

## INDEX

**Name of work:** Construction of Integrated Regional Office at Chennai.

**NIT No.:** 04/2025-26/CE/CCU/CED-III/Chennai

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Executive Engineer, CED-III, CCU  
(For and on behalf of the President of India)

# PART-A

## GENERAL INFORMATION

**INFORMATION AND INSTRUCTIONS FOR BIDDERS FOR E-TENDERING  
FORMING PART OF BID DOCUMENT**

The Executive Engineer, Civil Engineering Division-III, Civil Construction Unit (CCU), Ministry of Environment, Forest & Climate Change (MoEF&CC), 'D' wing, 1st floor, Kendriya Sadan, Koramangala, Bengaluru-560034 ([email- eeecd3ccu-mef@gov.in](mailto:eeecd3ccu-mef@gov.in)) on behalf of President of India invites online Percentage rate bid in single bid system from CPWD eligible enlisted contractors of appropriate class in Buildings & Roads (erstwhile composite /Building/ Infrastructure) category for the following work:

NIT No.	<b>4/2025-26/CE/CCU/CED-III/Chennai</b>
Name of Work	<b>Construction of Integrated Regional Office at Chennai.</b>
Location	<b>Chennai, Tamilnadu.</b>
Estimated cost put to bid (Rs.)	<b>Rs. 27,87,27,051/-</b>
Earnest Money (Rs.)	<b>Rs. 37,87,271/-</b>
Stipulated Period of Completion of work (in months)	<b>18 Months</b>
Last time & date of submission of online bid, copy of receipt of deposition of original EMD and other documents as specified in Notice Inviting e-Tender.	03:00 PM on 12/01/2026
Time date of opening of bid	03:30 PM on 12/01/2026

**\*\*To be filled by Executive Engineer, CED-III**

Enlistment of the contractors should be valid on the last date of submission of bids. In case, the last date of submission of bids is extended, the enlistment of contractor should be valid on the original date of submission of bids.

- 1) The intending bidder must read the terms and conditions of CPWD-6 carefully. He should only submit his bid if he considers himself eligible and he is in possession of all the documents required.
- 2) Information and Instructions for bidders posted on websites shall form part of bid document.
- 3) The enlistment of the contractors should be valid on the last date of submission of bids. In case the last date of opening of bid is extended, the enlistment of contractor should be valid on the original date of opening of tender.
- 4) The bid document consisting of plans, specifications, schedule of quantities of various types of items to be executed and the set of terms and conditions of the contract to be complied with and other necessary documents can be seen and downloaded from website <https://etender.cpwd.gov.in> free of cost.

- 5) But the bid can only be submitted after deposition of EMD through Payment Online payment mode and original bank guarantee including e-Bank guarantee (for balance amount as prescribed) **either in the office of Executive Engineer inviting bids or division office of any Executive Engineer, CPWD/CCU, MoEF&CC within the period of bid submission** and uploading the mandatory scanned documents as mentioned in the NIT, receipt for deposition of original EMD to any division office of CCU, MoEF&CC/ CPWD or office of **Executive Engineer, CED-III, CCU, Bengaluru** and other documents as specified.
- 6) Those contractors who are not registered or have not updated their profile on the website mentioned above, are required to get registered / update their profile beforehand. The necessary training materials including the videos with step-to-step process are available on download section of <https://etender.cpwd.gov.in>.
- 7) The intending bidder must have valid Class-III digital signature certificate with encryption key (combo type) to perform any operations / transactions on the e-tendering portal / website and the bidder should download and install the eMsigner on their system as per instructions available on download section of <https://etender.cpwd.gov.in>.
- 8) On opening date, the contractor can login and see the bid opening process. After opening of bids he will receive the competitor bid sheets.
- 9) Contractor can upload documents in the form of JPG format and PDF format.
- 10) Contractor must ensure to quote rate of each item. The column meant for quoting rate in figures appears in yellow colour and the moment rate is entered, it turns sky blue. In addition to this, while selecting any of the cells a warning appears that if any cell is left blank the same shall be treated as "0". Therefore, if any cell is left blank and no rate is quoted by the bidder, rate of such item shall be treated as "0" (ZERO). However, if a tenderer quotes nil rates against each item in item rate tender or does not quote any percentage above/below on the total amount of the tender or any section / sub head in percentage rate tender, the tender shall be treated as invalid and will not be considered as lowest tenderer.
- 11) The department reserves the right to reject any prospective application without assigning any reason and to restrict the list of qualified contractors to any number deemed suitable by it, if too many bids are received satisfying the laid down criterion.
- 12) Copy of enlistment order and certificate of work experience and other documents as specified in the tender documents for eligibility shall be scanned and uploaded to the e-tendering website within the period of bid submission.
- 13) Online bid documents submitted by intending bidders shall be opened only of those bidders, whose deposited EMD and other documents scanned and uploaded are found in order.
- 14) If any information furnished by the applicant is found incorrect at a later stage, he shall be liable to be debarred from tendering/taking up of works in department. The department reserves the right to verify the particulars furnished by the applicant independently.

### **List of Documents to be scanned and uploaded within the period of tender submission**

- 1) **Enlistment Order** of the Contractor of CPWD in appropriate Category and valid on the date of opening of tender.
- 2) Insurance Surety Bond/ Demand Draft / Pay order or Banker's Cheque / Deposit at Call Receipt /FDR/Bank Guarantee of any Scheduled Bank against **EMD in favour of "Executive Engineer, CED III, CCU, MoEF&CC, Bengaluru"**.
- 3) Copy of receipt of deposition of original EMD issued by any divisions of CPWD/CCU, MoEF&CC (Format of deposition receipt should be as per **Annexure- A** of this section)
- 4) GST Registration Certificate, if already obtained by the bidder. If the bidder has not obtained GST registration as applicable, then he shall scan and upload following undertaking along with bid documents.

"If work is awarded to me, I/we shall obtain GST registration certificate, as applicable (of the state where site is located), within one month from the date of receipt of award letter or before release of any payment by CCU, whichever is earlier, failing which I/we shall be responsible for any delay in payments which will be due towards me/us on account of the work executed and/or for any action taken by CCU or GST department in this regard".

- 5) **Letter of Transmittal** in the format as per **Annexure- C** of this section.
- 6) Valid Electrical License issued by Competent Authority in the name of the contractor or an undertaking that they will either obtain valid electrical license at the time of execution of electrical work or associate contractors having valid electrical license of eligible class of execution of all electrical works. (Format of Undertaking as per **Annexure-D** of this section)
- 7) Any other Document as specified in the NIT.

Executive Engineer, CED-III, CCU  
(For and on behalf of the President of India)

### CPWD 6 FOR E- TENDERING

1. Percentage rate bids are invited on behalf of President of India from approved and eligible contractors of CPWD in appropriate class in Buildings & Roads (erstwhile composite /Building/ Infrastructure) category for the work **“Construction of Integrated Regional Office at Chennai.”**

The enlistment of the contractors should be valid on the last date of submission of bids.

In case the last date of submission of bid is extended, the enlistment of contractor should be valid on the original date of submission of bids.

- 1.1 The work is estimated to cost Rs. **27,87,27,051/-**. This estimate, however, is given merely as a rough guide.
2. Agreement shall be drawn with the successful bidders on prescribed Form No. **CPWD 7** which is available as a Govt. of India Publication and also available on website **www.cpwd.gov.in**. Bidders shall quote his rates as per various terms and conditions of the said form which will form part of the agreement.
3. The time allowed for carrying out the work will be **18 months** from the date of start as defined in schedule ‘F’ or from the first date of handing over of the site, whichever is later, in accordance with the phasing, if any, indicated in the bid documents.
4. The site for the work is available on “as it is where it is” basis. **The bidders have to quote their rates in view of the site conditions and other parameters.**
5. The architectural and structural drawings for the work shall be made available in phased manner, as per requirement of the same as per approved programme of completion submitted by the contractor after award of work.
6. The bid document consisting of plans, specifications, the schedule of quantities of various types of items to be executed and the set of terms and conditions of the contract to be complied with and other necessary documents except Standard General Conditions of Contract Form can be seen on website <https://etender.cpwd.gov.in> or [www.cpwd.gov.in](http://www.cpwd.gov.in) free of cost.
7. After submission of the bid the contractor can re-submit revised bid any number of times **or withdraw it** before last date and time of submission of bid as notified. **No post-tender modification is allowed by the tenderers except through negotiations, if required. In case, any tenderer does so, the tender will be rejected and the tenderer will be debarred for future tendering in CCU/CPWD for two years by the concerned enlisting authority (in case of CPWD enlisted contractor) and by the concerned CE/SE (in case of non-enlisted contractor).**
8. While submitting the revised bid, contractor can revise the rate of one or more item(s) any number of times (he need not re-enter rate of all the items) but before last time and date of submission of bid as notified.
9. Earnest Money in the form of Insurance Surety Bonds, Account Payee Demand Draft, Fixed Deposit Receipt, Banker's Cheque or Bank Guarantee including e- Bank Guarantee (for balance amount as prescribed) from any of the Commercial Banks (drawn

in favour of **Executive Engineer, CED-III, CCU, MoEF&CC, Bengaluru**) shall be scanned and uploaded to the e-Tendering website within the period of bid submission. The original EMD should be deposited either in the office of Executive Engineer inviting bids or division office of any Executive Engineer, CCU/CPWD within the period of bid submission. The EMD receiving Executive Engineer (including NIT issuing EE/AE) shall issue a receipt of deposition of earnest money deposit to the bidder in a prescribed format (enclosed) uploaded by tender inviting EE in the NIT.

A part of earnest money is acceptable in the form of bank guarantee also. In such case, minimum 50% of earnest money or Rs. 20 lac, whichever is less, shall have to be deposited in shape prescribed above, and balance may be deposited in shape of Bank Guarantee including e- Bank Guarantee of any Commercial bank having validity for a period of **180 days** or more from the last date of receipt of bids which is to be scanned and uploaded by the intending bidders.

Copy of Enlistment Order and certificate of work experience and other documents as specified in the notice inviting e- tender shall be scanned and uploaded on the e-Tendering website within the period of bid submission. However, certified copy of all the scanned and uploaded documents as specified in e- tender notice shall have to be submitted by the lowest bidder within a week physically in the office of tender opening authority. Online bid documents submitted by intending bidders shall be opened only of those bidders, whose original EMD deposited with any division of CPWD/CCU and other document scanned and uploaded are found in order.

10. The bid submitted shall become invalid and e-Tender processing fee (if applicable) shall not be refunded if:
  - (i) The bidder is found ineligible.
  - (ii) The bidder does not upload scanned copies of all the documents stipulated in the bid document.
  - (iii) If any discrepancy is noticed between the documents as uploaded at the time of submission of bid and hard copies as submitted physically by the lowest bidder in the office of bid opening authority.
  - (iv) If a tenderer quotes nil rates against each item in item rate tender or does not quote any percentage above/below on the total amount of the tender or any section / sub head in percentage rate tender, the tender shall be treated as invalid and will not be considered as lowest tenderer
11. The contractor whose bid is accepted will be required to furnish performance guarantee at specified percentage of the tendered amount as mentioned in schedule E and within the period specified in Schedule F. This guarantee shall be in the form of Insurance Surety Bonds, Account Payee Demand Draft, Fixed Deposit Receipt or Bank Guarantee from any of the Commercial Banks in accordance with the prescribed form. In case the contractor fails to deposit the said performance guarantee within the period as indicated in Schedule 'F', including the extended period if any, the Earnest Money deposited by the contractor shall be forfeited automatically without any notice to the contractor. The earnest money deposited along with bid shall be returned after receiving the aforesaid performance guarantee. The contractor whose bid is accepted will also be required to

furnish either copy of applicable licenses/ registrations or proof of applying for obtaining labour licenses, registration with EPFO, ESIC and BOCW Welfare Board including Provident Fund Code No. If applicable and also ensure the compliance of aforesaid provisions by the subcontractors, if any engaged by the contractor for the said work within the period specified in Schedule F.

12. Intending Bidders are advised to inspect and examine the site and its surroundings and satisfy themselves before submitting their bids as to the nature of the ground and sub-soil (so far as is practicable), the form and nature of the site, the means of access to the site, the accommodation they may require and in general shall themselves obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their bid. A bidder shall be deemed to have full knowledge of the site whether he inspects it or not and no extra charge consequent on any misunderstanding or otherwise shall be allowed. The bidder shall be responsible for arranging and maintaining at his own cost all materials, tools & plants, water, electricity access, facilities for workers and all other services required for executing the work unless otherwise specifically provided for in the contract documents. Submission of a bid by a bidder implies that he has read this notice and all other contract documents and has made himself aware of the scope and specifications of the work to be done and of conditions and rates at which stores, tools and plant, etc. will be issued to him by the Government and local conditions and other factors having a bearing on the execution of the work.
13. The competent authority on behalf of the President of India does not bind itself to accept the lowest or any other bid and reserves to itself the authority to reject any or all the bids received without the assignment of any reason. All bids in which any of the prescribed condition is not fulfilled or any condition including that of conditional rebate is put forth by the bidder shall be summarily rejected.
14. Canvassing whether directly or indirectly, in connection with bidders is strictly prohibited and the bids submitted by the contractors who resort to canvassing will be liable for rejection.
15. The competent authority on behalf of President of India reserves to himself the right of accepting the whole or any part of the bid and the bidder shall be bound to perform the same at the rate quoted.
16. The contractor shall not be permitted to bid for works in the CCU Circle responsible for award and execution of contracts, in which his near relative is posted as a Divisional Accountant or as an officer in any capacity between the grades of Superintending Engineer and Junior Engineer (both inclusive). He shall also intimate the names of persons who are working with him in any capacity or are subsequently employed by him and who are near relatives to any Gazetted officer in the Civil Construction Unit or in the Ministry of Environment, Forests and Climate Change. Any breach of this condition by the contractor would render him liable to be removed from the approved list of contractors of the Department.
17. No Engineer of Gazetted Rank or other Gazetted Officer employed in Engineering or Administrative duties in an Engineering Department of the Government of India is allowed to work as a contractor for a period of one year after his retirement from Government service, without the prior permission of the Government of India in writing. This contract is liable to be cancelled if either the contractor or any of his employees is found any time to be such a person who had not obtained the permission of the Government of India as aforesaid before submission of the bid or engagement in the contractor's service.



18. The bid for the work shall remain open for acceptance for a period of **Forty Five (45)** days from the date of opening of tenders.
- i) If any tenderer withdraws his tender within 7 days after last date **and time (24 hours basis)** of submission of bids, then the Government shall without prejudice to any other right or remedy, be at liberty to forfeit 50% of the earnest money absolutely irrespective of letter of acceptance for the work is issued or not.
  - ii) If any tenderer withdraws his tender or makes any modification in the terms & conditions of the tender which is not acceptable to the department after expiry of 7 days after last date **and time (24 hours basis)** of submission of bids, then the Government shall without prejudice to any other right or remedy, be at liberty to forfeit 100% of the earnest money absolutely irrespective of letter of acceptance for the work is issued or not.
  - iii) **Withdrawal of the tender, by the tenderer, shall only be made through e-tender portal. Any other method i.e. through letter/ e-mail etc. shall not be considered.**
  - iv) In case of forfeiture of earnest money as prescribed in para (i) and (ii) above, the bidders shall not be allowed to participate in the rebidding process of the same work..
19. This notice inviting Bid shall form a part of the contract document. The successful bidders/contractor, on acceptance of his bid by the Accepting Authority shall within 15 days from the stipulated date of start of the work, sign the contract consisting of: -
- i) The Notice Inviting Bid, all the documents including additional conditions, specifications and drawings, if any, forming part of the bid as uploaded at the time of invitation of bid and the rates quoted online at the time of submission of bid and acceptance thereof together with any correspondence leading thereto.
  - ii) Standard C.P.W.D. Form 7 or other Standard C.P.W.D. Form as applicable.
  - iii) General Conditions of Contract 2023 for Construction works, Central Public Works Department, as corrected up to last date of submission of bids.
20. **Specialized Agencies for E&M services:** The tenderer must associate himself with agencies of the appropriate eligibility for each of specialized nature of items / work as per part-‘C’ of NIT. The work of Lifts, STP, ETP & WTP shall be carried out by OEMs respectively. Such works shall be got executed only through associated agencies specialized in these fields. Separate MOU has to be signed with each of the specialized works with either OEMS (Authorised channel partners) or with specialized agencies who have the credentials of executing either one work of 80% value or two work of 60% value or three works of 40% value of the corresponding component of the specialized work in last seven years. It shall be the responsibility of contractor to sort out any dispute / litigation with the Specialized Agencies without any time & cost overrun to the Department. The contractor shall be solely responsible for settling any dispute / litigation arising out of his agreement with the Specialized Agencies. The contractor shall ensure that the work shall not suffer on account of litigation/ dispute between him and the specialized agencies / sub-contractor(s). No claim of hindrance in the work shall be entertained from the Contractor on this account. No extension of time shall be granted and no claim what so ever, of any kind, shall be entertained from the Contractor on account of delay attributable to the selection/rejection of the Specialized Agency. The

contractor has to associate agency(s) for specialized component(s) conforming to eligibility criteria as defined in the bid document and has to submit detail of such agency(s) to Engineer-in-charge within prescribed time. Name of the agency(s) to be associated shall be approved by Engineer-in-Charge.

21. The proposal for all specialized agencies (for Civil works and E& M works as specified in part 'B' and Part 'C' of notice inviting tender respectively) shall be submitted by the contractor within 03 months of the date of start/commencement. MOU should be submitted within three months of the date of start/commencement. In case of non-submission or incomplete or part submission of the proposals, deduction @ Rs. 5000/- per day per proposal of specialised agency shall be made from any amount payable to the contractor.
22. In case the contractor intends to change any of the above agency/agencies during the operation of the contract, he shall obtain prior approval of Engineer-in-charge. The new agency/agencies shall also have to satisfy the laid down eligibility criteria. In case Engineer-in-charge is not satisfied with the performance of any agency, he can direct the contractor to change the agency executing such items of work and this shall be binding on the contractor.
23. The contractor has to enter into MOU with agency(s) associated by him. Copy of such agreement shall be submitted to EE in charge. In case of change of associate contractor, the main agency(s) has to enter into MOU/agreement with the new contractor associated by him.
24. The intending bidders are required to update their profile in CPWD e- tender portal and to upload their bids well in advance of last date of submission of tender. Any issue related to updating profile/uploading tender can be resolved through ERP helpline no. 18001803286 or e-mail [cpwd.support@techmahindra.com](mailto:cpwd.support@techmahindra.com). The e- tendering bidders are also advised not to wait to raise any issues till the last date of submission of bid in their own interest.

Executive Engineer, CED-III  
(For and on behalf of the President of India)

**GOVERNMENT OF INDIA**  
**MINISTRY OF ENVIRONMENT, FORESTS & CLIMATE CHANGE**

**PERCENTAGE RATE BID AND CONTRACT FOR WORKS**

Tender for the work of “**Construction of Integrated Regional Office at Chennai**”

- i) To be uploaded by **15.00 hours on 12/01/2026** to/upload at
- ii) To be opened in presence of tenderers who may be present at **15.30 hours on 12/01/2026** in the office of in the office of the Executive Engineer, CED-III, CCU, Bengaluru.

\*\* To be filled by EE, CED-III

**TENDER**

I/We have read and examined the notice inviting tender, schedule, A, B, C, D, E & F Specifications applicable, Drawings & Designs, General Rules and Directions, Conditions of Contract, clauses of contract, Special conditions, Schedule of Rate & other documents and Rules referred to in the conditions of contract and all other contents in the tender document for the work.

I/We hereby tender for the execution of the work specified for the President of India within the time specified in Schedule ‘F’ viz., schedule of quantities and in accordance in all respect with the specifications, designs, drawing and instructions in writing referred to in Rule-1 of General Rules and Directions and in Clause 11 of the Conditions of contract and with such materials as are provided for, by, and in respect of accordance with, such conditions so far as applicable.

We agree to keep the tender open for acceptance for **Forty Five (45)** days from the due date of its opening of bid and not to make any modifications in its terms and conditions.

