITC 250 A FP 36 KA MCCB with handle spreader Link Box	1.00	Nos		
47	SITC 8 SWG GI Earth wire	175.00	Rft		
48	SITC 20 pair Jelly filled Armoured telephone cable	100.00	Rft		
49	Supply & Laying of 1.5sqmm Cu FRLS Wire for Earth Point Wiring	1500.00	Rft		
50	Supply & Laying 4+1 Wire for CCTV	200.00	Rft		
51	Supply & Inst of 8 Module POPUP Box Legrand or Eq make	6.00	Nos		
52	Supply & Laying of 1Rmt Patch cord Wire for Data	60.00	Nos		
53	SITC Of Microprocessor based rodent repellent master controller with on board controls generating frequencies from 20 Khz to 60 Khz, complete with all related mouting accessories such as racks etc. The master console shall be able to connect 24 satellites. (Make: ESSL / Fortuna / mMaster / R-SCAT Make).	4	NOS		
54	Supply and Installation of main LT panel, floor mounted, front operated dead back, totally enclosed vermin proof, indoor, non drawout, cubicle type power dist. panel fabricated out of 2mm thick CRCA sheet having gasketed hinged door on each cubicle, fully powder coated after seven tank treatment, incorporating horizontal / vertical sleeved tinned copper busbar complete with all internal wiring, danger board, two earthing lugs, cable chamber etc. as required housing below mentioned switchgears / meters. (GA diagram of the panel to be got approved from the Consultant)				

	MAIN LT PANEL a) 250 amp mccb - 4 pole = 2 nos b) 200 amp MFM 230 al 300 series c) 100 amp MCCB - 4 pole = 5 nos d) 125 amp MCCB - 4 pole = 2 nos c) local manager 100 amp = 3 nos d) copper busbars 300 amp = 1 set e) indicator lamp with fues = 1 set f) Panel = 1nos g) wire, lugs, mcb, etc	1	NOS		
	TOTAL				
	GST				
	TOTAL WITH GST				

AIR CONDITIONING FOR 4TH FLOOR NEW INDIA CENTER AT COOPERAGE

INSTALLATION OF WINDOW AC UNITS (ONLY FOR ENCLOSED AREAS, EXISTING CENTRAL AC TO BE USED FOR OPEN OFFICE AREAS WITH DUCTING MODIFICATION)

PART A :- HI-SIDE

SR. NO.	DESCRIPTION	UNIT	QTY.	SUPPLY	
				RATE	AMOUNT
1	Supplying, installing, testing & commissioning window type BEE 5 star rating variable speed inverter technology with minimum 3 to 1 convertible mode for compressor, room air conditioning unit 1.0TR to 1.2TR capacity having ISEER minimum 3.5 suitable to operate on 250V, 50 Hz, A.C. supply having 1 no of air handling unit hi-wall/floor mounting type complete with refrigerant R32 having copper condenser, minimum 2.5PM filter, self diagnosis feature, stabilizer free operation & temperature display on indoor unit, noise level maximum 50dBA at position in provided recess with wooden frame complete	Nos	3.00		
2	Supplying, installing, testing & commissioning window type BEE 5 star rating variable speed inverter technology with minimum 3 to 1 convertible mode for compressor, room air conditioning unit 1.3TR to 1.6TR capacity having ISEER minimum 3.5 suitable to operate on 250V, 50 Hz, A.C. supply having 1 no of air handling unit hi-wall/floor mounting type complete with refrigerant R32 having copper condenser, minimum 2.5PM filter, self diagnosis feature, stabilizer free operation & temperature display on indoor unit, noise level maximum 50dBA at position	Nos	1.00		
3	Supplying, installing, testing & commissioning window type BEE 5 star rating variable speed inverter technology with minimum 3 to 1 convertible mode for compressor, room air conditioning unit 1.7TR to 2.00TR capacity having ISEER minimum 3.1 to maximum 3.29 suitable to operate on 250V, 50 Hz, A.C. supply having 1 no of air handling unit hi-wall/floor mounting type complete with refrigerant R32 having copper condenser, minimum 2.5PM filter, self diagnosis feature, stabilizer free operation & temperature display on indoor unit, noise level maximum 50dBA at position in provided recess with wooden frame complete	Nos	2.00		
4	Supplying, installing, testing & commissioning split type BEE 5 star rating variable speed inverter technology with minimum 3 to 1 convertible mode for compressor, room air conditioning unit 0.7TR to 0.9TR capacity having ISEER minimum 3.8 to maximum 4.39 suitable to operate on 250V, 50 Hz, A.C. supply having 1 no of air handling unit hi-wall/floor mounting type complete with refrigerant R32 having copper condenser, minimum 2.5PM filter, self diagnosis feature, stabilizer free operation & temperature display on indoor unit, noise level maximum 50dBA at position. Cost to include that for wall mounting external stand for the oout door unit.	Nos	1.00		
	TOTAL AMOUNT FOR WINDOW/ SPLIT AC'S				
	GST 18% EXTRA				
	TOTAL WITH GST				

PART B:- LOW SIDE

1	Removing, resizing & Refitting the existing AC ducting, Dampers & Grills as per the instructions of the consultant, including new insulation wherever required.	Lot	1		
	TOTAL AMOUNT LOW SIDE(Rs.)				
	GST 18 % EXTRA				
	TOTAL WITH GST				
	TOTAL HIGH SIDE & LOW SIDE COST				