A copy of earnest money deposit receipt of prescribed amount deposited in the form of Insurance Surety Bonds, Account Payee Demand Draft, Fixed Deposit Receipt, Banker's Cheque or Bank Guarantee (as prescribed) issued by a Commercial Bank, is scanned and uploaded. If I/We, fail to furnish the prescribed performance guarantee within prescribed period, I/We agree that the said President of India or his successors, in office shall without prejudice to any other right or remedy, be at liberty to forfeit the said earnest money absolutely. Further, if I/We fail to commence work as specified, I/ We agree that President of India or the successors in office shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the said performance guarantee absolutely. The said Performance Guarantee shall be a guarantee to execute all the works referred to in the tender documents upon the terms and conditions contained or referred to those in excess of that limit at the rates to be determined in accordance with the provision contained in Clause 12.2(c) of the tender form. I/We hereby declare that I/we shall treat the tender documents drawings and other records connected with the work as secret/confidential documents and shall not communicate information derived there from to any person other than a person to whom I/we am/are authorized to communicate the same or use the information in any manner prejudicial to the safety and integrity of the State.

Further, I/We agree that in case of forfeiture of Earnest Money or Performance Guarantee as aforesaid, I/We shall be debarred for participation in the re-tendering process of the work.

I/We undertake and confirm that eligible similar work(s) has/have not been got executed through another contractor on back-to-back basis. Further that, if such a violation comes to the notice of Department, then I/We shall be debarred for tendering in CCU, MoEF&CC in future

forever. Also, if such a violation comes to the notice of Department before date of start of work, the Engineer-in-Charge shall be free to forfeit the entire amount of Earnest Money Deposit/Performance Guarantee.

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

Signature of contractor

Postal Address -----\*\*

Telephone No. -----\*\*

Fax -----\*\*

E-MAIL -----\*\*

Witness:

Address:

Occupation:

\*\* To be filled by Bidder

#### ACCEPTANCE

The above tender (as modified by you as provided in the letters mentioned hereunder) is accepted by me for and on behalf of the President of India for a sum of Rs.....  
(Rupees.....  
.....  
....)

The letters referred to below shall form part of this contract agreement: -

(a) -----\*

(b) -----\*

(c) -----\*

For & on behalf of President of India

Signature.....\*

Dated: -----\*

.....\*

Designation

\* To be filled by Executive Engineer

## **SCHEDULE – ‘A’, ‘B’, ‘C’, ‘D’, ‘E’ & ‘F’ FOR THE WORK**

### **SCHEDULE ‘A’**

Schedule of Quantities -

As per contract document

### **SCHEDULE ‘D’**

Extra schedule for specific requirements/document for the work, if any:	As per tender documents
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### **SCHEDULE ‘E’**

Reference to General Conditions of contract	CPWD General Conditions of Contract 2023 Construction works, as amended / modified upto previous day of the last date of submission of bid.
Name of Work	<b>Construction of Integrated Regional Office at Chennai.</b>
Estimated cost of the work	<b>Rs. 27,87,27,051/-</b>
Earnest money	<b>Rs.37,87,271/-</b>
Performance Guarantee	5.00% of tendered amount
Security Deposit	2.50% of tendered amount.

### **SCHEDULE ‘F’**

#### **GENERAL RULES AND DIRECTION**

Officer inviting tender	The Executive Engineer, CED-III, Civil Construction Unit (CCU), Ministry of Environment, Forest & Climate Change (MoEF&CC), ‘D’ wing, 1 <sup>st</sup> floor, Kendriya Sadan, Koramangala, Bengaluru - <b>560034</b> or his legal successor or assignee thereof.
Maximum percentage of quantity of items of work to be executed beyond which rates are to be determined in accordance with Clause 12.2(c)	See at appropriate clause

#### **Definitions:**

2(vi)	Engineer-in-Charge	Executive Engineer, CED-III, Civil Construction Unit (CCU), Ministry of Environment, Forest & Climate Change (MoEF&CC), ‘D’ wing, 1 <sup>st</sup> floor, Kendriya Sadan, Koramangala, Bengaluru - <b>560034</b> or his legal successor or assignee thereof.
2(viii)	Accepting Authority	Chief Engineer, CCU, MoEF&CC or his or his legal successor or Assignee thereof
2(x)a	Percentage on cost of materials and labour to cover all overheads and profits	15%

2(x)b	Standard Schedule of Rates	DSR 2023 Corrected up to last date of submission of bid (for civil work volume I & II)  DSR 2025 Corrected up to last date of submission of bid (for Elect. work)  Schedule of Rates, Analysis of Rates and Specifications (Horticulture & Landscaping)-2025 Corrected up to last date of submission of bid
2(xi)	Department:	Civil Construction Unit, Ministry of Environment, Forest & Climate Change, Government of India.
9(ii)	Standard CPWD Contract Form	CPWD Form 7.

<b>Clause 1</b>		
i)	Time allowed for submission of Performance Guarantee, Programme Chart (Time and Progress) and applicable labour licenses, registration with EPFO, ESIC and BOCW Welfare Board or proof of applying thereof from the date of issue of letter of acceptance.	07 Days
ii)	Maximum allowable extension with late fee @0.1% per day of Performance Guarantee amount beyond the period as provided in (i) above	03 Days
<b>Clause 2</b>		
i)	Authority for fixing Compensation under Clause 2:	Superintending Engineer, CCU, MoEF&CC or his legal successor or Assignee thereof
<b>Clause 5</b>		
i)	Time allowed for execution of work	18 Months
ii)	Numbers of days from date of issue of letter of acceptance for reckoning date of start	10 Days

**Mile stones as per table given below**

Sl. No.	Description of mile stone (s)	Time allowed (From date of start)	Amount to be withheld in case of Non-achievement of each Mile stone(s)
1.	Work done amounting to 8% of accepted tendered amount (Civil + Electrical/Mechanical + Horticulture/Landscape)	3 months	0.8 % of the Accepted tendered value.
2.	Work done amounting to 20% of accepted tendered amount (Civil + Electrical/Mechanical + Horticulture/Landscape).	6 months	0.8 % of the Accepted tendered value.
3.	Work done amounting to 45% of accepted tendered amount (Civil + Electrical/Mechanical + Horticulture/Landscape).	9 months	0.8 % of the Accepted tendered value.

4.	Work done amounting to 60% of accepted tendered amount (Civil + Electrical/Mechanical + Horticulture/Landscape)	12 months	0.8 % of the Accepted tendered value.
5.	Work done amounting to 80% of accepted tendered amount (Civil + Electrical/Mechanical + Horticulture/Landscape)	15 months	0.8 % of the Accepted tendered value.
6.	Work done amounting to 100% of accepted tendered amount (Civil + Electrical/Mechanical + Horticulture/Landscape)	18 months	1.0 % of the Accepted tendered value.

**Time allowed for execution of work: 18 Months**

Monthly recovery for delay in submission of the monthly progress report within specified period - not exceeding Rs. 2000/- per month for each month default.

**Schedule of handing over of site:**

Part	Portion of site	Time period for handing over reckoned from date of issue of letter of intent
Part A	Portion without any hindrance	10 days
Part B	Portions with encumbrances	NA
Part C	Portions dependent on work of other agencies	NA

Authority to decide:

i) Extension of time :	Executive Engineer, CED-III, Civil Construction Unit (CCU), Ministry of Environment, Forest & Climate Change (MoEF&CC), 'D' wing, 1 <sup>st</sup> floor, Kendriya Sadan, Koramangala, Bengaluru -560034 or his successor or Assignee thereof.
ii) Authority to decide rescheduling of mile stones and extension of time.	Superintending Engineer, Civil Construction Unit (CCU), MoEF&CC, CGO Complex, Lodhi Road, New Delhi -110003 or his successor or Assignee thereof.
iii) Shifting of date of start in case of delay in handing over of site	Superintending Engineer, Civil Construction Unit (CCU), MoEF&CC, CGO Complex, Lodhi Road, New Delhi -110003 or his successor or Assignee thereof.

**CLAUSE 5.4:** Schedule of rate of recovery for delay in submission of the modified programme in terms of delay days

S.N.	Contract Value	Recovery Rs / Per day
1.	More than Rs. 1 Crore	2000

#### Clause 6

i) Mode of measurement	CMB
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#### Clause 7

Gross work to be done together with net payment/ adjustment of advances for material collected, if any, since the last such payment for being eligible to interim payment	<b>Rs. 1.00 Crores (civil)</b> <b>Rs. 0.50 Crores (electrical)</b>
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<b>Clause 7A</b> <b>Whether clause 7A shall be applicable</b>	Yes
<b>Clause -7B</b> <b>Whether clause 7B shall be applicable</b>	Yes

<b>Clause 8 A: Completion plans to be submitted by the contractor</b>	
Authority to decide compensation on account if contractor fails to submit completion plans	Superintending Engineer, Civil Construction Unit (CCU), MoEF&CC, CGO Complex, Lodhi Road, New Delhi -110003 or his successor or Assignee thereof

#### Clause 10 A

As per site requirement and details attached in the relevant pages of this bid document

<b>Clause 10B (i)</b> Whether Clause 10 B (i) shall be applicable?	:	Yes
<b>Clause 10B (ii)</b> Whether Clause 10 B (ii) shall be applicable?	:	No.

#### Clause 10 C

Whether Clause 10 C shall be applicable	Not Applicable
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#### Clause 10CC

**Applicable**

S. N.	Relevant component of Material /Labour for price escalation	Percentage of total value of work
1	Component of Cement	<b>10%</b>
2	Component of Labour	<b>25%</b>
3	Civil component of the other construction materials	<b>27%</b>
4	Electrical and Mechanical (E&M) Component of Construction Materials	<b>24%</b>



5	Reinforcement steel bars/ TMT bars/Structural steel (including strands and cables)	<b>14%</b>
	Total	<b>100 %</b>

**Clause 11:**

Specifications to be followed for execution of work ( <b>for civil work</b> )	:	<ol style="list-style-type: none"> <li><b>Civil work:</b> CPWD Specifications 2019 Volume- I &amp; II with up to the date corrections slips.</li> <li>MORTH Specifications for Roads and Bridge work.</li> </ol>
Specifications to be followed for execution of work ( <b>for Electrical work</b> )	:	<p><b>Electrical &amp; Other works</b> (amended upto date):</p> <ol style="list-style-type: none"> <li>CPWD General Specification for Electrical Works Part I (Internal) &amp; Part II (External) – 2023.</li> <li>General Specification for Electrical Works (Part III Lifts &amp; Escalators)-2003.</li> <li>CPWD General Specification for Electrical Works Part IV Substation-2013.</li> <li>CPWD General Specification for Electrical Works Part V Wet riser and sprinkler system-2020.</li> <li>CPWD General Specification for Electrical Works Part VI fire detection and alarm system-2018.</li> <li>CPWD General Specification for Electrical Works Part VII DG Sets– 2013</li> <li>CPWD General Specification for Electrical Works Part VIII Gas Based Fire Extinguishing System–2013.</li> <li>General Specification for Heating Ventilation &amp; Air-Conditioning-2024.</li> </ol>
Specifications to be followed for execution of work ( <b>for Horticulture &amp; Landscaping work</b> )	:	Schedule of Rates, Analysis of Rates and Specifications (Horticulture & Landscaping)-2025.

**All the afore stated specifications shall be read with updated correction slips issued till last date of submission of bid.**

**Clause 12 : Construction work**

12.2 (c)	Deviation limit beyond which clauses 12.2(c) shall apply for building work.	:	100%
	i) Deviation limit beyond which clauses 12.2(c) shall apply for foundation work (except items mentioned in earth work sub head in DSR and related items)	:	100%
	ii) Deviation limit for items mentioned in earth work sub head of DSR and related items	:	100%

**Clause 16:**

Competent Authority for deciding reduced rates	:	Superintending Engineer, Civil Construction Unit (CCU), MoEF&CC, CGO Complex, Lodhi Road, New Delhi -110003 or his legal successor or Assignee thereof
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**Clause 18:**

List of Mandatory Machinery, tools & plants to be deployed by the contractor at site: -

As per site requirement and details attached in the relevant pages of this bid document.

**Clause 19**

<b>Clause 19 C</b>	Penalty for each default	<b>Rs. 500/-</b>
<b>Clause 19 D</b>	Penalty for each default	<b>Rs. 500/-</b>
<b>Clause 19 G</b>	Penalty for each default	<b>Rs. 500/-</b>
	Enhanced penalty per day for continuous default	<b>Rs. 500/-</b>
<b>Clause 19 K</b>	Penalty for each default	<b>Rs. 500/-</b>

**Clause 25: Settlement of disputes by Conciliation and Arbitration**

<b>Conciliator:</b>	:	Superintending Engineer, Civil Construction Unit (CCU), MoEF&CC, CGO Complex, Lodhi Road, New Delhi -110003 or his legal successor or Assignee thereof
<b>Arbitrator Appointing Authority</b>	:	Chief Engineer, Civil Construction Unit (CCU), MoEF&CC, CGO Complex, Lodhi Road, New Delhi -

		110003 or his legal successor or Assignee thereof
<b>Place of Arbitration</b>	:	New Delhi

**Clause 32 : Requirement of Technical Representative(s) and Recovery Rate:**

S.N.	Minimum Qualification of Technical Representative	Discipline	Designation (Principal Technical / technical representative)	Minimum Experience (Years)	Number	Rate at which recovery shall be made from the contractor in the event of not fulfilling Provision of clause 32 (i)
						Figures
1	Graduate Engineer	Civil	<b>Project manager with degree in civil engineering</b>	20 (and having experience of one similar nature of work)	1	Rs.1,50,000/- per Month
2	Graduate Engineer	Civil	<b>Deputy Project Manager</b>	12 (and having experience of one similar nature of work)	1	Rs.1,00,000/- per Month
3	Graduate Engineer Or Diploma Engineer	Civil	<b>Project/Site Engineer</b>	5 or 10 respectively	1	Rs. 50000/- Per month
4	Graduate Engineer Or Diploma Engineer	Electrical	<b>Project/Site Engineer</b>	5 or 10 respectively	1	Rs. 50000/- Per month
5	Graduate Engineer	Civil	<b>Project Planning /Billing</b>	2 or 5 respectively	1	Rs. 30000/- Per month
6	Graduate Engineer	Electrical	<b>Project Planning /Billing</b>	2 or 5 respectively	1	Rs. 30000/- Per month

Assistant Engineers retired from Government services that are holding Diploma will be treated at par with Graduate Engineers. Diploma holder with minimum 10-year relevant experience with a reputed construction co. can be treated at par with Graduate Engineers for the purpose of such deployment subject to the condition that such diploma holders should not exceed 50 % of requirement of degree engineers

**Clause 38**

(i)	(a)	<b>Schedule/statement for determining theoretical quantity of cement &amp; bitumen on the basis of (for civil work)</b>	:	Delhi Schedule of Rates 2023 printed by C.P.W.D. with upto date correction slip upto last date of bid submission.
		<b>Schedule/statement for determining theoretical quantity of cement &amp; bitumen on the basis of (for Electrical work)</b>	:	Delhi Schedule of Rates 2025 printed by C.P.W.D. with upto date correction slip upto last date of bid submission.
(ii)		<b>Variations permissible on theoretical quantities:</b>		
	(a)	<b>Cement</b>	:	2% plus/minus.
	(b)	<b>Bitumen All Works</b>	:	2.5% plus only & nil on minus side.
	(c)	<b>Steel Reinforcement and structural steel sections for each diameter, section and category</b>	:	2% plus/minus variation
	(d)	<b>All other materials.</b>	:	Nil

**RECOVERY RATES FOR QUANTITIES BEYOND PERMISSIBLE VARIATION**

S.No.	Description of Item	Rates in figures and words at which recovery shall be made from the Contractor	
		Excess beyond permissible variation	Less use beyond permissible variation
1.	Cement (PPC)	Nil	Not allowed. Substandard work will be rejected.
2.	Reinforcement Steel	Nil	
3.	Structural Steel	Nil	

Executive Engineer, CED-III,  
Civil Construction Unit (CCU),  
Ministry of Environment, Forest & Climate Change (MoEF&CC),  
'D' wing, 1<sup>st</sup> floor, Kendriya Sadan,  
Koramangala, Bengaluru -560034

**PROFORMA FOR THE RECEIPT TO BE ISSUED BY THE EXECUTIVE ENGINEER  
RECEIVING THE EMD**

Receipt of deposition of original EMD (drawn in favour of <b>Executive Engineer, CED-III, CCU, MoEF&amp;CC, Bengaluru</b> ) (Receipt No. .... / date.....)		
Name of work	:	Construction of Integrated Regional Office at Chennai.
NIT No	:	<b>4/2025-26/CE/CCU/CED-III/Chennai</b>
Estimated Cost	:	<b>Rs. 27,87,27,051/-</b>
Amount of Earnest Money Deposit	:	<b>Rs. 37,87,271/-</b>
Last date of submission of bid	:	
To be filled by EMD receiving Executive Engineer		
Name of contractor	:	
Form of EMD	:	
Amount of Earnest Money Deposit	:	
Date of Submission of EMD	:	
		(Signature) Name and Designation of EMD receiving officer (EE/AE(P)/AO/AAO) along with office stamp

**(On non-judicial stamp paper of minimum Rs. 100)**

**(Guarantee offered by Bank to CCU in connection with the execution of contracts)**

**Form of Bank Guarantee for Earnest Money Deposit /Performance Guarantee/Security Deposit**

1. Whereas the Executive Engineer ..... (name of division) ....., CCU on behalf of the President of India (hereinafter called “The Government”) has invited bids under .....(NIT number)..... dated ..... for ..... (name of work) ..... The Government has further agreed to accept irrevocable Bank Guarantee for Rs. .... (Rupees ..... only) valid upto ..... (date)\*..... as Earnest Money Deposit from ..... (name and address of contractor) .....(hereinafter called “the contractor”) for compliance of his obligations in accordance with the terms and conditions of the said NIT.

OR\*\*

Whereas the Executive Engineer ..... (name of division) ....., CCU on behalf of the President of India (hereinafter called “The Government”) has entered into an agreement bearing number ..... with .....(name and address of the contractor) ..... (hereinafter called “the Contractor”) for execution of work ..... (Name of work) ..... The Government has further agreed to accept an irrevocable Bank Guarantee for Rs. .... (Rupees ..... only) valid upto ..... (date)..... as Performance Guarantee/Security Deposit from the said Contractor for compliance of his obligations in accordance with the terms and conditions of the agreement.

2. We, ..... (indicate the name of the bank) ..... (herein after referred to as “the Bank”), hereby undertake to pay to the Government an amount not exceeding Rs. .... (Rupees..... only) on demand by the Government within 10 days of the demand.
3. We, .....(indicate the name of the Bank) ....., do hereby undertake to pay the amount due and payable under this guarantee without any demur, merely on a demand from the Government stating that the amount claimed is required to meet the recoveries due or likely to be due from the said Contractor. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this Guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. ....(Rupees .....only).
4. We, ..... (indicate the name of the Bank) ....., further undertake to pay the Government any money so demanded notwithstanding any dispute or disputes raised by the contractor in any suit or proceeding pending before any Court or Tribunal, our liability under this Bank Guarantee being absolute and unequivocal. The payment so made by us under this Bank Guarantee shall be a valid discharge of our liability for payment there under and the Contractor shall have no claim against us for making such payment.

5. We, ..... (indicate the name of the Bank) ....., further agree that the Government shall have the fullest liberty without our consent and without affecting in any manner our obligation here under to vary any of the terms and conditions of the said agreement or to extend time of performance by the said Contractor from time to time or to postpone for any time or from time to time any of the powers exercisable by the Government against the said contractor and to forbear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such variation or extension being granted to the said Contractor or for any forbearance, act of omission on the part of the Government or any indulgence by the Government to the said Contractor or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.
6. We, ..... (indicate the name of the Bank) ....., further agree that the Government at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor at the first instance without proceeding against the Contractor and notwithstanding any security or other guarantee the Government may have in relation to the Contractor's liabilities.
7. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor.
8. We, ..... (Indicate the name of the Bank) ....., undertake not to revoke this guarantee except with the consent of the Government in writing.
9. This Bank Guarantee shall be valid up to ..... unless extended on demand by the Government. Notwithstanding anything mentioned above, our liability against this guarantee is restricted to Rs. .... (Rupees ..... only) and unless a claim in writing is lodged with us within the date of expiry or extended date of expiry of this guarantee, all our liabilities under this guarantee shall stand discharged.

Date .....

Witnesses:

- |  |  |
|--|--|
| 1. Signature.....<br>Name and address<br>Designation | Authorized signatory<br>Name<br>Staff code no. |
| 2. Signature .....<br>Name and address               | Bank seal                                      |

\*Date to be worked out on the basis of validity period of 90 days where only financial bids are invited and 180 days for two/three bid system from the date of submission of tender.

\*\*In paragraph 1, strike out the portion not applicable. Bank Guarantee will be made either for earnest money or for performance guarantee/security deposit/mobilization advance, as the case may be.

**LETTER OF TRANSMITTAL**

**From:**

.....  
.....

**To**

The Executive Engineer, CED III,  
CCU, Bangalore.

Subject: Name of Work: "Construction of Integrated Regional Office at Chennai."  
Sir,

Having examined details given in tender notice and bid document for the above work, I/we hereby submit the bid along with all required information and documents.

- 1) I/We hereby certify that all the statements made and information supplied by me/us are true and correct.
- 2) I / we have furnished all information and details necessary for bid and have no further pertinent information to supply.

I/We also authorize Executive Engineer, CED III, CCU, Bangalore to approach individuals, employers, firms and corporation to verify our details, if required.

- 3) Certificate: It is certified that the information given by me/us in the bid are correct. It is also certified that I/We shall be liable to be debarred, disqualified/ cancellation of enlistment in case any information furnished by me/us is found to be incorrect.
- 4) Contact Details of our authorized representative are as under:

Name  
Mobile Number:  
Email id:  
Contact Address:

Name of Bidder:  
Contact Address:  
Email Id of Bidder:  
Mobile Number of Bidder(s):

Signature(s) of Bidder(s)  
Seal of bidder



**UNDERTAKING REGARDING ELECTRICAL LICENSE**

To,  
The Executive Engineer, CED III,  
CCU, Bangalore.

**Name of work:** “Construction of Integrated Regional Office at Chennai.”

Dear Sir,

Having examined the details given in the NIT and Bid document for the above said work, I  
/We here by submit the following;

“I / We here by certify that I/ We either obtain valid electrical license at the time of  
execution of electrical work or associate Contractor having valid electrical License of eligible  
class”.

Seal of bidder:

Date of submission:

Signature(s) of Bidder(s)

**GUARANTEE TO BE EXECUTED BY CONTRACTOR (S)**  
**FOR ANY FADING, PEELING OFF AND DISCOLOURING AFTER**  
**COMPLETION IN RESPECT OF ITEMS IN THE SCHEDULE OF QUANTITIES**

The agreement made this .....day of .....Two thousand .....  
between .....son of ..... (hereinafter called the  
GUARANTOR of the one part) and the PRESIDENT OF INDIA (hereinafter called the  
Government of the other part).

WHEREAS THIS agreement is supplementary to a contract (hereinafter called the  
contract) dated ..... and made between GUARANTOR OF THE ONE PART and  
the GOVERNMENT of the other part, whereby the contractor, inter alia, undertook to apply paint  
on external surface of the building and structures in the said contract.

AND WHEREAS THE GUARANTOR agreed to give a guarantee to the effect that the  
said painting against fading, peeling off and discolouring for five years from the date after the  
maintenance period prescribed in the contract.

Provided that the Guarantor will not be responsible for misuse of the painted surface. The  
decision of the Engineer-in-Charge with regard to misuse of painted surface shall be final.

During this period of guarantee, the guarantor shall make good all defects and in case of  
any defects being found in painting such as fading, peeling off and discolouring to the  
satisfaction of the Engineer-in-Charge at his cost and shall commence the work for such  
rectification within seven days from the date of issue of the notice from the Engineer-in-  
Charge calling up on him to rectify the defects, failing which the work shall be got done by the  
department by some other contractor at the GUARANTOR's cost and risk. The decision of the  
Engineer-in-Charge as to the cost, payable by the guarantor shall be final and binding.

If the Guarantor fails to execute the painting or commits breach there under, then the  
Guarantor will indemnify the principal and his successors against all loss, damage, cost,  
expense or otherwise which may be incurred by him by reason of any default on the part of the  
GUARANTOR in performance and observance of this supplementary agreement. As to the  
amount of loss and/ or damage and/ or cost incurred by the Government the decision of the  
Engineer-in-Charge will be final and binding on the parties.

IN WITNESS WHERE OF these presents have been executed by GUARANTOR  
..... and by ..... and for and on behalf of the  
PRESIDENT OF INDIA on the day, month and year first above written.

Signed, sealed and delivered by the GUARANTOR in the presence of 1.  
2.

Signed for and on behalf of the PRESIDENT OF INDIA by  
.....in the presence of  
.....

**GUARANTEE TO BE EXECUTED BY CONTRACTOR FOR REMOVAL OF DEFECTS  
AFTER COMPLETION OF WORK IN RESPECT OF WATER PROOFING WORKS**

This agreement made this \_\_\_\_\_ day of \_\_\_\_\_ two thousand \_\_\_\_\_ and between \_\_\_\_\_, (Name of the contractor, hereinafter call Guarantor of the one part) and the PRESIDENT OF INDIA (hereinafter called the Government of the other part).

Whereas this agreement is supplementary to a contract (hereinafter called the Contract) dated \_\_\_\_\_ and made between the GUARANTOR of the one part and the GOVERNMENT of the other part where by the Contractor inter alia, undertook to render the buildings and structures in the said contract recited completely water and leak proof.

And whereas the Guarantor agreed to give a guarantee to the effect that the said structures will remain water / leak proof for ten years from the date of completion of work.

Now the Guarantor hereby guarantees that water proofing treatment given by him will render the structures completely leak proof and the minimum life of such water proofing treatment shall be ten years to be reckoned from the date completion of work.

Provided that the Guarantor will not be responsible for leakage caused by earthquakes or structural defects or misuse of roof or alterations and for such purpose

Misuse of roof shall mean by operation, which will damage roofing treatment, like chopping of firewood and things of the same nature, which might cause damage to the roof.

Alteration shall mean construction of an additional storey or a part of roof or construction adjoining to existing roof, where by roofing treatment is removed in parts.

The decision of the Engineer-in-Charge with regard to cause of leakage shall be final.

During this period of guarantee, the Guarantor shall make good all defects and in case of any defects being found, render the building water proof at his own cost, to the satisfaction of the Engineer-in-Charge and shall commence the work for such rectification within seven days from the date of issue of the notice from the Engineer-in-Charge calling upon him to rectify the defects, failing which the work shall be got done by Department through some other contractor at the GUARANTOR'S cost and risk. The decision of the Engineer-in-Charge as to the cost, payable by the Guarantor shall be final and binding.

That is the Guarantor fails to execute the necessary rectification or commits breach there under then the Guarantor will indemnify the Principal and his successors against all loss, damage, cost expense or otherwise which may be incurred by him by reasons of any default on the part of GUARANTOR in performance and observance of this supplementary agreement. As to the amount of loss and / or damage and / or cost incurred by the Government, the decision of the Engineer-in-Charge will be final and binding on the parties.

In witness where of these presents has been executed by the Obligator \_\_\_\_\_ and by \_\_\_\_\_ and for and on behalf of the PRESIDENT OF INDIA on the day \_\_\_\_\_ month and year first above written.

Signed, sealed and delivered by (OBLIGOR) in the presence of:

1.

2.

Signed for and on behalf of THE PRESIDENT OF INDIA BY \_\_\_\_\_ in the presence of:

1.

2.

(Guarantee to be signed and delivered on a Non-Judicial stamp paper worth Rs.100/-)

## LIST OF EQUIPMENTS FOR TESTING OF MATERIALS&CONCRETE AT SITE LABORATORY

All necessary equipment for conducting all necessary tests shall be provided at the site in the well-furnished site laboratory by the contractor at his own cost. The following minimum laboratory equipment's shall be set up at site office laboratory:

Sl. No.	Equipment	Numbers (Minimum)
1	Compressing testing machine	As per requirement
2	Cube mould	As per requirement
3	Slump cone, steel plate, tamping rod, steel scale, scoop	As per requirement
4	Graduated glass measuring cylinder	As per requirement
5	Sets of sieves of 450mm internal dia for coarse aggregate [100mm, 80mm, 40mm; 20mm;12.5mm, 10mm;4.75mm complete with lid and pan]	As per requirement
8	Sets of sieves of 200mm internal dia for fine aggregate [4.75mm;2.36mm;1.18mm; 600 microns;300 microns& 150micron,	As per requirement
9	Sieve Brushes and sieve shaker capable of 200mm and 300mm dia sieves, manually operated with timing switch assembly	As per requirement
10	Electronic balance 600gx0.1g., 10kg and 50kg	As per requirement
11	Physical balance weight upto 5 kg	As per requirement
12	Measuring jars100ml, 200ml,500ml	As per requirement
13	Gauging trowels 100mm & 200mm with wooden Handle	As per requirement
14	Spatula 100mm & 200mm with long blade wooden Handle	As per requirement
15	Vernier callipers12" &6" size	As per requirement
16	GI tray 600x450x50mm, 450x300x40mm,300x250x40mm	As per requirement
17	Screw gauge 0.1mm-10mm, least count 0.05	As per requirement
18	Set of box spanner	As per requirement
19	Hammer1lb & 2lb	As per requirement
20	Rubber Hammer	As per requirement
21	Hacksaw with 6 blades	As per requirement
22	Measuring tape 5mtr	As per requirement
23	Depth gauge 20cm	As per requirement
24	Shovels &Spade	As per requirement

**Note:** The above list is only indicative and not exhaustive. The contractor may be required to provide more equipment's as per the requirement of work and as per the direction of the engineer- in- charge.

**LIST OF MANDATORY MACHINERY, TOOLS & PLANTS TO BE DEPLOYED BY THE CONTRACTOR AT SITE**

<b>S. No.</b>	<b>Equipment</b>	<b>Numbers (Minimum)</b>
1.	Needle Vibrators.	As per Requirement of work
2.	Plate Vibrator	As per Requirement of work
3.	JCB, Excavator, Dumper, Tipper	As per Requirement of work
4.	Reinforcement cutting & Bending machines	As per Requirement of work
5.	Total station.	As per Requirement of work
6.	Auto level & staff.	As per Requirement of work
7.	Water tanker (Minimum capacity of 5000 litres)	As per Requirement of work
8.	Welding machine 400 Ampere	As per Requirement of work
9.	Screener for coarse sand and fine sand	As per Requirement of work
10.	Centrifugal mono block water pump minimum capacity 2 HP	As per Requirement of work
11.	Steel Shuttering with necessary steel props	As per Requirement of work
12.	Steel scaffolding and staging materials	As per Requirement of work
13.	Plain Concrete/Mortar Mixer	As per Requirement of work
14.	Semi-Automatic Pavement Concrete Paver	As per Requirement of work
15.	Screed Vibrator	As per Requirement of work
16.	Any other machinery required for completion of the work as per decision of Engineer-in-charge.	As per Requirement of work

# **PART B**

## **SPECIAL CONDITIONS, PARTICULAR SPECIFICATION FOR CIVIL AND HORTICULTURE WORK**

## **SPECIAL CONDITIONS**

### **1.0 GENERAL**

- 1.1** The contractors are advised to inspect and examine the site and its surroundings before submission of the bids and satisfy themselves with the nature of site, the means of access to the site, the constraints of space for stacking material / machinery, accommodation of labour etc., constraints put by local regulations (if any), weather conditions at site (rainfall, snowfall, winter and summer temperatures etc.), general ground/subsoil conditions etc. or any other circumstances which may affect or influence their tenders. No claims, whatsoever, shall be entertained at a later date for any errors found, on plea that the information supplied by the department in the tender is insufficient or is at variance with the actual site conditions.
- 1.2** The contractor shall, if required by him, before submission of the tender, study the drawings and tender document carefully. The department shall not bear any responsibility for the lack of knowledge and also the consequences, thereof to the contractor. The information and data shown in the drawings and mentioned in the tender documents have been furnished, in good faith, for general information and guidance only. The Engineer-in-Charge, in no case, shall be held responsible for the accuracy thereof and/or interpretations or conclusions drawn there from by the contractor and all consequences shall be borne by the contractor. It is presumed that the contractor shall satisfy himself for all possible contingencies, incidental charges, wastages, bottlenecks etc. likely during execution of work and acts of coordination which may be required between different agencies. Nothing extra shall be payable on this account.
- 1.3** The work shall be carried out, all in accordance with true intent and meaning of the scope of work, specifications and the drawings taken together, regardless of whether the same may or may not be particularly shown on the drawings and/or described in the specifications and/or scope of work, provided that the same can be reasonably inferred.
- 1.4** The work shall generally be carried out in accordance with the “CPWD Specifications 2019 Vol. I & II” with correction slips up to last date of submission of bid (including any extension in last date of bid submission), additional/particular specifications, architectural and structural drawings and as per instructions of Engineer-in-Charge. Any additional item of work, if taken up subsequently, shall also conform to the relevant specifications mentioned hereinabove.
- 1.5** The several documents forming the tender are to be taken as mutually complementary to each other. Detailed drawings shall be followed in preference to small scale drawings and figured dimensions in preference to scale dimensions. Between two or more clauses of this contract, the provisions of a specific clause relevant to the issue under consideration shall prevail over those in other clauses.
- 1.6** The work shall be carried out in accordance with the architectural drawings and structural drawings, which shall be issued by the Engineer-in-Charge after award of work as per schedule mentioned in the CPWD6. Before commencement of any item of work, the contractor shall correlate all the relevant architectural, structural and services drawings issued for the work and satisfy himself that the information available there from is complete and unambiguous. The discrepancy, if any, shall be brought to the notice of the Engineer-in-Charge before execution of the work. The contractor alone shall be responsible for any loss or damage occurring by the commencement of work on the basis of any erroneous and or incomplete information.
- 1.7** Should there be any difference or discrepancy between the description of items or condition of contract or conditions of contract as given in the particular specifications, special conditions,



general condition of contract and I.S. Codes, drawings etc., the following order of preference shall be observed-

- a) Description of Schedule of Quantity
- b) Particular specification
- c) Special conditions
- d) Additional Conditions
- e) Architectural drawings /Structural drawings
- f) CPWD Specifications including upto date correction slips.
- g) CPWD General Conditions of Contract 2023 construction works including correction slips issued up to last date of submission of bid including extensions if any.
- h) Indian Standards Specifications of B.I.S.
- i) ASTM, BS, or other foreign origin code mentioned in tender document.
- j) Manufacturer's specifications and as decided by the Engineer-in-Charge.
- k) Sound Engineering practices or well-established local construction practices.

**1.8** In the event of any variation/ discrepancy in the drawings, specifications and tender documents etc. the decision of the Engineer-in-Charge shall be final binding and conclusive and if, the contractor have any doubt, the same should be got clarified immediately from the Engineer-in-charge and no claim of the contractor shall be entertained thereafter. Moreover, the contractor is not allowed to take benefit out of any clerical/ grammatical mistake in the standard clauses/specifications etc. being used in the agreement.

**1.9** The contractor shall give to the local body, police and other authorities all necessary notices etc. that may be required by law and obtain all requisite licenses and/or for temporary obstructions, enclosures etc. and pay all fee, taxes and charges which may be levied on account of these operations in executing the contract. The charges to be paid by contractor are not related to permanent constructed asset as per contract.

**1.10** The contractor shall ensure that there is no damage to adjoining property. If any such untoward incident happens, he shall be entirely responsible for any consequences besides making good any damages to the adjoining property whether public or private. He shall supply and maintain lights either for illumination or for cautioning the public at night.

**1.11** Proper temporary barricading by fencing with G.I. sheets around the construction site, shall be carried out by the contractor at the start of work. It shall be done by providing, erecting, maintaining temporary protective barricading of minimum height as per direction of engineer in charge and in accordance with the prevalent guidelines issued by statutory authorities in this context, made in panels, with each panel having MS frames / MS scaffolding pipes of suitable size and stiffness, with 24-gauge thick GI corrugated sheet or suitably stiffened plain GI sheet fixed on frames. Such panels shall be suitably connected to each other for stability with nuts and bolts, hooks, clamps etc. and fixed firmly to the ground at about 2 meters (or as per design) spacing, for the entire duration till completion of the work. The contractor shall also provide and erect temporary protective barricades within the site as per stipulations/guidelines of statutory authorities. Temporary protective roofing near the Entrance to the building, under construction, shall be made to protect the visiting officials from getting hurt by falling debris etc. Also, one or more coat of enamel paint of shade as approved and directed by the Engineer-in-Charge shall be applied on the panels and "CCU, MoEF&CC" shall be painted over that in suitable sizes, shapes and numbers as directed by the Engineer-in-Charge. It shall be dismantled and taken away by the contractor after the completion of work at his own cost with the approval of the Engineer-in- Charge. Nothing extra shall be payable on this account. **The contractor shall maintain the site barricading during the complete period of execution and realign it if required, for execution of**

**works. A Recovery of Rs.500/- per day shall be levied for not maintaining the barricading in good condition or breach of any of the above conditions as per the direction of Engineer-in-charge.**

- 1.12** The contractor shall bear all incidental charges for cartage, storage and safe custody, insurance, erection, testing and commissioning of materials issued by department (if any) as well as to those materials arranged by the contractor. The contractor shall also be responsible for the watch and ward / guard of the buildings, safety of all fittings and fixtures including sanitary and water supply fittings and fixtures provided by him against pilferage and breakage during the period of installations and thereafter till the building is physically handed over to the department. No extra payment shall be made on this account.
- 1.13** Wherever any reference to any Indian Standards occurs in the documents relating to this contract, the same shall be inclusive of all amendments issued thereto or revisions thereof, if any, up to the last date of receipt of tenders (including extended date, if any).
- 1.14** No claim whatsoever on account of any discrepancy between the sub-surface strata conditions shall be entertained.
- 1.15** Any legal or financial implications resulting out of disposal of earth shall be sole responsibility of the contractor. Nothing extra shall be paid on this account.
- 1.16** Wherever required for the execution of work, scaffolding shall be provided and suitably fixed, by the contractor. The contractor shall provide steel double scaffolding system, suitably braced for stability, with all the accessories, gangways, etc. with adjustable suitable working platforms to access the areas with ease for working and inspection. It shall be designed to take all incidental loads. It should cater to the safety features for workmen. Nothing extra shall be payable on this account. It shall be ensured that damage is not caused to any structure due to the scaffolding.
- 1.17** The contractor shall make his own arrangements to provide for accommodation for labour as per the rules of the local bodies. The Engineer-in-Charge shall in no way be responsible for any delay on this account and no claim, whatsoever, on this account shall be entertained. Nothing extra shall be payable on this account.
- 1.18** No tools and plants including any special T&P etc. shall be supplied by the department and the contractor shall have to make his own arrangements at his own cost. No claim of hindrance (or any other claim) shall be entertained on this account.
- 1.19** The contractor shall take all precautions to abide by the environmental related restrictions imposed by any statutory body having jurisdiction in the state as well as prevent any pollution of streams, ravines, river bed and waterways. All waste or superfluous materials shall be transported by the contractor and disposed off at designated places only. Nothing extra shall be payable on this account.
- 1.20** No claim on account of site constraints mentioned in this document or any other site constraints such as lack of public transport, inadequate availability of skilled, semi-skilled or unskilled workers in the near vicinity, non-availability of construction machinery spare parts etc. or any other constraints not specifically stated here shall be entertained from the contractor. Therefore, the tenderers are advised to visit site and get first-hand information of site constraints. Accordingly, they should quote their tenders. Nothing extra shall be payable on this account. Any hindrances claimed by the contractor on this account shall not be considered

while action under clause '2' and '5' of General condition of contract amended upto date till last date or extended last date of submission of tender.

- 1.21** Other agencies may also simultaneously execute and install the works of other civil and E&M services for the work. The contractor shall afford necessary facilities for the same. The contractor shall leave such recesses, holes, openings, trenches etc. as may be required for such related works and the contractor shall fix the same at time of casting of concrete, stone work and brick work, if required, and nothing extra shall be payable on this account.
- 1.22** The contractor shall take all precautions to avoid accidents by exhibiting necessary caution boards day and night. The contractor shall ensure entire necessary precaution during the entire period of work and site related activities to ensure full safety to workers and avoid any kind of accident. In case of any accident of labour's/ contractual staffs or any other human being the entire responsibility will rest on the part of the contractor both legally and financially and any compensation under such circumstances, if becomes payable, shall be entirely borne by the contractor.
- 1.23** Any cement slurry added over base surface (or) for continuation of concreting for better bond is deemed to have been included in the contract amount and nothing extra shall be payable for extra cement considered in consumption on this account.

#### **1.24 FACILITIES FOR THE DEPARTMENT**

- (a) **Site Office-** The contractor shall provide 1 No. site office accommodations of approximately 200 sqm area (as per layout plan to be approved by engineer-in-charge) including conference hall as specified by Engineer in charge, including but not limited to following-
- i) The site office accommodation shall be provided with all necessary furniture, fitted with all electrical items like lights, fans, air conditioners, Generator set, all office utilities, good quality projector in conference room etc. and complete wiring, water supply, sewerage and drainage system etc. The office should have Engineered marble flooring in common areas and vitrified tiles in rooms with UPVC windows and hollow metal doors. The toilet fixtures shall be as per specifications mentioned in this document. The agency shall provide necessary air conditioners, lights and fixtures including fan, RO etc.
  - ii) The contractor shall provide the office accommodation within 03 (Three) months from the date of commencement of work failing which the compensation @ **Rs.1,00,000/- per month shall be recovered from the contractor.**
  - iii) The cost of construction, cost of all furniture (of make Godrej/Haworth/Rockworth), fittings/fixtures /electrical fittings etc. and cost of maintenance and the related service charges of the office building is deemed to be included in the quoted rates of work and nothing extra shall be payable. This site office accommodation shall be maintained properly till completion of work and no claim whatsoever shall be entertained on the ground whether the delay in completion of work has been attributable to the Department or to the contractor.
- (b) **Communication and Commuting**
- i) The contractor shall provide one number laptop and one number tablet (as per latest configuration as per direction of Engineer-in Charge like macbook air

models) and numbers all-in-one desktop (window 10) with 4G/5G enabled internet connection. The contractor shall also provide one number color laser printer (A3 Size). These accessories shall be the property of Engineer-in-Charge. The complete cost of these accessories are deemed to be inclusive in the quoted rates of the agency. No additional payment shall be made to the Contractor on this account. The laptop/computer shall be provided with software with MS-project, Primavera, MS office, Auto Cad, STADD etc.

- (c) The contractor shall make arrangement for Helmets and leather shoes (meant of construction work at sites) for all field staff of the department during the entire period of construction for safety reasons. One helmet and two pairs of shoes per staff member (maximum ten members) of the departments per year shall be arranged by the contractor.
- (d) **IP Based CCTV:** The contractor shall provide IP Based CCTV (in sufficient number to capture/monitor whole site) with all requisite software, hardware and accessories. A monitoring room with digital screens shall be made in site office.

## **1.25 NUISANCE PREVENTION AND POLLUTION CONTROL**

The contractor shall take all necessary precautions to prevent any nuisance or inconvenience to the owners, tenants or occupants of the adjacent properties and to the public in general. The contractor shall take all care, as not to damage any other adjacent property or other services running adjacent to the plot. If any damage is done, the same shall be made good by the contractor at his own cost and to the entire satisfaction of the Engineer-in-Charge. The contractor shall use such methodology and equipment's for execution of the work, so as to cause minimum environmental pollution of any kind during construction, to have minimum construction time and minimum inconvenience to road users and to the occupants of the buildings on the site/adjacent plot and public in general, etc. He shall make good at his own cost and to the entire satisfaction of the Engineer in Charge any damage to roads, paths, cross drainage works or public or private property whatsoever caused, due to the execution of the work or by traffic brought thereon, by the contractor. Further, the contractor shall take all precautions to prevent any pollution of streams and waterways. All waste or superfluous materials shall be carted away by the contractor, entirely to the satisfaction of the Engineer-in-Charge.

- 1.26** The site of work has limited availability of space left out for stores, field office, batching plant etc. The contractor may be allowed to erect site office, stores, field office, batching plant within site/plot subject to availability of space and without disturbing the construction area. However, the contractor shall make his own arrangements to provide for additional requirement (in addition to available area at site), as per the rules of the local bodies. Before tendering, he shall visit the site and assess the manner in which he is able to arrange the above facilities. The Engineer-in-Charge shall in no way be responsible for any delay on this account and no claim, whatsoever, on this account shall be entertained.
- 1.27** No payment shall be made for any damage caused by rain, snowfall, flood or any other natural calamity, whatsoever during the execution of the work. The contractor shall be fully responsible for any damage to the govt. property and the work for which payment has been advanced to him under the contract and he shall make good the same at his risk and cost. The contractor shall be fully responsible for safety and security of his material, T&P/Machinery brought to the site by him. Nothing extra shall be payable on this account. Also, no claims for hindrance shall be entertained on this account.

- 1.28** Royalty at the prevalent rates shall be paid by the contractor or by RMC supplier as per the terms of supply between them on all materials such as boulders, metals, sand and bajri etc. collected by him for the execution of the work, directly to the revenue authority of the state government concerned. Nothing extra shall be payable on this account.
- 1.29** The contractor shall keep himself fully informed of all acts/laws of the Central/State/Local Governments, orders of central/state/local government, decrees of statutory bodies, tribunals having any jurisdiction or authority, which in any manner may affect those engaged or employed and anything related to carrying out the work. All the rules & regulations and bye-laws laid down by Collector / Municipal Corporation of area (where site is located) and any other statutory bodies shall be adhered to, by the contractor, during the execution of work. The contractor shall also adhere to all traffic restrictions notified by the national/state/local authorities. The contractor shall abide and ensure compliances to terms and conditions of various approvals obtained for the project. He shall protect and indemnify the department and it's officials & employees against any claim and /or liability arising out of violations of any such laws, ordinances, orders, decrees, by himself or by his employees or his authorized representatives. The contractor shall indemnify the department against all claims in respect of patent rights, royalties, design, trademarks- of name or other protected rights, damages to adjacent buildings, roads or members of public, in course of execution of work or any other reasons whatsoever, and shall himself defend all actions arising from such claims and shall indemnify the department in all respect from such actions, costs and expenses. Nothing extra shall be payable on this account.
- 1.30** The fee payable to statutory authorities for obtaining the various permanent service connections and occupancy certificate for the building shall be borne by the department.
- 1.31** The earth work under this work will be treated as earth work for major works under CPWD Specifications Volume 1, 2019 (as applicable). No extra payment will be made for maintaining water level low enough so as to execute the work and not to cause any harm to work done inclusive of pumping out or bailing out water, if required.

### **1.32 SETTING OUT**

- (i) The contractor shall carry out survey of the work area, setting out the layout and fixing of alignment of the building as per architectural and Structural drawings in consultation with the Engineer-in-Charge and proceed further ensuring full structural continuity and integrated/monolithic construction. Any discrepancy between the architectural drawings and actual layout at site shall be brought to the notice of the Engineer-in-charge. It shall be responsibility of the contractor to ensure correct setting out of alignment/layout using total station instrument. Nothing extra shall be payable on this account.
- (ii) The initial levels shown in the layout plan are indicative and the actual ground levels may vary. Though the site levels are indicated in the drawings the Contractor shall ascertain and confirm the site levels with respect to benchmark from the concerned authorities. No claim due to difference in ground levels as per layout plan and as per actual on ground shall be entertained.
- (iii) The contractor shall establish, maintain and assume responsibility for grades, lines, levels and benchmarks. He shall report any errors or inconsistencies regarding grades, lines, levels, dimensions etc. to the Engineer -in-Charge before commencing work. Commencement of work shall be regarded as the contractor's acceptance of such grades, lines, levels, and dimensions and no claim shall be entertained at a later date for any errors found.



- (iv) If at any time, any error appears due to grades, lines, levels and benchmarks during the progress of the work, the contractor shall, at his own expense rectify such error, if so required, to the satisfaction of the Engineer -in-Charge.
- (v) The contractor shall protect and maintain temporary/ permanent benchmarks at the site of work throughout the execution of work. These benchmarks shall be got checked by the Engineer-in-Charge or his authorized representatives. The work at different stages shall be checked with reference to bench marks maintained for the said purpose.
- (vi) The approval by the Engineer-in-Charge, of the setting out by the contractor, shall not relieve the contractor of any of his responsibilities and obligation to rectify the errors/ defects, if any, which may be found at any stage during the progress of the work or after the completion of the work.
- (vii) The contractor shall be entirely and exclusively responsible for the horizontal, vertical and other alignments, the level and correctness of every part of the work and shall rectify effectively any errors or imperfections therein. Such rectifications shall be carried out by the contractor at his own cost to the entire satisfaction of the Engineer- in-Charge.

**1.33** The contractor shall do proper sequencing of the various activities by suitably staggering the activities within various pockets in the site so as to achieve early completion. The contractor shall deploy adequate equipment, machinery and labour as required for the completion of the entire work within the stipulated period specified. Also, ancillary facilities shall be provided by contractor commensurate with requirement to complete the entire work within the stipulated period. Nothing extra shall be payable on this account. Adequate number/sets of equipment in working condition, along with adequate stand-by arrangements, shall be deployed during entire construction period. It shall be ensured by the contractor that all the equipment/tools & plants, machineries etc. provided by him are maintained in proper working conditions at all times during the progress of the work and till the completion of the work. Further, all the construction tools, plants, equipment and machineries provided by the contractor, on site of work or his workshop for this work, shall be exclusively intended for use in the construction of this work and they shall not be shifted/ removed from site without the permission of the Engineer-in-Charge.

**1.34** The Engineer-in-Charge shall not be responsible for any claims for injuries to person/workmen or for structural damage to property happening from any neglect, default, want of proper care or misconduct on the part of the contractor or of his representatives, during the execution of the work. The compensation, if any, shall be paid directly to the Department / authority / persons concerned, by the contractor at his own cost.

### **1.35 PRESERVATION AND CONSERVATION MEASURES**

- i) Existing drains, pipes, cables, over-head wires, sewer lines, water lines and similar services, if any, encountered in the course of the execution of work shall be protected against the damage by the contractor at his own expense. Even in case of accidental damage, the responsibility of repair / replacement including removal of leaked/spilled water sewage etc. will be on the contractor at his own cost.
- ii) Existing services shall not be diverted permanently until they are interfering directly with the layout. Notwithstanding anything to the contrary contained herein, the contractor shall ensure that the respective entities owning the existing roads, right of way, level crossings, structures, or utilities on, under or above the site are enabled by it

to keep them in continuous satisfactory use, if necessary, by providing suitable temporary diversions with the controlling authority of that road, right of way or utility. All temporary supports and other measures required to protect and maintain the services during construction period as per direction of Employer, shall be deemed to be included in the quoted rate / amount of the contractor and nothing extra shall be paid on this account. In case the same are to be removed and diverted, expenditure incurred in doing so shall be payable to the contractor. The contractor shall work out the cost, get the same approved by Engineer-in-Charge before taking up actual execution. The contractor shall not store materials or otherwise occupy any part of the site in a manner likely to hinder the operation of such services.

- iii) All fossils, coins, articles of value of antiquity, structures and other remains or things of geological or archaeological interest discovered on project location during excavation/construction shall be the property of the Government, and shall be dealt with as per provisions of the relevant legislation. The contractor will take reasonable precaution to prevent his work men or any other persons from removing and damaging any such article or thing. He will, immediately upon discovery thereof and before removal acquaint the Engineer-in-charge of such discovery and carry out the official instructions of Engineer-in- charge for dealing with the same, till then all work shall be carried out in a way so as not to disturb/damage such article or thing.

**1.36** A site laboratory with the minimum equipment's as specified in CPWD specifications/in this tender document shall be established, made functional and maintained within three months from the commencement date or date of start without any extra cost to the department. In case of noncompliance / delay in compliance of this condition, a recovery @ Rs. 5000/- per day will be imposed which will be recovered from the R/A Bill of the Contractor.

### **1.37 CO-OPERATION WITH SPECIALIZED AGENCIES/ SUB-CONTRACTORS**

- i) The contractor shall cooperate with and provide the facilities to the sub-contractors and other agencies working at site for smooth execution of the work. The contractor shall indemnify the department against any claim(s) arising out of such disputes. The contractor shall:
  - a) Allow use of toilets, sheds etc.
  - b) Properly co-ordinate their work with the work of other contractors.
  - c) Provide control lines and benchmarks to his sub-contractors and the other contractors.
  - d) Provide electricity and water at mutually agreed rates.
  - e) Provide hoist and crane facilities for lifting material at mutually agreed rates.
  - f) Co-ordinate with other contractors for leaving inserts, making chases, alignment of services etc. at site.
  - g) Adjust work schedule and site activities in consultation with the Engineer-in- Charge and other contractors to suit the overall schedule completion.
  - h) Resolve the disputes with other contractors/ sub-contractors amicably and the Engineer-in-Charge shall not be made intermediary or arbitrator
- ii) The work should be planned in a systematic manner so as to ensure proper co-ordination of various disciplines e.g. sanitary & water supply, drainage, rainwater harvesting, electrical, firefighting, information technology, communication & electronics and any other services.
- iii) The contractor shall conduct his work, so as not to interfere with or hinder the progress or completion of the work being performed by other contractor(s) or by the Engineer-in-Charge

and shall as far as possibly arrange his work and shall place and dispose of the materials being used or removed so as not to interfere with the operations of another contractor. The contractor shall arrange his work with that of the others, in an acceptable, and in a proper coordinated manner and shall perform it in proper sequence to the complete satisfaction of others

### 1.38 RATES

- i) The rates quoted by the contractor are deemed to be inclusive of site clearance, setting out work, creating profile, establishment of reference bench mark(s), installing various signage, taking spot levels, survey with total station, construction of all safety and protection devices, compulsory use of helmet and safety shoes, and other appropriate safety gadgets by workers, imparting continuous training for all the workers, barriers, preparatory works, working during monsoon or odd season, working beyond normal hours, working at all depths, height, lead, lift, levels and location, implementation of green building norms to achieve desired GRIHA rating etc. and execution of compliance of any other condition mentioned anywhere in the bid document.
- ii) The rates quoted by the tenderer, shall be firm and inclusive of all taxes and levies.
- iii) No foreign exchange shall be made available by the department for importing (purchase) of equipment, plants, machinery, materials of any kind or any other items required to be carried out during execution of the work. No delay and no claim of any kind shall be entertained from the contractor, on account of variation in the foreign exchange rate.
- iv) Ancillary and incidental facilities required for execution of work like labour accommodations, stores, fabrication yard, offices for Contractor, watch and ward, temporary ramp required to be made for working at the basement level (if any), temporary structure for plants and machineries, water storage tanks, installation and consumption charges of temporary electricity, telephone, water etc. required for execution of the work, liaison and pursuing for obtaining various No Objection Certificates, completion certificates from local bodies etc., protection works, testing facilities / laboratory at site of work, facilities for all field tests and for taking samples etc. during execution, shall be deemed to be included in rates quoted by the contractor. Nothing extra shall be payable on these accounts. Before start of the work, the contractor shall submit to the Engineer-in-Charge, a site / construction yard layout, specifying areas for construction, site office, positioning of machinery, material yard, cement and other storage, steel fabrication yard, site laboratory, water tank, etc.
- v) For completing the work in time, the contractor might be required to work in two or more shifts (including night shifts). No claim whatsoever shall be entertained on this account.
- vi) All material shall only be brought at site as per program finalized with the Engineer-in-Charge. Any pre-delivery of the material not required for immediate consumption shall not be accepted and thus not paid for.

### 1.39 SAFETY PRACTICES

- i) **WARNING/ CAUTION BOARDS:** All temporary warning / caution boards / glow signage display such as "Construction Work in Progress", "Keep Away", "No Parking", Diversions & protective Barricades, barricading as required from environmental protection view as per NGT etc. shall be provided and displayed by the Contractor, wherever required. These glow signage and red lights shall be suitably illuminated during



night also. The contractor shall be solely responsible for damage and accident caused, if any, due to negligence on his part. Also, he shall ensure that no hindrance, as far as possible, is caused to general traffic during execution of the work. Nothing extra shall be payable on this account. If the contractor fails to provide the warning /caution boards within 7 days of written direction of Engineer In charge or his authorized representative, **recovery of Rs. 1000/- on per day basis shall be made.**

- ii) **SIGN BOARDS:** The Contractor shall provide and erect a display board of size and shape as required and paint over it, in a legible and workman like manner, the details about the salient features of the project, as required by the Engineer-in-Charge. The contractor shall fabricate and put up a sign board in an approved location and to an approved design indicating name of the project, Client/Owner, Engineer-in-charges, structural consultants, department etc. besides providing space for names of other contractors, sub-contractors and specialized agencies within 15 days from issuance of letter of acceptance. Nothing extra shall be payable on this account. In case of noncompliance/delay in compliance, a **recovery @ Rs. 500/- per day will be imposed which will be recovered from the immediate next R/A Bill of the Contractor.**
- iii) Necessary protective and safety equipment's shall be provided to the site engineer, supervisory staff, labour and technical staff by the contractor at his own cost.
- iv) All signage shall be dismantled and taken away by the contractor after completion of the work with the approval of engineer in charge. No payment shall be made on this account.
- v) No inflammable materials including P.O.L shall be allowed to be stored in huge quantity at site. Only limited quantity of P.O.L may be allowed to be stored at site subject to the compliance of all rules / instructions issued by the relevant authorities and as per the direction of Engineer -in- Charge in this regard. Also, all precautions and safety measures shall be taken by the contractor for safe handling of the P.O.L products stored at site. All consequences on account of unsafe handling of P.O.L shall be borne by the contractor.

#### **1.40 QUALITY ASSURANCE**

- i) The proposed work is a prestigious project and quality of work is of paramount importance. Contractor shall have to engage well-experienced skilled labour and deploy modern T&P and other equipment to execute the work. Many items like exposed finish form work, specialized flooring work, Oxysulphide sealant and backer rod fixing in structural glazing works, factory made door- window shutters, proper slope maintaining in toilet units, sanitary- water supply installation, water proofing treatment will specially require engagement of skilled workers having experience particularly in execution of such items.
- ii) The contractor shall ensure quality construction in a planned and time bound manner. Any sub-standard material/work beyond set out tolerance limit shall be summarily rejected by the engineer-in-charge & contractor shall be bound to replace / remove such sub-standard / defective work immediately. If any material, even though approved by engineer-in-charge is found defective or not conforming to specifications shall be replaced / removed by the contractor at his own risk & cost.
- iii) The contractor/ associated agency shall extend full cooperation to **Third Party Quality Assurance Agencies** engaged by the department for the project during their field visits.
- iv) In addition to the supervision of work by engineer- in-charge or his representatives, the consultants deployed by the department shall also be carrying out regular and periodic

inspection of the ongoing activities in the work and deficiencies, shortcomings, inferior workmanship pointed out by them shall be communicated by Engineer- in-charge or his representatives to the contractor. Upon receipt of instructions from engineer in charge, the work so pointed out shall be made good by necessary improvement, rectification, replacement upto his complete satisfaction. Special attention shall be paid towards line and level of internal and external plastering, exposed smooth surface of RCC members by providing fresh shuttering plates, rubberized linings to all the shuttering joints, accurate joinery work in wooden doors and windows, thinnest joints in stone/ tiling / cladding work, non-hollowness in floor and dado tiles work, protection from scratches over flooring by impounding layer of plaster of paris, water tight pipe linings, absence of hollow vertical joints in brick masonry, proper compaction of filled up earth etc. to achieve an facility of international standards.

- v) The contractor shall submit immediately after the issuance of letter of acceptance within 20 days, Minimum Quality Assurance Plan (a detailed and complete method statement for the execution, testing and quality assurance plan/procedures for basic materials and such items, to be followed during the execution of the work), for approval of the Engineer-in-Charge. All the materials to be used in the work, to give the finished work complete in all respects, shall comply with the requirements of the specifications and shall pass all the tests required as per specifications as applicable or such specifications / standards as directed by the Engineer-in-Charge. Further, **a recovery of Rs. 1000/- shall be made on per day basis in case of delay in submission of the Minimum Quality Assurance Plan.**
- vi) All materials and fittings brought by the contractor to the site for use shall conform to the samples approved by the engineer-in-charge which shall be preserved till the completion of the work. If a particular brand of material is specified in the particular specification, the same shall be used after getting the same approved from Engineer-In-Charge. Wherever brand / quality of materials are not specified in the particular specifications; the contractor shall submit the sample as per list of preferred make given in tender documents. For all other items, materials and fittings of ISI Marked shall be used with the approval of Engineer-in-Charge. Wherever ISI Marked material / fittings are not available, the contractor shall submit samples of materials / fittings manufactured by firms of repute conforming to relevant specifications or IS codes and use the same only after getting the approval of Engineer-In-Charge.
- vii) The contractor shall procure and provide all the materials from the manufacturers / suppliers as per the item description/particular specifications for the work. The equivalent brand other than brand / make mentioned in particular specification for any item, shall be permitted to be used in the work, only when the specified make is not available subject to documentary evidence produced by the contractor for non-availability of the brand specified and also subject to independent verification by the Engineer-in-Charge. In exceptional cases, where such approval is required, the decision of Engineer-in-Charge as regards to the equivalent make of the material shall be final and binding on the contractor. the material shall be procured only after written approval of the Engineer-in-Charge. No claim, whatsoever, of any kind shall be entertained from the contractor on this account. Nothing extra shall be payable on this account.
- viii) All materials whether obtained from government stores or otherwise shall be got checked by the Engineer-in-Charge or his authorized supervisory staff on receipt of the same at site before use.
- ix) The tests, as necessary, shall be conducted in the laboratory approved by the Engineer-in-Charge. The samples shall be taken for carrying out all or any of the tests stipulated in

the particular specifications, minimum quality assurance plan, and as directed by the Engineer-in-Charge or his authorized representative.

- x) All the registers of tests (carried out at construction site or in outside laboratories) and all material at site (MAS) registers including cement register shall be maintained by the contractor which shall be issued to the contractor by Engineer-in-charge. All the entries in the registers will be made by the designated engineering staff of the contractor and same should be regularly reviewed by JE/AE/AEE/EE. Contractor shall be responsible for safe custody of all the registers.
- xi) The contractor shall at his own risk and cost make all arrangements and shall provide all such facilities including material and labour, the Engineer-in-Charge may require for collecting, preparing, forwarding the required number of samples for testing as per the frequency of test stipulated in the contract specifications or as considered necessary by the Engineer-in-Charge, at such time and to such places, as directed by the Engineer-in-Charge. Nothing extra shall be payable for the above.
- xii) The contractor or his authorized representative shall associate in collection, preparation, forwarding and testing of such samples. In case he or his authorized representative is not present or does not associate him, the result of such tests and consequences thereon shall be binding on the contractor. The contractor or his authorized representative shall remain in contact with the Engineer-in-Charge or his authorized representative associated for all such operations.
- xiii) Unless specified otherwise, all the testing charges shall be borne by contractor.
- xiv) All the hidden items such as water supply lines, drainage pipes, electrical conduits, sewers etc. are to be properly tested as per the design conditions before covering.
- xv) Water tanks, taps, sanitary, water supply and drainage pipes, fittings and accessories should conform to byelaws and municipal body / corporation where CPWD specifications are not available. The contractor should engage licensed plumbers for the work and get the materials (fixtures/fittings) tested by the Municipal Body/Corporation authorities wherever required at his own cost.
- xvi) The contractor shall give performance test of the entire installation(s) as per the standing specifications before the work is finally accepted.
- xvii) The contractor shall give ten years guarantee in the prescribed proforma for water proofing items specified in the schedule of quantities. The ten years to be reckoned from the date after the defect liability period prescribed in the contract. In addition to this 10% of the executed cost of items shall be retained either in fixed deposit or in the form of bank guarantee, which shall be released as per existing Rules and as per the provision of CPWD Works Manual 2024 with amendment /modifications upto last date of submission of tender, if no defects are found in water proofing or the defects are made good. This amount shall be adjusted against the expenses incurred on making good the defects if the contractor commits breach of guarantee.
- xviii) The contractor shall arrange electricity at his own cost for testing of the various electrical installations as directed by Engineer-in-Charge and for the consumption by the contractor for executing the work. Also, all the water required for testing various electrical installations, fire pumps, wet riser / firefighting equipment's, fire sprinklers etc. and also testing water supply, sanitary and drainage lines, water proofing of underground sump, overhead tanks, water proofing treatment etc. shall be arranged by the contractor at his

own cost.

- xix) The contractor shall make available, on request from the department, the copies of challan, cash memos, receipts and other certificates, if any, vouchers towards the quantity and quality of various materials procured for the work. The contractor shall also provide information and necessary documentation on the name of the manufacturer, manufacturer's product identification, manufacturer's instructions, warning, date of manufacturing and test certificates (from manufacturers for the product for each consignment delivered at site), shelf life, if any etc., for the department to ensure that the material have been procured from the approved source and is of the approved quality, as directed by the Engineer-in-Charge. Wherever specified, day-to-day account of receipt of such material shall be maintained at site of work.
- xx) If the Contractor does not provide adequate supporting staff or labour or both for carrying out field tests or collecting and forwarding samples to outside laboratory or for maintaining test records, Engineer in charge may carry out field tests or collect and forward sample to outside laboratory or appoint any person to maintain the registers at risk and cost of contractor. The charges so incurred shall be entirely borne by contractor and shall be deducted from running or final bill of contractor. Further, **recovery of Rs. 2000/- for each default shall be levied to contractor.**
- xxi) In case there is any discrepancy in frequency of testing as given in list of mandatory tests and that in individual sub-heads of work as per CPWD Specifications, higher of the two frequencies of testing shall be followed and nothing extra shall be payable on this account.

#### **1.41 SUBMISSION AND DOCUMENTATION**

The contractor shall render all help and assistance in documenting the total sequences of this project by way of photography, slides, audio / video recording etc. The original films shall be the property of the department. No copy shall be prepared without the prior approval of the Engineer- in – Charge.

- i) The contractor shall display all permissions, licenses, registration certificates, bar charts, other statements etc under various labour laws and other regulations applicable to the works, at his site office. He should also keep at site at least one set of BIS Codes and other relevant codes and produce the same if asked for by engineer-in-charge. In case of noncompliance, these codes will be purchased from the Market and actual cost of purchase will be recovered from the next RA Bill of the contractor.
- ii) The contractor shall make available five (05) sets of “AS BUILT” architectural, structural, all services (internal & external) drawings (including soft copy of the same), along with literatures, maintenance manuals, warranty certificates etc. of various installed fittings, fixtures and equipment for the completed projects. This shall be the prerequisite for payment of final bill.
- iii) The contractor shall make available four (04) sets of computerized Standard Measurement Books (SMBs) having measurement of all the permanent standing.
- iv) The performance guarantee shall not be released to the contractor until the aforesaid drawings are submitted to the Engineer-in-Charge.
- v) The contractor shall comply the conditions of various NOC, clearance obtained for the project and submit the necessary document mentioned in these statutory NOC /

Clearance.

#### **1.42 PROGRAM /SCHEDULE**

The contractor shall prepare an integrated program chart including civil, electrical & mechanical, horticulture, landscaping activities for the execution of work, showing clearly all activities from the start of work to completion, with details of manpower, equipment and machinery required for the completion of the work within the stipulated period and submit the same for approval of the Engineer-In-Charge within fifteen days of the issuance of letter of acceptance. The integrated program chart so submitted should not have any discrepancy with the physical/financial milestones specified in this tender documents. The program chart should include the following: -

- i) Descriptive note explaining sequence of various activities.
- ii) Construction program prepared on PRIMAVERA/ M.S. Project etc. Software, which will indicate resources in terms of materials, manpower and specialized equipment for every important stage.
- iii) Program for procurement of materials by the contractor.
- iv) Program for arranging and deployment of manpower both skilled and unskilled so as to achieve targeted progress.
- v) Program of procurement of machinery/equipment having adequate capacity, commensurate with the quantum of work to be done within the stipulated period, by the contractor.
- vi) In case of noncompliance/delay in compliance, a recovery @ Rs. 5000/- per week or part thereof will be imposed which will be recovered from the R/A Bill of the contractor.
- vii) If at any time, it appears to the Engineer-In-Charge that the actual progress of work does not conform to the approved program referred above, the contractor shall produce a revised program showing the modifications to the approved program by additional inputs to ensure completion of the work within the stipulated time.
- viii) The submission for approval by the Engineer-In-Charge of such program or the furnishing of such particulars shall not relieve the contractor of any of his duties or responsibilities under the contract. This is without prejudice to the right of Engineer-In-Charge to take action against the contractor as per terms and conditions of the contract.

#### **1.43 SUBMISSION OF PROGRESS REPORT:**

Apart from the above integrated program chart, the contractor shall be required to submit fortnightly progress report of the work in a computerized form on 5th and 20th of every month. The progress report shall contain the following -

- a) Construction schedule of the various components of the work through a bar chart for the next two fortnights (or as may be specified), showing the micro-milestone/milestones, targeted tasks (including material and labour requirement) and up to date progress. At least 10 digital photographs showing all the parts of construction



site along with at least 5 minutes video of executions of different items in soft copy has to be submitted in every fortnightly progress report.

- b) Comparative progress chart of the various components of the work that were planned and achieved, for the fortnight, with reason for deviations, if any in a tabular format.
- c) Plant and machinery statement, indicating those deployed in the work.
- d) Man-power statement indicating:
  - Individually the names of all the staff deployed on the work, along with their designations.
  - No. of skilled workers (trade wise) and total no. of unskilled workers deployed on the work and their location of deployment within site.
- e) Financial statement, indicating the broad details of all the running account payment received up to date, such as gross value of work done, advances taken, recoveries effected, amount withheld, net payments details of cheque payment received, extra/substituted/deviation items if any, etc.
- f) In case of noncompliance / delay in compliance in submission of fortnightly progress report, a recovery @ Rs. 2000/- per report will be imposed which will be recovered from the R/A Bill of the Contractor.

#### **1.44 TEMPORARY WATER/ ELECTRICITY/ TELEPHONE CONNECTION**

- i) Arrangement of temporary connection for telephone, water and electricity etc. by him, shall be made by the contractor at his own cost and also necessary permissions shall be obtained by him directly from concerned authorities, under intimation to the department. Also, all initial cost, running charges, and security deposit, if any, in this regard shall be borne by him. The contractor shall abide by all the rules/ bye laws applicable in this regard and he shall be solely responsible for any penalty on account of violation of any of the rules / byelaws in this regard. The contractor may bring water from outside through tankers from authorized sources.
- ii) The contractor shall be responsible for maintenance and watch and ward of the complete installation and water / electricity meter. The contractor shall also be responsible for any pilferage, theft, damage, penalty etc. in this regard. The contractor shall indemnify the department against any claim arising out of pilferage, theft, damage, penalty etc. whatsoever on this account. Security deposit for the work shall be released only after No Dues Certificates are obtained from the local Authorities from whom temporary electric/ water / telephone connection have been obtained by the contractor.
- iii) The department shall in no way be responsible for either any delay in getting electric and/or water and/or telephone connections for carrying out the work or not getting connections at all. Also, contingency arrangement of stand-by water & electric supply shall be made by the contractor for commencement and smooth progress of the work so that work does not suffer on account of power failure or disconnection or not getting connection at all. No claim of delay of any kind whatsoever shall be entertained on this account from the contractor.

#### **1.45 CLEANLINESS OF SITE**

- i. The contractor shall not stack building material / malba / muck on the land or road of the local development authority or on the land owned by the others, as the case may be. So, the muck, rubbish etc. shall be removed periodically, from the site of work to the approved dumping grounds as per the local byelaws and regulations of the concerned authorities and all necessary permissions in this regard from the local bodies shall be obtained by the contractor. In case, the contractor is found stacking the building material / malba as stated above, the contractor shall be liable to pay the stacking charges / penalty as may be levied by the local body or any other authority and also to face penal action as per the rules, regulations and bye-laws of such body or authority. The engineer-in-charge shall be at liberty to recover, such sums due but not paid to the concerned authorities on the above counts, from any sums due to the contractor including amount of the security deposit and performance guarantee in respect of this contract.
- ii. The contractor shall take instructions from the engineer-in-charge regarding collection and stacking of materials at any place within the site. No excavated earth or building rubbish shall be stacked on areas where other buildings, roads, services or any development works are to be constructed/carried out.
- iii. The site of work shall always be kept clean due to constraints of space and to avoid any nuisance to the users of buildings in the adjacent plots. The contractor shall take all care to prevent any water- logging at site. The wastewater, slush etc. shall not be allowed to be collected at site. For discharge into public drainage system, necessary permission shall be obtained by the contractor from relevant authorities after paying the necessary charges, if any, directly to the authorities. The work shall be carried out in such a way that the area is kept clean and tidy. All the fees/charges in this regard shall be borne by the contractor.
- iv. It is the responsibility of contractor to keep building neat and clean. The contractor shall spray the chemicals fumigate site area to check the mosquitoes at frequent interval or as directed by the engineer in charge. The contractor shall also make lighting and temporary ventilation arrangement in basement. The contractor shall provide submersible pumps with automatic on/off system in each sump in basement to bail out the water accumulated. The contractor shall quote rates after considering the above sated conditions and nothing extra shall be paid on this account.
- v. The contractor shall not wash the drum of TM (transit mixture) at site and shall avoid the spread of leachate / cement slurry at the site of work and all care shall be taken to keep the site neat and clean at his own cost.

#### **1.46 INSPECTION OF WORK**

- (i) In addition to the provisions of relevant clauses of the contract, the work shall also be open to inspection by senior officers of department & the representative of the consultants. The contractor shall at times during the usual working hours and at all times at which reasonable notices of the intention of the Engineer-in-charge or other officers as stated above to visit the works shall have been given to the contractor, either himself be present to receive the orders and instructions or have a responsible representative duly accredited in writing, to be present for that purpose.
  - a) The consultant and third-party quality assurance agency appointed by department shall be inspecting the works including workshops and fabrication factory to ensure that the works are in general being executed according to the design, drawings and specifications laid down in the contract. Their observations shall be communicated by department to contractor and compliance shall be reported to department by the

contractor.

- b) Senior officers of department, dignitaries from central ministry / department, shall be inspecting the on-going work at site at any time with or without prior intimation. The contractor shall, therefore, keep updated the following requirements and detailing.
  - i) Display board showing detail of work, weekly progress achieved with respect to targets, reason of shortfall, status of manpower, wages being paid for different categories of workers.
  - ii) Keep entrance and surrounding area clean.
  - iii) Display layout plan, key plan, building drawings including plans, elevations and sections.
  - iv) Upto date displays of progress of work in form of Bar chart, CPM and PERT etc.
  - v) Keep details of quantities executed, balance quantities to be executed, deviations, possible Extra item, etc.
  - vi) Keep plastic / cloth mounted one sets of building drawings.
  - vii) Set of helmets and safety shoes for exclusive use for officers/dignitaries visiting at site.

#### **1.47 PRODUCT DELIVERY, STORAGE AND HANDLING OF CHEMICALS**

- (i) The contractor shall construct storage space for chemicals to ensure that the storage conditions are as recommended by the manufactures.
- (ii) All the chemical shall be procured and delivered in sealed containers with labels legible and intact.
- (iii) All the chemicals (polymers, epoxy, water proofing compound, plasticizer, Polysulphide, SBR based elastomeric, all exterior and interior paints, polish etc.) shall be procured in convenient packings (say 20 litres/Kgs.) with packing capacity as approved by the Engineer-in-Charge, and not in bigger capacity containers, say 200 litre (Kgs.) drums unless otherwise specifically permitted by the Engineer-in-Charge. One sample from each lot of the chemicals procured by the contractor shall be tested in a laboratory approved by the Engineer-in-charge.
- (iv) All chemicals required for the execution of the work shall be got approved, procured and deposited with the departmental supervisory staff. The chemicals shall be kept in joint custody of the contractor and the department. The watch and ward of such material shall, however, remain to be the responsibility of the contractor and no claim, whatsoever, on this account shall be entertained. Different containers of each chemical shall be serially numbered on packing and also consumed in that order. Day-to-Day account of receipt, issue and balance shall be regulated by the department and proper account shall be maintained at site of work in the prescribed form as per the standard practice.
- (v) All the chemicals shall be procured by the contractor directly from the manufacturer. In exceptional circumstances, the contractor may be allowed to procure the materials from the authorized dealers of the manufacturers, if specifically permitted by the Engineer-in-Charge.



- (vi) The original copies of challan/cash memos towards the quantity of various chemicals procured shall be made available by the contractor to Engineer-in- Charge and a copy of the same shall be kept in record.
- (vii) The name of manufacturers, manufacturer's product identification, manufacturer's mixing instructions, warning for handling and toxicity and date of manufacturing and shelf life shall be clearly and legibly mentioned on the labels of each container.
- (viii) The contractor shall submit for the chemicals procured, manufacturer's and / or authorized dealer's certificate regarding supplying and verifying conformance to the material specifications, as specified.
- (ix) All filled containers shall be handled in safe manner and in a way to avoid breaking container seals.
- (x) Empty containers of the chemicals should not be removed from site till the completion of work and shall be removed only with the written approval of the Engineer-in-Charge.
- (xi) All arrangements for measuring, dosing and mixing of material / chemicals at site have to be made by the contractor.
- (xii) Contractor shall suitably advise his site engineer and all the workers as regards safe handling of chemicals. Necessary protective and safety equipment's in form of hand gloves, goggles etc. shall be provided by the contractor and be also used at site.
- (xiii) The chemicals shall be tested at the frequency as specified in an independent laboratory as approved by the Engineer-in-charge. If required, more samples may have to be tested as per the directions of the Engineer-in-Charge. Nothing extra shall be payable on this account.

#### **1.48 DE-WATERING**

- i. De-watering required, if any, shall be done conforming to BIS Code IS: 9759 (guide lines for de-watering during construction) and / or as per the specifications approved by the Engineer-in-Charge. Design of an appropriate and suitable dewatering system shall be the contractor's responsibility. Such scheme shall be modified / augmented as the work proceeds based on fresh information discovered during the progress of work. At all times during the construction work, efficient drainage of the site shall be carried out by the contractor and especially during the laying of plain cement concrete, taking levels etc. The contractor shall also ensure that there is no danger to the nearby properties and installations on account of such lowering of water table. If needed, suitable precautionary measures shall be taken by the contractor. Also, the scheme of dewatering adopted shall have adequate built-in arrangement to serve as stand-by to attend to repair of pumps etc. and disruption of power / fuel supply. Nothing extra shall be payable on this account.
- ii. In trenches where surface water is likely to get into cut / trench during monsoons, a ring bund of puddle clay or by any other means shall be formed outside, to the required height, and maintained by the contractor. Also, suitable steps shall be taken by the contractor to prevent back flow of pumped water into the trench. Nothing extra shall be payable on this account.
- iii. The contractor shall be responsible for taking necessary approval from the concerned authority for the discharge of the water. Nothing extra shall be payable on this account.

## **1.49 INSURANCE POLICIES**

Before commencing the execution of work, the contractor shall, without in any way limiting his obligations and liabilities, insure at his own cost and expense against any damage or loss or injury, which may be caused to any person or property, at site of work. The contractor shall obtain and submit to the Engineer-in-Charge proper Contractor All Risk Insurance Policy for an amount 1.25 times the contract amount for this work, with Engineer-in-Charge as the first beneficiary. The insurance shall be obtained in joint names of Engineer-in-Charge and the contractor (who shall be second beneficiary). Also, he shall indemnify the department from any liability during the execution of the work. Further, he shall obtain and submit to the Engineer-in-Charge, a third-party insurance policy for maximum Rs.10 lakh for each accident, with the Engineer-in-Charge as the first beneficiary. The insurance shall be obtained in joint names of Engineer-in-Charge and the contractor (who shall be second beneficiary). The contractor shall, from time to time, provide documentary evidence as regards payment of premium for all the insurance policies for keeping them valid till the completion of the work. The contractor shall ensure that insurance policies are also taken for the workers of his sub-contractors / specialized agencies also. Without prejudice to any of its obligations and responsibilities specified above, the contractor shall within 10 days from the date of letter of acceptance of the tender and thereafter at the end of each quarter submit a report to the department giving details of the insurance policies along with certificate of these insurance policies being valid, along with documentary evidences as required by the Engineer-in-Charge. No work shall be commenced by the contractor unless he obtains the insurance policies as mentioned above. Also, no payment shall be made to the contractor on expiry of insurance policies unless renewed by the contractor. Nothing extra shall be payable on this account. No claim of hindrance (or any other claim) shall be entertained from the contractor on these accounts.

## **1.50 PRESERVE AND PROTECT LANDSCAPE DURING CONSTRUCTION**

- i) The contractor shall ensure that no trees, existing or otherwise, shall be harmed and damage to roots should be prevented during trenching, placing backfill, driving or parking heavy equipment, dumping of trash, oil, paint, and other materials detrimental to plant health. These activities should be restricted to the areas outside of the canopy of the tree, or, from a safe distance from the tree/plant by means of barricading. Trees will not be used for support; their trunks shall not be damaged by cutting and carving or by nailing posters, advertisements or other material. Lighting of fires or carrying out heat or gas emitting construction activity within the ground, covered by canopy of the tree is not to be permitted.
- ii) The contractor shall take steps to protect trees or saplings identified for preservation within the construction site using tree guards of approved specification.
- iii) Contractor should limit all construction activity within the specified area as per the Construction Management Plan (CMP) approved by Engineer in Charge.
- iv) The contractor shall avoid cut and fill in the root zones, through delineating and fencing the drip line (the spread limit of a canopy projected on the ground) of all the trees or group of trees. Separate the zones of movement of heavy equipment, parking, or excessive foot traffic from the fenced plant protection zones.
- v) The contractor shall ensure that maintenance activities during construction period shall be performed as needed to ensure that the vegetation remains healthy.

## 1.51 PREPARATION OF SAMPLE (MOCK UP)

The contractor shall prepare one sample/Mock-Up for typical units (e.g. Room, office cabin, Lobby, Corridor of minimum 10m length, complete male, female, Handicap toilet unit etc.). Samples of representative units shall be prepared by the contractor well in advance before taking up the mass execution at the appropriate time as per mile stones. The contractor shall invariably prepare the samples units with finishing items i.e. flooring of different types, external & internal finishing i/c colour scheme of paint, tiles in dado, flooring in platforms & staircase, water supply & sanitary fittings and any other item as per direction of Engineer-in-charge. The contractor shall proceed with further finishing works only after getting the samples of these items approved in writing from Engineer-in-charge.

## 1.52 SPECIALIZED AGENCIES

The contractor shall engage specialized agency for carrying out specialized item such as:

- i) Structural Glazing,
- ii) Expansion Joint Works,
- iii) Waterproofing work,
- iv) Water supply & Plumbing work,
- v) Fire check Doors,
- vi) Anti-termite treatment, etc.

Before engaging such agency, the contractor shall submit the name of the agency along with their working experience, presentation on method statement and materials being used for execution of such items etc. to Engineer-in-charge for approval. Contractor shall submit the proposal (along with work experience certificate issued by competent authority) of only those specialized agencies who have work experience of satisfactorily completion of similar works as per following criteria during last seven years –

Three works each costing not less than 40% of estimated cost for concerned similar work

Or

Two works each costing not less than 60% of estimated cost for concerned similar work

Or

One work costing not less than 80% of estimated cost for concerned similar work item.

- vii) Estimated cost of the specialized item/work for various items/schemes shall be as per schedule of quantity or as determined by engineer-in-charge. Unless specified otherwise, the contractor shall be fully responsible for and shall guarantee proper design and performance of specialized works for a period of 10 years from the date of completion of work. All the guarantees shall be submitted before final payment and shall not in any way limit any other rights to correct which the employer may have under the contract. **In addition, an amount of 10 % of work done of specialized work, shall be retained in interim/final payment till it reaches the 10 % of estimated cost of such specialized items/works. This amount shall be withheld towards guarantee and shall be in addition to the other amounts to be withheld as mentioned elsewhere in the contract.** However, this amount (withheld) would be released after guarantee period if the performance, as required, is found satisfactory. If any defects are noticed during the guarantee period, it shall be rectified by the contractor within seven days of issuance of notice to the contractor, temporarily, to the satisfaction of the department or any other authorized representative of department and permanent rectification of the defects/replacement of defective should be carried out by the contractor within a period

of one month after issuance of notice to the contractor. If not attended to, the same shall be got done through other agency at the risk and cost of the contractor and the cost, which shall be final and binding on the contractor, shall be recovered from the amount withheld towards the guarantee as mentioned above or from any other amount due to the contractor. However, the amount withheld as guarantee can be released in full on submission of irrevocable bank guarantee, from a Schedule/Nationalized Banks, of the same amount, for the guarantee period by the contractor. The defects, if any, shall be rectified in a workmanlike manner, retaining the same aesthetics and other functional parameters of the original work.

- viii) The contractor shall submit the credential of specialized agency well in advance as per the direction of Engineer-in-charge. After verification of the same, written approval will be conveyed to main contractor in this regard. The contractor shall not change the specialized agency. However, if the change is warranted, he may do so, with permission of Engineer-in-charge. However, before making any such change, he has to enter into similar agreement as with previous agency & submit the same to Engineer-in-Charge for approval. This shall however be without any change in the accepted rates of the contract and without any cost implications to the Department. If the contractor proposes name of specialized agencies from list of preferred makes, there is no need to comply eligibility criteria mentioned in para (i) above. Also, if the specialized work is carried out by the authorized fabricator/ applicator of the manufacturers then there is no need to comply eligibility criteria mentioned in para (i) above.
- ix) The main contractor cannot work as a specialized agency unless his name is approved as specialized agency by Engineer-in-charge in accordance with criteria mentioned at sr. No. (i) above.
- x) Proposal of the specialized agencies for each specialized work shall be obtained from the Engineer-in-Charge within three months of issuance of letter of acceptance even if, such specialized items of work shall be executed by the specialized agencies at later date. The work shall be deemed to be executed by the tenderer for all purposes and the responsibility of the quality of items of works executed etc. shall continue to be that of the tenderer only. It is expressly agreed that the contractor shall, at all times, be responsible and liable for all its obligations under this contract notwithstanding anything contained in the contracts with its sub-contractors or any other contract that may be entered into by the contractor, and no default under any such contract shall excuse the contractor from its obligations or liability hereunder.
- xi) It shall be the responsibility of contractor to sort out any dispute / litigation with the specialized agencies without any time & cost overrun to the department. The contractor shall be solely responsible for settling any dispute / litigation arising out of his agreement with the specialized agencies. The contractor shall ensure that the work shall not suffer on account of litigation/ dispute between him and the specialized agencies / sub-contractor(s). No claim of hindrance in the work shall be entertained from the contractor on this account. No extension of time shall be granted and no claim whatsoever, of any kind, shall be entertained from the contractor on account of delay attributable to the selection/rejection of the specialized agencies or any dispute amongst them.

### **1.53 STRUCTURAL SAFETY**

Following guidelines shall be followed where height of casting of concrete is higher than 3.5 m or where higher loading are coming during casting of concrete or span is more than 5 meter long or special structure like domes, vaults, steel structure etc. are to be constructed:

- i) Centering/scaffolding/staging for casting of these structures should be properly designed by a qualified and experienced person/agency having past experience in design of false work (centering) for concrete structures and should be proof checked by similar experienced person/agency and it should be approved by Engineer-in-Charge. The provisions of relevant Indian standard (IS: 14687) may be referred for design of false work (centering).
- ii) A method statement for erection and dismantling of the centering/scaffolding/staging and process of concreting & process of anchor of steel structure shall be prepared by contractor and submitted to Engineer-in-Charge for approval and the work shall be commenced only after approval of method statement by Engineer-in-Charge. The provisions of relevant Indian standard (IS: 14687) may be referred for erection of false work (centering), safety precautions and other site operations, pertaining to false work (centering).
- iii) Engineering form watcher shall be engaged during erection, concreting and dismantling for early detection of any movement or instability in the system.
- iv) A detailed programme of field safety inspection of centering, scaffolding, form work of such structures during different stages should be chalked out and strictly followed.
- v) The prime responsibility of safety of false work shall be with contractor.
- vi) Provision of safety net, fall arresting system including other safety gears, for workers, working over these structures shall be used strictly.

#### **1.54 OTHER CONDITIONS W.R.T EXECUTION OF WORK**

- i) The work shall be carried out in accordance with the contract specification/terms, tendered drawings and detailed drawings including revised drawings, if any, issued during execution of work by the Engineer-in-Charge.
- ii) Before commencement of any item of work, the contractor shall correlate all the relevant architectural, structural and MEP drawings, and specifications etc. issued for the work and satisfy himself that the information available therefrom is complete and unambiguous. The figure and written dimension of the drawings shall be superseding the measurement by scale. The discrepancy, if any, shall be brought to the notice of the Engineer-in-charge before execution of the work. The contractor alone shall be responsible for any loss or damage occurring by the commencement and execution of work based on any erroneous and or incomplete information and no claim whatsoever shall be entertained on this account.
- iii) The contractor is required to deploy resources as per availability of site and as per approved programme chart of the work. However, no claims shall be entertained for idle labour, idle machinery, idle technical/no-technical staff, idle T&P etc.
- iv) The work of services may be executed simultaneously. The contractor shall minimize the scope of making recesses, holes, opening etc. as the same shall be planned in advance and necessary grooves/niches shall be provided in shuttering of RCC.
- v) Ready mix plaster shall be executed using pneumatic spray machine of reputed make.

- vi) Laminates on flush doors shall be machine pressed, preferably in factory. The design and pattern of laminates shall be as approved by engineer in charge.
- vii) The aluminium door-windows-framework, lamination and lipping on flush doors shall be factory made.
- viii) Unless otherwise specified, wherever mild steel / galvanized iron sections and pipes are provided in the work, priming coat of approved steel primer shall be done after removing rust from section if any and finally finished with low VOC synthetic enamel paint or as mentioned in specification.
- ix) Unless otherwise specified, monkey ladder shall be provided for overhead water tanks, mummy and lift machine room doors with frame and steps of 40x40x6 mm angle iron, etc.
- x) Wall mounted door stoppers shall be provided to protect the wall where the door handle would run into it.
- xi) For avoiding of scratch marks or damage to the vitrified / ceramic floor tile, the necessary arrangement of hessian cloth with a coat of plaster of paris over it shall be provided.
- xii) Fall nets and scaffolding nets for protection from debris / dusts and noise etc. are to be provided during the construction period.
- xiii) Wherever M.S. grill provided in window, weight of grill in each window should not be less than 12 kg/sqm.
- xiv) Wherever utility ducts, drains etc. are required, the same shall be provided with precast concrete units made of M-30 grade concrete and reinforcement steel of grade of Fe-500D.
- xv) Wherever the doors are required to be fixed to AAC block masonry, the frame shall be fixed in RCC band or concrete block masonry.
- xvi) No sunken floor slab except floor depression for maintaining slopes. However, camouflaging of water supply and sanitary line of upper floor to be done by false ceiling.

**1.55** It is intended to make our built environment barrier free and accessible to all. Bidders are instructed to strictly adhere to the provision contained in Hand Book on Barrier free and accessibility containing and corresponding provisions of NBC 2016 while incorporating such - features in the building.

**1.56** In case of reduction in scope of work, no claim on account of reduction in value of work, loss of expected profit, consequential overheads etc. shall be entertained.

**1.57** Jurisdiction of the court shall be **Delhi**.

## **2.0 SPECIAL CONDITIONS FOR GREEN BUILDING**

The building shall confirm to minimum 4-Star rating as per GRIHA. norms. The contractor shall follow the all guidelines to achieve minimum 4-star GRIHA rating. The contractor shall be fully responsible for maintaining the desired records / documentation which shall be required for achieving minimum 4-star GRIHA rating. The copies of these records /documentation shall be provided to the appointed GRIHA consultant, GRIHA council and Engineer in charge. The contractor shall provide full cooperation to appointed GRIHA



consultant, GRIHA council and Engineer in charge. The contractor shall attend all the site visits / meetings conducted by the appointed GRIHA consultant, GRIHA council and Engineer in charge time to time and shall provide the necessary compliances accordingly at site for this purpose.

## **2.1 Construction Stage-**

- i) All vehicles, equipment and machinery to be procured for construction shall conform to the relevant Bureau of India Standard (BIS) norms.
- ii) Emission from the vehicles must conform to environmental norms.
- iii) Dust produced from the vehicular movement and other site activities shall be mitigated by sprinkling of water.

### **a) Construction Wastes Disposal**

- i) The pre-identified dump locations will be a part of solid waste management plan to be prepared by the Contractor in consultation with Engineer -in-charge.
- ii) Contractor shall get approved the location of disposal site prior to commencement of the excavation on any section of the project location.
- iii) Contractor shall ensure that any spoils of material will not be disposed off in any municipality solid waste collection bins.

## **2.2 Procurement of Construction Materials**

- i) All vehicles delivering construction materials to the site shall be covered to avoid spillage of materials and maintain cleanliness of the roads.
- ii) Wheel Tyres of all vehicles used by the contractor, or any of his sub-contractor shall be cleaned and washed clear of all dust/mud before leaving the project premises. This shall be done by routing the vehicles through tyre washing tracks.
- iii) Contractor shall arrange for regular water sprinkling at least twice a day (i.e., morning and evening) for dust suppression of the construction site and unpaved roads used by his construction vehicles.

## **2.3 Water Pollution**

- i) The contractor shall take all precautionary measures to prevent accumulation of the wastewater during construction.
- ii) The wastewater arising from the project shall be disposed off in the manner that is acceptable to the Engineer -in-charge.

## **2.4 Air and Noise Pollution**

- i) Contractor shall use dust screens and sprinkle water around the construction site to arrest spreading of dust in the air and surrounding areas.
- ii) Contractor shall ensure that all vehicles, equipment and machinery used for construction are regularly maintained and shall confirm that emission levels comply with environmental emission standards/norms.

- iii) All vehicles and equipment used in construction may be fitted with exhaust silencers.
- iv) Servicing of all construction vehicles and machinery shall be done regularly and during routine servicing operations, the effectiveness of exhaust silencers may be checked and be replaced if, found defective.
- v) Noise emission from compactors (rollers) front loaders, concrete mixers, cranes (movable), vibrators and saws should be less than 75 dB(A).

## **2.5 Personal Safety, Hygiene Measures for Labour**

- i) Contractor may provide the following items for safety of workers employed by contractor and associate agencies:
  - a) Protective footwear and gloves to all workers employed for the work on mixing, cement, lime mortars, concrete etc. and works of water pipeline/sewer line.
  - b) Welder's protective eye-shields to workers who are engaged in welding works.
  - c) Safety helmet and Safety harness/ belt.
  - d) Provide adequate sanitation/safety facilities for construction workers to ensure the health and safety of the workers during construction, with effective provisions for the basic facilities such as sanitation, drinking water and safety equipment's or machinery.
- ii) All the workers should be wearing helmet and shoes all the time on site.
- iii) Masks and gloves should be worn whenever and wherever required.
- iv) Adequate drinking water facility should be provided at site, adequate number of decentralized latrines and urinals to be provided for construction workers.
- v) If allowed and full-time workers are residing on site, then they should be provided with clean and adequate temporary hutment.
- vi) First aid facility should also be provided.
- vii) Overhead lifting of heavy materials should be avoided. Barrow wheel and hand-lift boxes should be used to transport materials onsite.
- viii) Tobacco and cigarette smoking should be prohibited onsite.
- ix) All dangerous parts of machinery are well guarded and all precautions for working on machinery are taken.
- x) Maintain hoists and lifts, lifting machines, chains, ropes and other lifting tackles in good condition. Provide safety net of adequate strength to arrest falling material down below.
- xi) Use of durable and reusable formwork systems to replace timber formwork and ensure that formwork is properly maintained.



- xii) Ensure that walking surfaces or boards at height are of sound construction and are provided with safety rails and belts.
- xiii) Provide measure to prevent fire. Fire extinguisher and buckets of sand may be provided in fire-prone area.
- xiv) Provide sufficient and suitable light for working during night.
- xv) Ensure that the construction firm/division/company should have sound safety policies.
- xvi) Comply with the safety procedure, norms and guidelines (as applicable) as outlined in NBC 2016.
- xvii) Adopt additional best practices and prescribed norms as in NBC 2016

**2.6** Contractor is required to get existing top soil tested for fertility. If test finds it fertile, then top soil preservation is required. For preservation, top layer of soil (150mm- 300mm from the top) must be stripped off the site areas where construction activity will be carried out and kept separately for preservation. The preserved top soil must NOT be mixed with subsoil (soil excavated below 150mm – 300mm depth). The top soil should be preserved from erosion by wind/rain water by planting plants or grass on it. The preserved top soil stack height should not be more than 400mm – 600mm. The area used for preserved top soil should be barricaded from all the sides & nothing should be dumped on it during the construction process. There should be regular water sprinkling on the preserved top soil for its compaction & to maintain its fertility by adding organic manure as per the direction of horticulturist. Top-soil fertility test must be carried out before preservation and post construction to ensure and maintain its fertility. The soil fertility should be enhanced by organic means only if required. Preserved top soil must be spread back to landscaped areas after the construction activity is completed as per the direction of engineer in charge. Top soil fertility test must be done from an ICAR or NABL accredited laboratory for the following parameters- P.H., Mineral Content, Organic Matter (%), Nitrogen (kg/Hec), Phosphorus (kg/Hec), Potassium (kg/Hec), Free Lime content (%), Iron (ppm), Maganese (ppm), Bauxite (ppm), Copper (ppm), Texture (%), Bulk Density (Mg m3), Particle Density (Mg m3), Maximum Water Holding Capacity (%), Exchangeable Sodium (Mg/100g).

**2.7** Identify roads on-site that would be used for vehicular traffic. Upgrade vehicular roads (if these are unpaved) by increasing the surface strength by improving particle size, shape and mineral type that make up the surface base. Add surface gravel to reduce source of dust emission. Amount of fine particles (smaller than 0.075mm) may be to 10 -20%. Vehicular speed on site may be limited 10km/h. Nothing extra will be payable for this.

**2.8** All material storages should be adequately covered and contained so that they are not exposed to situations where winds on site could lead to dust/particulate emissions.

**2.9** Spills of dirt or dusty materials shall be cleaned up promptly so the spilled material does not become a source of fugitive dust and also to prevent of seepage of pollutant laden water into the ground aquifers. When cleaning up the spill, ensure that the clean - up process does not generate additional dust. Similarly, spilled concrete slurries or liquid wastes should be contained/cleaned up immediately before they can infiltrate into the soil/ground or runoff in nearby areas.

- 2.10** The contractor shall ensure that water spraying is carried out by wetting the surface by spraying water on:
- i) Any dusty material.
  - ii) Areas where demolition work is carried out.
  - iii) Any unpaved main-haul road and.
  - iv) Areas where excavation or earth moving activities are to be carried out.
- 2.11** The contractor shall ensure the following:
- i) Cover and enclose the site by providing dust screen, sheeting or netting to scaffold along the perimeter of a building.
  - ii) Covering stockpiles of dusty material with impervious sheeting.
  - iii) Covering dusty load on vehicles by impervious sheeting before they leave the site.
  - iv) Transferring, handling/storing dry loose materials like bulk cement and dry pulverized fly ash inside a totally enclosed system.
  - v) Clear vegetation only from areas where work will start right away.
  - vi) Vegetate/mulch areas where vehicles do not ply.
  - vii) Apply gravel / landscaping rock to the areas where mulching/paving is impractical.
- 2.12** The contractor shall adopt measures to prevent air pollution in the vicinity of the site due to construction activities.
- 2.13** Prior to the commencement of any work, the method of working, plant equipment and air pollution control system to be used on -site should be made available for the inspection and approval of the Engineer -in-Charge to ensure that these are suitable for the project.
- 2.14** The contractor shall employ measures to segregate the waste on-site into inert, chemical or hazardous wastes. The inert waste may be disposed off to Municipal Corporation/local bodies dump yard and landfill sites.
- 2.15** The contractor shall preserve the existing landscape and protect it from degradation during the process of construction. Proper timing for construction activity shall be selected to minimize the disturbance such as soil pollution due to spilling of the construction material and its mixing with rainwater. The construction management plan including soil erosion control management plan shall be prepared accordingly for each month. The application of erosion control measures includes construction of gravel pits and tyre washing bays of approved size and specification for all vehicular site entry/exits, protection of slopes greater than 10%. Existing vegetation shall be preserved and protected by not-disturbing or damaging to specified site areas during construction.
- 2.16** The contractor should follow the construction plans proposed by the Engineer-in-charge / landscape consultant to minimize the site disturbance such as soil pollution due to spilling.

- 2.17 The contractor shall ensure that no construction leachates (e.g., cement slurry) is allowed to percolate into the ground. Temporary drainage channels, perimeter dike/swale, etc. shall be constructed to carry the pollutant -laden water directly to the treatment device or facility (municipal sewer line).
- 2.18 All lighting installed by the contractor around the site and at the labour hutments during construction shall be CFL/ LED bulbs of the appropriate illumination levels.
- 2.19 All the building materials and systems used on site must be as per the specifications and approved makes by the Engineer-in-Charge.
- 2.20 All required certificates explaining the properties of the building material/system needs to be obtained from the manufacturer/vendor as required by the green building rating authority. The purchase orders of all the materials made with the manufacturers / authorized vendors should be maintained and shall be provided for the process with due diligence upon request.
- 2.21 **All paints, adhesives and sealants should comply with the VOC limits prescribed by GRIHA norms.**
- 2.22 Water saving measures need to be followed on site. If bore well water is used for construction, it must be metered. For waste water use in construction, record must be maintained of all tankers used at site. All sources of water use during construction must be regularly monitored.
- 2.23 The contractor / subcontractor shall prepare and submit a Site Management Plan (SMP) within 10 days of commencement date, for approval by the Engineer -in-charge. This SMP shall indicate the locations of go down, stockpiles, barricading, waste storage, offices, vehicular movement routes etc. In short, this SMP would comprehensively represent how the site activities shall be managed conforming to GRIHA guidelines. **Deduction/recovery @ Rs. 500 per day** of delay on non-submission of SMP beyond due date which shall be recovered from next RA bill.
- 2.24 Any other site management measures suggested by the Engineer-in-charge shall be followed on site.
- 2.25 The contractor & his team shall put adequate efforts to minimize construction waste generation at site. This shall include collection and segregation of all construction waste at site like broken bricks, tiles, glass, pavers, Steel scrap, Concrete debris, Plastic bags, drums, packaging cardboard, Timber scrap, Cement bags etc.
- 2.26 The contractor must keep record of all the construction waste being recycled or reused at site and also maintain receipts/records of waste sold from site. The contractor must ensure that no waste from the site is sent to landfill from sites, either all waste is reused within the site or sent for recycling. Waste sent off the site to its final destination may be tracked. Contractor must keep record as gate passes / challans for all the waste material sent out for selling.
- 2.27 The contractor shall submit to the Engineer -in-Charge after completion of the buildings, a detailed as built quantification of the following within 10 days of recording of completion. **Deduction/recovery @ Rs. 500 per day** of delay on non-submission beyond due date shall be recovered from the Final bill:
- i) Total materials used
  - ii) Total waste generated,

- iii) Total waste reused,
- iv) Total water used,
- v) Total electricity consumed, and
- vi) Total diesel consumed.

**2.28** Evidence for the implementation of the all the above required measures shall be provided in the form of photographs and templates as required for the submission to the green building rating authority (GRIHA). Contractor shall provide potable water for all workers. The contractor shall provide the minimum level of sanitation and safety facilities for the workers at site. The contractor shall ensure cleanliness of workplace with regard to the disposal of waste and effluent; provide clean drinking water, latrines and urinals as per applicable standard. Adequate toilet facilities shall be provided for the workman within easy access of their place of work. The total no. of toilets to be provided shall not be less than 1 per 30 employees in any one shift. Toilet facilities shall be provided from the start of building operations, and connection to a sewer shall be made as soon as practicable. Every toilet shall be so constructed that the occupant is sheltered from view and protected from the weather and falling objects. Toilet facilities shall be maintained in a sanitary condition. A sufficient quantity of disinfectant shall be provided. Natural or artificial illumination shall be provided.

**2.29 In compliance to the Hon'ble National Green Tribunal (NGT) and Office Memorandum no. DG/SE/CM/CON/Misc./02 dated 16.03.2016 following preventive/corrective measures to be taken at site in order to control Air pollution from construction and demolition activity: –**

- (i) The contractor shall not store/dump construction material or debris on metalled road.
- (ii) The contractor shall get prior approval from Engineer-in-charge for the area where the construction material or debris can be stored beyond the metalled road. This area shall not cause any obstruction to the free flow of traffic/inconvenience to the pedestrians. It should be ensured by the contractor that no accidents occur on account of such permissible storage.
- (iii) The contractor shall take appropriate protection measures like raising wind breakers of appropriate height on all sides of the plot /area using CGI sheets or plastic and /or other similar material to ensure that no construction material dust fly outside the plot area.
- (iv) The contractor shall ensure that all the trucks or vehicles of any kind which are used for construction purposes/or are carrying construction material like cement, sand and other allied material are fully covered. The contractor shall take every necessary precaution that the vehicles are properly cleaned and dust free to ensure that enroute their destination, the dust, sand or any other particles are not released in air/contaminate air.
- (v) The contractor shall provide mask to every worker working on the construction site and involved in loading, unloading and carriage of construction material and construction debris to prevent inhalation of dust particles.
- (vi) The contractor shall provide all medical help, investigation and treatment to the workers involved in the construction.
- (vii) The contractor shall ensure that C&D waste is transported to the C&D Waste

site only and due record shall be maintained by the contractor.

- (viii) The contractor shall compulsorily use of wet jet in grinding and stone cutting.
- (ix) The contractor shall comply all the preventive and protective environmental steps as stated in the MoEF&CC guidelines, 2010.
- (x) The contractor shall carry out on-Road-Inspection for black smoke generating machinery. The contractor shall use cleaner fuel.
- (xi) The contractor shall ensure that all DG sets comply emission norms notified by MoEF&CC.
- (xii) The contractor shall use vehicles having pollution under control certificate. The emissions can be reduced by a large extent by reducing the speed of a vehicle to 20 kmph. Speed bumps shall be used to ensure speed reduction. In cases where speed reduction cannot effectively reduce fugitive dust, the contractor shall divert traffic to nearby paved areas.
- (xiii) The contractor shall ensure that the construction material is covered by tarpaulin. The contractor shall take all other precaution to ensure that no dust particles are permitted to pollute air quality as a result of such storage.
- (xiv) The paving of the path for plying of vehicles carrying construction material is more permanent solution to dust control and suitable for longer duration projects.

**2.30** In case of non-availability of the C& D waste Material / Product, the contractor shall make arrangement of substitute materials/Products without any cost adjustment.

**2.31** Any Penalty imposed by Civic bodies/ NGT for Non-Compliance of their guidelines issued by them from time to time shall be borne by the contractor.

**2.32** The contractor shall comply with the safety procedures, norms and guidelines (as applicable) as outlined in the Part 7 of National Building code 2016 of India, Bureau of Indian Standards. A copy of all pertinent regulations and notices concerning accidents, injury and first-aid shall be prominently exhibited at the work site. Depending upon the scope & nature of work, a person qualified in first-aid shall be available at work site to render and direct first-aid to wounded/causalities. A telephone may be provided to first-aid assistant with telephone numbers of the hospitals. Complete reports of all accidents and action taken thereon shall be forwarded to the competent authorities.

**2.33** The contractor shall preferably select materials / vendors, harvested and manufactured regionally, within a 800-km radius of the project site. Contractor shall collect & submit the relevant material certificates for materials with high recycled (both post-industrial and post-consumer) content, including materials like RMC mix with fly-ash, glass with recycled content, calcium silicate boards etc.

**2.34** The contractor shall ensure that a flush out of all internal spaces is conducted prior to handover. This shall comprise an opening of all doors and windows for 14 days to vent out any toxic fumes due to paints, varnishes, polishes, etc.

- 2.35** Wherever required, Contractor shall meet and carry out all activities on site, supplement information, and submittals.
- 2.36 CONSTRUCTION WASTE**
- 2.36.1 Contractor shall ensure that wastage of construction material is within 3%. Subject to the suitability, all construction debris shall be used for road preparation, back filling, etc., as per the instructions of the Engineer in Charge, with necessary activities of sorting, crushing, etc. No construction debris shall be taken away from the site, without the prior approval of the Engineer in Charge. If and when construction debris is taken out of the site, after prior permissions from the Engineer in Charge, then the contractor shall ensure the safe disposal of all wastes and will only dispose of any such construction waste in approved dumping sites.
- 2.36.2 Contractor shall collect all construction waste generated on site. Segregate these wastes based on their utility and examine means of sending such waste to manufacturing units which use them as raw material or other site which require it for specific purpose. All construction debris generated during construction shall be carefully segregated and stored in a demarcated waste yard. Clear, identifiable areas shall be provided for each waste type. Typical construction debris could be broken bricks, steel bars, broken tiles, spilled concrete and mortar etc.
- 2.36.3 Water spray, through a simple hose for small projects, to keep dust under control. Fine mists should be used to control fine particulate. However, this should be done with care so as not to waste water. Heavy watering can also create mud, which when tracked onto paved public roadways, must be promptly removed. Also, there must be an adequate supply of clean water nearby to ensure that spray nozzles don't get plugged.
- 2.36.4 Contractor shall be required to provide an easily accessible area that serves the entire building and is dedicated to the separation, collection and storage of materials for recycling including (at a minimum) paper, corrugated cardboard, glass, plastics, and metals. He shall coordinate the size and functionality of the recycling areas with the anticipated collections services for glass, plastic, office paper, newspaper, cardboard, and organic wastes to maximize the effectiveness of the dedicated areas.
- 2.36.5 Staging (dividing a construction area into two or more areas to minimize the area of soil that will be exposed at any given time) should be done to separate undisturbed land from land disturbed by construction activity and material storage.
- 2.36.6 The storage of material shall be as per standard good practices as specified in Part 7, Section 2 in Storage, Stacking and Handling practices, NBC 2016 and shall be to the satisfaction of the Engineer in Charge to ensure minimum wastage and to prevent any misuse, damage, inconvenience or accident. There should be a proper planning of the layout for stacking and storage of different materials, components and equipment's with proper access and proper manoeuvrability of the vehicles carrying the materials. While planning the layout, the requirements of various materials, components and equipment's at different stages of construction shall be considered.
- 2.36.7 The contractor shall provide for adequate number of garbage bins around the construction site and the workers facilities and will be responsible for the proper utilization of these bins for any solid waste generated during the construction. The contractor shall ensure that the site and the workers facilities are kept litter free. Separate bins should be provided for plastic, glass, metal, biological and paper waste and labelled in both Hindi and English with suitable symbols.



2.36.8 The Contractor shall remove from site all rubbish and debris generated by the Works and keep Works clean and tidy throughout the Contract Period. All the serviceable and non-serviceable (malba) material shall be segregated and stored separately. The malba obtained during construction shall be collected in well-formed heaps at properly selected places, keeping in a view safe condition for workmen in the area. Materials which are likely to cause dust nuisance or undue environmental pollution in any other way, shall be removed from the site at the earliest and till then they shall be suitable covered. Glass & steel should be dumped or buried separately to prevent injury. The work of removal of debris should be carried out during day. In case of poor visibility artificial light may be provided.

## **2.37 DOCUMENTATION:**

- (a) The contractor shall submit to the Engineer in Charge, before the start of construction, a site plan along with a narrative to demarcate areas on site from which top soil has to be gathered, designate area where it will be stored, measures adopted for top soil preservation and indicate areas where it will be reapplied after construction is complete.
- (b) The contractor shall, during the entire tenure of the construction phase, maintain the following records and submit to the Engineer in Charge on demand:
  - i) Water consumption in litres
  - ii) Electricity consumption in 'kwh' units
  - iii) Diesel consumption in litres
  - iv) Quantum of waste (volumetric/weight basis) generated at site and the segregated waste types divided into inert, chemical and hazardous wastes.
  - v) Digital photo documentation to demonstrate compliance of safety guidelines as specified herein.
  - vi) Quantities of material brought into the site, including the material issued to the contractor by the Engineer in charge.
  - vii) Quantities of construction debris (if at all) taken out of the site
  - viii) Digital photographs of the works at site, the workers facilities, the waste and other material storage yards, pre-fabrication works, etc.
- (c) The contractor shall submit to the Engineer in Charge, following information, for all material brought to site for construction purposes, including manufacturer's certifications, and test data, but not limited to:
  - i) Source of products: Supplier details and location of the supplier.
  - ii) Recycled Content: Submit information regarding product post-industrial recycled and post-consumer recycled content.
  - iii) Product Recyclability: Submit information regarding product and product's component's recyclability including potential sources accepting recyclable materials wherever applicable.
- (d) The contractor shall provide total support to Engineer in Charge and Green Building

Consultants appointed by the Engineer in charge in completing all Green Building Rating related formalities, including signing of forms, providing signed letters in the contractor's letterhead whenever required.

- (e) The contractor is expected to go through all other conditions of the GRIHA rating stipulations. Failure to adhere to any of the above-mentioned conditions, without approval of the Engineer in Charge, shall be deemed as a violation of contract and the contractor shall be held liable for penalty as per terms of the agreement.

### **3.0 Special condition for Cement:**

- 3.1** Unless otherwise specified in this document, PPC cement shall be used. For design-mix concrete, OPC cement with flyash or PPC cement may be used without any cost adjustment. The contractor shall procure PPC conforming to IS: 1489 (Part 1) as required in the work from cement manufacturers mentioned in the list of Preferred makes for civil works or from any other reputed cement manufacturer having a production capacity not less than 1 million tons per annum as approved by competent authority of CCU. Uses of GGBS /Fly ash with OPC is permitted as per norms.
- 3.2** The supply of cement shall be taken in 50 kg. bags bearing manufacturer's name and ISI marking. Samples of cement arranged by the contractor shall be taken by the Engineer-in-charge and got tested in accordance with provisions of relevant BIS codes. In case the test results indicate that the cement arranged by the contractor does not conform to the relevant BIS codes, the same shall stand rejected, and it shall be removed from the site by the contractor at his own cost within a weeks' time of written order from the Engineer- in-charge to do so. Supply of cement shall be taken in 50-kg bags bearing manufacturer's name, or his registered trademarks if any and grade and type of cement as well as ISI marking.
- 3.3** The cement shall be brought at site in bulk supply of approximately 40 tons or as decided by the Engineer-in-charge on the basis of requirement of work in progress. The cement godown of Minimum 1000 bags capacity to store the cement shall be constructed by the Contractor at site of work for which no extra payment shall be made.
- 3.4** Double lock provision shall be made to the door of the cement godown. The keys of one lock shall remain with the engineer-in-charge or his authorised representative and the keys of other lock shall remain with the contractor. The contractor shall be responsible for the watch and ward and safety of cement godown. The contractor shall facilitate the inspection of cement godown by the Engineer-in-charge at any time.
- 3.5** The cement shall be got tested by the Engineer-in-charge and shall be used on the work only after satisfactory test results have been received.
- 3.6** The actual issue and consumption of cement on work shall be regulated and proper accounts shall be maintained. The theoretical consumption of cement shall be worked out. In case the cement consumption is less than theoretical consumption including permissible variation, recovery at the rate so prescribed shall be made. In case of excess consumption, no cost adjustment shall be made.
- 3.7** The cement brought to the site and the cement remaining unused after completion of the work shall not be removed from site without the written permission of the Engineer-in-charge.



**3.8** The damaged cement shall be removed from the site immediately by the contractor on receipt of a notice in writing from the Engineer-in-charge. If he does not do so within 3 days of receipt of such notice, the Engineer-in-charge shall get it removed at the cost of the Contractor.

#### **4.0 Special Conditions for Steel Reinforcement**

**4.1** The Contractor shall/procure ISI marked TMT bars of various grades from the Steel Manufacturers mentioned in preferred make list for civil works or their authorized dealers/ authorized distributors/channel partners.

**4.2** Samples shall also be taken and got tested by the Engineer-in-Charge as per the provisions in this regard in relevant BIS codes. In case the test results indicate that the reinforcement steel arranged by the contractor does not conform to the specifications, the same shall stand rejected, and it shall be removed from the site of work by the contractor at his cost within a week time or written orders from the Engineer-in-Charge to do so.

**4.3** The steel reinforcement bars shall be brought to the site in bulk supply of 25 tonnes or more, or as decided by the Engineer-in-charge.

**4.4** The steel reinforcement bars shall be stored by the contractor at site of work in such a way as to prevent their distortion and corrosion, and nothing extra shall be paid on this account. Bars of different sizes and lengths shall be stored separately to facilitate easy counting and checking.

**4.5** For checking nominal mass, tensile strength, bend test, re-bend test etc. specimens of sufficient length shall be cut from each size of the bar at random, and at frequency not less than that specified below:

<b>Size of bar</b>	<b>For consignment below 100ton</b>	<b>For consignment above 100ton</b>
Under 10 mm dia bars	One sample for each 25 tonnes or part there of	One sample for each 40 tonnes or part there of
10 mm to 16mm dia bars	One sample for each 35 tonnes or part there of	One sample for each 45 tonnes or part there of
Over 16mm dia bars	One sample for each 45 tonnes or part there of	One sample for each 50 tonnes or part there of

**4.6** The contractor shall supply free of charge the steel required for testing including its transportation to testing laboratories.

**4.7** The actual issue and consumption of steel on work shall be regulated and proper accounts maintained. The theoretical consumption of steel shall be worked out. In case the consumption is less than theoretical consumption including permissible variations, recovery at the rate so prescribed shall be made. In case of excess consumption, no adjustment needs to be made.

**4.8** The Steel brought to site and remaining unused shall not be removed from site without the written permission of Engineer-in-Charge.

**4.9** The standard sectional weights referred to shall be as given in Table 5.4 in para 5.3.4 in CPWD Specification 2019 Vol.-I and will be considered for conversion of length of various sizes of TMT Bars in to standard weight. Record of actual sectional weights shall also be kept diameter and lot wise. The average sectional weight for each diameter shall be arrived at from samples from each lot of steel received at site. The decision of the Engineer-in-Charge shall be final for the procedure to be followed for determining the average sectional weight of each lot. Quantity

of each diameter of steel received at site of work each day will constitute one single lot for the purpose. The weight of steel by conversion of length of various sizes of bars based on the actual weighted average sectional weight shall be termed as Derived Actual Weight. If the derived weight is less than the standard weight, then the Derived Actual Weight shall be accepted if it is within the following tolerances specified in IS:1786-2008, otherwise whole lot will be rejected. However, deductions shall be made for the difference in derived actual weight and standard weight at the rate determined by engineer-in-charge. If the derived actual weight is found more than the standard weight, then nothing shall be paid extra for the difference in derived actual weight and standard weight.

- 4.10** The contractor shall submit original vouchers from the manufacturer for the total quantity of steel supplied under each consignment to be used in the work. All consignment received at the work site shall be inspected by the Site staff along with the relevant documents before acceptance. The contractor shall obtain original vouchers and copy of test certificates and furnish the same to the Engineer-in-Charge in respect of all the lots of steel brought by him from approved supplier to the site of work. The original vouchers and copy of test certificates shall be defaced by the site staff and kept on record in the site office.
- 4.11** The reinforcement steel brought to site of work shall be stored on brick / timber platform of 30/40-cm height, nothing extra shall be paid on this account.

## **PARTICULAR SPECIFICATIONS FOR CIVIL WORKS**

### **1.0 General:**

- (i) CPWD Specifications Vol. I & vol II as amended from time to time shall be applicable for all the items to be executed as per contract.
- (ii) Provision contained in the harmonized guidelines & standard for universal Accessibility in India 2021 (Available on CPWD website) of Ministry of Housing and urban affairs, Government of India shall be complied with while executing the works.
- (iii) C& D waste products and recycled aggregates to the extent provided in IS codes shall be used as per extant provisions of the green building measures. Only potable water shall be used in the work

### **2.0 Earthwork, Foundation and Plinth:**

- (i) Excavation (surface excavation, over area, foundation, trenches etc.) in all kind of soil shall be carried out upto desired level as per good for construction structural drawings.
- (ii) Earth required for filling in all works like trenches, foundations, plinth, around building, road work and other development works shall be of good quality useful for filling as per CPWD specifications.
- (iii) The available excavated earth suitable for filling shall be used by the contractor.
- (iv) Surplus excavated earth after filling as per site conditions shall be disposed outside the campus after remittance of due royalty to concerned authority, as applicable, by taking required permission from concerned Government authority.
- (v) Appropriate ground improvement or soil stabilization measures recommended as per the soil investigation report and structural design, if any, shall be carried out.
- (vi) Appropriate foundation system including isolated footing/combined footing/ raft/ pile and possible combination of these as per the recommendations of the soil investigation report containing borehole data, seasonal variation of subsoil water table, and as per structural design conforming to relevant Indian standard codes shall be provided.
- (vii) Anti-termite treatment as per the necessity of soil at site shall be carried out as per relevant Indian standard codes/CPWD specifications.
- (viii) Structural grade slab shall be designed & provided accordingly.
- (ix) Damp proof course shall be provided wherever required as per CPWD specification.
- (x) Drainage and plinth protection along the perimeter of the buildings may be provided, wherever required, as per CPWD specifications or as per specific functional requirement.
- (xi) All the excavated earth/soil shall be levelled & neatly dressed. Sand filling of minimum 150mm thickness, with river sand, wherever required, shall be done under floor.

### **3.0 Superstructure:**

- (i) Expansion joints/seismic separation joints shall be provided as per the good for construction structural drawing and shall be treated/covered as per CPWD specifications / manufacturer specifications.
- (ii) The exposed structural steel shall be made fire resistant (as per NBC 2016) by using vermiculite coating as per manufacturer's specifications and by applicators authorized by them.

### **4.0 Concrete Works:**

All concrete works shall be carried out in general as per CPWD Specifications 2019, Volume-I & II with upto date revisions, amendments, correction slips issued till last date (including any extension, if any) of submission of bid.

### **5.0 RCC WORKS:**

Foundation (isolated/combined, strip, raft, pile etc.) shall be with RCC using specified grade of concrete. RCC retaining/breast wall shall be provided as per good for construction drawings and site condition.

### **6.0 Design Mix Concrete (from Batch Mix Plant or from RMC Plant)**

- 6.1** Design mix shall be carried out as per IS 10262, IS 456, IS 4926, and other relevant IS codes / CPWD Specifications amended upto last date (including extended date, if any) of submission of bid. The contractor shall carry out design mixes for each class of concrete indicating that the concrete ingredients and proportions will result in concrete mix meeting requirements specified. The cement shall be actually weighed as presumption of each bag having 50 kg shall not be allowed. In case of use of admixture, the mix shall be designed with these ingredients as well. All the ingredient shall confirm to relevant Indian standard as well as the CPWD specification.
- 6.2** The contractor may install fully automatic Batch Mix Plant at site or in nearby area wherever permissible. In case, contractor opt for installing of Batch Mix Plant as mentioned in description of items in BOQ then agency has to install new fully automatic Batch Mix Plant at site. The old Batch Mix Plant shall not be permitted, in any case. If desired by the engineer-in-charge the contractor has to submit the vouchers of new purchased fully automatic Batch Mix Plant. All permissions/NOCs (including payment/fee if any stipulated) from the concerned authorities shall be obtained by the contractor and no claim of hindrance on account of delay in installation of batching plant shall be admissible. Contractor may arrange concrete from RMC (Ready Mix Concrete) producing plants with prior approval from Engineer-in-charge. Nothing extra shall be payable for sourcing concrete from RMC plant. For all purposes, the contractor shall carry out fully, the responsibilities of the “placement Contractor” and the “manufacturer of concrete”.
- 6.3** The Engineer-in-Charge will reserve the right to inspect at any stage and reject the concrete if he is not satisfied about quality of product at the user's end.
- 6.4** The Engineer-in-charge reserves the right to exercise control over the: -
  - i) Ingredients, water and admixtures purchased, stored and to be used in the concrete including conducting tests for checking quality of materials, recording of test results and

declaring the materials fit or unfit for use in production of mix.

- ii) Calibration checks of the Fully Automatic Batching plant /RMC.
- iii) Weight and quantity check on the ingredients, e.g. cement, aggregates, water and admixtures added for batch mixing.
- iv) Time of mixing of concrete.
- v) Testing of fresh concrete, recordings of results and declaring the mix fit or unfit for use. This will include continuous control on the workability during production and taking corrective action, if required.

**6.5** All stone aggregate and stone ballast shall be of hard stone variety to be obtained from approved quarries. Coarse sand should be obtained from approved sources. The same shall be clean and sharp angular grit type. The coarse sand shall be screened before using, if required. If the sand brought to site is dirty, it must be washed in clean water to bring the sand to the required specifications. Nothing extra shall be payable on this account.

**6.6** For exercising such control, the Engineer-in-charge shall periodically depute his authorized representative at the fully automatic batching plant/ RMC plant. It shall be responsibility of the contractor to ensure that all necessary equipment, manpower & facilities are made available for inspections/checking to Engineer-in-Charge and/or his authorized representative at fully automatic batching plant/ RMC plant.

**6.7** All relevant records of produced and used concrete shall be made available to the Engineer-in-Charge or his authorized representative. Engineer-in-Charge shall, as required, specify guidelines & additional procedures for quality control & other parameters in respect of materials, production & transportation of concrete mix which shall be binding on the contractor. Concrete as per design mix approved by Engineer-in-Charge shall be produced and transported to the site.

**6.8** The terms machine batched, machine mixed and machine vibrated concrete used elsewhere in contract shall mean the concrete produced in concrete batching and mixing plant and if necessary, transported by transit concrete mixers, placed in position by the concrete pumps, tower crane and vibrated by surface vibrator /needle vibrator / plate vibrator, as the case may be to achieve required strength and durability.

**6.9** The concrete mix design with and without admixture will be carried out by the contractor, at his own cost, through one of the laboratories/Test houses to be approved by Engineer-in-charge.

#### **6.10 Ultrasonic Pulse Velocity Method of Test for RCC**

- a) The underlying principle of assessing the quality of concrete is that comparatively higher velocities are obtained when the quality of concrete in terms of density, homogeneity and uniformity is good. In case of poorer quality lower velocities are obtained. If there are cracks, voids or flaws inside the concrete which come in the way of transmission of pulse, lower velocities are obtained.
- b) The quality of concrete in terms of uniformity, incidence or absence of internal flaws, cracks and segregation etc. are indicative of the level of workmanship employed, can thus be assessed using the guidance given in table below, which have been evolved for

characterizing the quality of concrete in structure in term of the ultrasonic pulse velocity.

#### Velocity criterion for Concrete Quality Grading

S.N.	Pulse Velocity by Cross Probing (Km/Sec)	Concrete Quality grading
1	Above 4.5	Excellent
2	4.5 to 3.5	Good
3	3.5 to 3.0	Medium
4	Below 3.0	Doubtful

- c) Ultrasonic Pulse velocity method of testing of concrete is to be conducted for works as a routine test. The acceptance criteria as per the above table will be applicable which is as per IS 13311 (Part-1):1992. From the above “Good” and “Excellent” grading are acceptable and the grading “Medium” and “Doubtful” will not be acceptable.
- d) Atleast **5%** of the total number of RCC members in each category i.e. beam, column, slab and footing may be tested by Ultrasonic Pulse velocity test method for establishing quality of concrete. It is suggested that test may be conducted on RCC beam near joint with column, on RCC column near joint with beam, on RCC footings and rafts. On RCC rafts a suitable grid can be worked out for determining number of tests. In addition, doubtful areas such as honeycombed locations, locations, where continuous seepage is observed, construction joints and visible loose pockets may also be tested.
- e) The test results shall be examined in view of the above acceptance criteria “Good” and “Excellent” and wherever concrete is found with less than required quality as per acceptance criteria, repairs to concrete will be made. Honeycombed areas and loose pockets will be repaired by grouting using Portland Cement Mortar/Polymer Modified Cement Mortar /Epoxy Mortar, after chipping loose concrete in appropriate manner. In areas where concrete is found below acceptance criteria and defects are not apparently visible on surface, injecting approved grout in appropriate proportion using epoxy grout /acrylic polymer modified cements slurry made with shrinkage compensating cement / plain cement slurry etc. shall be resorted to for repairs (refer relevant chapters from CPWD Hand Book on Repairs and Rehabilitation of RCC Buildings). Repair to concrete shall be done till satisfactory results are obtained as per the acceptance criteria by retesting of the repaired area. If satisfactory results are not obtained dismantling and relaying of concrete will be done at the cost of contractor.

**6.11** Standard of acceptance shall be same as specified in clause 16 of IS 456-2000. In case of rejection of concrete on account of unacceptable compressive strength, the work for which samples have failed shall be redone at the cost of contractor. However, the Engineer in charge may order for additional tests (like cutting cores, ultrasonic pulse velocity test, load test on structure or part of structure etc.) to be carried out at the cost of contractor to ascertain if the portion of structure wherein concrete represented by the sample has been used, can be retained on the basis of results of individual or combination of these tests. The contractor shall take remedial measures necessary to retain the structure as approved by the Engineer in charge without any extra cost.

**6.12 COVER/SPACER BLOCK-** The contractor shall provide approved type of support for maintaining the bars in position and ensuring required spacing and correct cover of concrete to reinforcement as called for in the drawings, by providing spacer blocks of required shape and



size. Chairs and spacer bars shall be used in order to ensure accurate positioning of reinforcement. Only factory-made cover blocks shall be used. Pre-cast cement mortar/concrete blocks/blocks of polymer shall not be used as spacer blocks unless specially approved by the Engineer-in-charge.

## **7.0 SHUTTERING/FORMWORK:**

- 7.1** The work shall be done in general as per CPWD Specifications 2019, Volume-I & II with date revisions, amendments, correction slips issued upto last date of submission of bid.
- 7.2** Double steel scaffolding having two sets of vertical supports shall be provided for external wall finish, cladding etc. The supports shall be sound and strong, tied together with horizontal pieces over which scaffolding platform shall be fixed. Scaffolding shall have steel staircase for inspection of works at upper levels.
- 7.3** In order to keep the floor finish as per architectural drawings and to provide required thickness of the flooring as per specifications, the level of top surface of R.C.C. shall be accordingly adjusted at the time of its centering, shuttering and casting for which nothing extra shall be paid to the contractor.
- 7.4** As per general engineering practice, level of floors in toilet / bath, balconies, shall be kept lower than general floors as required from waterproofing point of view. Shuttering should be adjusted accordingly. Nothing extra is payable on this account.
- 7.5** Dented, broken, cracked, twisted or rusted shuttering shall not be allowed to be used on the work.
- 7.6** The shuttering shall be cleaned properly with electrically driven sanders to remove any cement slurry or cement mortar or rust. Proper shuttering oil or de-bonding compound shall be applied on the surface of the shuttering in the requisite quantity before laying of steel reinforcement.
- 7.7** For the execution of centering and shuttering, the contractor shall use propriety shuttering oil as approved by Engineer-in-Charge and nothing extra shall be paid on this account.
- 7.8** All existing formwork that fails to meet the specifications mentioned above or do not qualify to meet the minimum standards in the view of Engineer-in-Charge shall have to be removed and stacked.

## **8.0 REINFORCEMENT:**

- 8.1** The reinforcement work shall be done as per CPWD Specifications 2019, Volume-I & II with revisions, amendments, correction slips upto last date of bid submission (including extensions if any).
- 8.2** Reinforcement work includes all operations including straightening, cutting, bending, welding, binding with annealed steel or welding and placing in position at all the floors with all leads and lift complete as per CPWD Specifications.
- 8.3** The contractor shall provide approved type of support for maintaining the bars in position and ensuring required spacing and correct cover of concrete to reinforcement as mentioned in the drawings. Spacer blocks of required shape and size, chairs and spacer bars shall be used in order to ensure accurate positioning of reinforcement. To ensure proper cover, factory made round / rectangular type cover blocks will be used to avoid displacement of bars in any. Couplers may be used for splicing of reinforcement bars.

**8.4** Reinforcement TMT bars, to be used for the work, shall be of grade Fe 500D or more and shall confirm to criteria corresponding to Bar set 'II' of OM no. CSQ/SE(TAS)/Steel/2024/262(H) dated 14.08.2025 of CPWD Directorate.

**8.5** Bar Bending Schedule: The agency shall prepare bar bending schedule as per structural drawings and submit to Engineer-in-Charge in advance for approval. The bar bending schedule shall conform to Indian Standard IS 2502-Code of Practice for Bending and Fixing of bars for Concrete Reinforcement. Before execution of work, two copies of these bar bending schedules including revision, will be submitted to Engineer-in-Charge for approval.

## **9.0 MASONRY WORK:**

The masonry work shall be done as per CPWD Specifications 2019, Volume-I & II with revisions, amendments, correction slips upto last date of bid submission (including extensions if any). In case of conflict or contradiction between detailing shown in drawings and specification mentioned herein under this subhead, the specification mentioned herein under this subhead shall be followed.

**9.1** Chicken mesh 85gsm or fibre mesh of good quality to be provided in plaster at the junction of Masonry and RCC or CC Member/band.

**9.2** For masonry work above plinth level, RCC band at sill level and lintel level shall be provided. This thickness of the band shall preferably be 100 mm or as approved by the Engineer-in-Charge.

**9.3** All opening on masonry wall shall be provided with RCC lintels, RCC bands / lintel over top of parapet wall at corridors, balconies etc. with cement concrete of 1:1½:3 (1 Cement: 1½ C & D recycled stone dust: 3 graded stone aggregate 20 mm nominal size) shall be provided. If the C&D waste product are unavailable in market, the conventional products may be used by the contractor at no extra cost to department.

**9.4** AAC blocks masonry shall be of Grade I and of oven dry density 551-650 kg/cum with polymer modified adhesive mortar above plinth level except wet areas. The polymer modified adhesive mortar shall be provided @ 30 kg per cum. AAC Block confirming the IS Code – 2185 (Part-3) 1984 (Reaffirmed 2005) shall be used. All type of internal masonry work which is affected by water shall be carried out by using Clay bricks of class designation 75 in the building as per CPWD specifications. In rest of the internal masonry work shall be of AAC blocks.

- a) Dimensions & Tolerances: Autoclave Aerated Concrete Block shall be made in sizes and shapes to fit different needs.
- b) The maximum variation in the length of the Autoclave Aerated Concrete Block shall not be more than plus/minus 5mm and maximum variation in the height and width of Autoclave Aerated Concrete Block, not more than plus/minus 3mm.
- c) The faces of Autoclave Aerated Concrete Block shall be flat & rectangular, opposite faces shall be parallel and all arises shall be square. The bedding surfaces shall be at right angle to the face of the Blocks. The Autoclave Aerated Concrete Block with special faces shall be manufactured and supplied if so required.
- d) The autoclaved aerated concrete block shall be classified in two grades according to their compressive strength as indicated in table below:



S.N.	Density in Oven dry Condition (Kg/m <sup>3</sup> )	Compressive Strength (N/mm <sup>2</sup> )		Thermal Conductivity in air dry condition (W/m.k)
		Grade I	Grade II	
1	451 to 550	2.00	1.50	0.21
2	551 to 650	4.00	3.00	0.24
3	651 to 750	5.00	4.00	0.30
4	751 to 850	6.00	5.00	0.37
5	851 to 1000	7.00	6.00	0.42

- e) All Autoclave Aerated Concrete Block shall be sound, free of cracks or other defects which interfere with the proper placing of block units and impair the strength or performance of the construction. The face or faces that are to be exposed shall be free of chips, cracks or other imperfections except that if not more than 5% of a consignment contains slight cracks or small chippings not larger than 25mm, this shall not be deemed grounds for rejection.
- f) **Block Density** – The Block density shall conform to the requirements specified in above table, when tested accordance with IS 6441 (Part-1) -1972.
- g) **Compressive Strength** – The minimum compressive strength being the average of twelve block units shall be as prescribed in above table, when tested accordance with accordance with IS 6441 (Part-5) -1972.
- h) **Thermal Conductivity** – The thermal conductivity shall not exceed the values specified in above table when tested in accordance with IS 3346 -1980.
- i) **Drying Shrinkage** – The drying shrinkage shall be not more than 0.05% for grade –1 block and 0.10% for grade-2 block when tested in accordance with IS 6441 (Part-2) -1972.
- j) **Number of tests:** A sample of 24 blocks shall be selected at random. All the 24 Blocks shall be checked for dimensions and inspected for visual defects. Out of the 24 blocks, 12 blocks shall be subjected to the test for compressive strength, 3 blocks to the test for density, 3 blocks to the test for thermal conductivity and 3 blocks to the test for drying shrinkage. The remaining 3 blocks shall be reserved for re-test for drying shrinkage if a need arises.
- k) The samples of AAC blocks (each sample consisting of 6 specimen) shall be chosen randomly from the lot procured and tested for various parameters specified as above. One samples shall be tested for every **200 cum** or part thereof. However, minimum one sample shall be tested from each lot received at site if the quantity procured in the lot is less than 200 cum. If required, Engineer-in-Charge or his authorized representative shall inspect the factory during production of the material for this work and also collect samples (of materials used for making AAC blocks and precast AAC blocks) from the factory itself. The contractor shall consider this contingency also while placing the order with one of the approved firms. Nothing extra shall be payable on this account.
- l) **Criteria for conformity:** The number of blocks with dimensions outside the tolerance limit and or with visual defects, among those inspected, shall not be more than two. For density, the mean value shall be within the range as specified in above Table. For compressive strength, the mean value, say X shall be determined. The test results shall be grouped into groups of 4, individual values of ranges shall be determined, the

average range a calculated from these values and shall satisfy the following condition:  
 $X - 0.6 R > \text{minimum value specified in above Table}$ . For thermal conductivity, the mean value shall be equal to or less than the value specified in above Table. For drying shrinkage, all the test specimens shall satisfy the requirements of the test. If one or more specimens fail to satisfy the requirements, the remaining 3 blocks shall be subjected to these tests. All these blocks shall satisfy the requirements.

- m) **Manufacturer's Certificate:** The manufacturer shall satisfy himself that the masonry units conform to the requirements of these specifications and, if requested, shall supply a certificate to this effect to the purchaser or his representative.
- n) **Marking:** Each lot of concrete masonry units manufactured in accordance with this specification shall preferably be marked with information-
  - The identification of the manufacture
  - The grade and block density of the unit
  - The month and year of manufacturing

## **10.0 DOOR/WINDOW WORK:**

The door/window work in general shall be carried out as per CPWD Specifications 2019, Volume-I & II with revisions, amendments, correction slips upto last date of bid submission (including extensions if any). In case of conflict or contradiction between detailing shown in drawings and specification mentioned herein under this subhead, the specification mentioned herein under this subhead shall be followed. Before taking up any procurement/construction activity, shop drawings (for fixing of all kind of doors, showing all hardwares) shall be prepared (on the basis of specification laid herein) and submitted by contractor for obtaining approval from Engineer-in-Charge.

- 10.1** Windows along with glazing shall be designed for wind loads applicable to the area/location as per relevant IS codes.
- 10.2** The samples of species of timber to be used, shall be deposited by the contractor with the Engineer-in-Charge before commencement of the work. The contractor shall produce cash vouchers and certificates from standard kiln seasoning plant operator about the timber to be used on the work having been kiln seasoned by them, failing which it would not be accepted as kiln seasoned. Specified timber shall be of good quality and well-seasoned. It shall have uniform colour, reasonably straight grains and shall be free from dead knots, cracks and sapwood.
- 10.3** Wood work shall not be painted, oiled or otherwise treated before it has been approved by the Engineer-in-Charge. All portion of timber including architrave abutting against masonry concrete stone or embedded in ground shall be painted with approved wood preservative or with boiling coal tar.
- 10.4 Toilet Cubical-** Toilet Cubical shall be provided for all the internal doors of wet areas having more than one unit of W/C, bathroom, change rooms etc. in all buildings.
- 10.5 Glazed Doors:** All the glazed doors (non-fire rated) shall be made in Aluminum door frames, shutters of suitable section, (with powder coating in required shade and colour of not less than 50 microns), toughened glass with necessary fittings and fixtures of stainless steel (SS 304) required to make the door operational and function smoothly, complete as per directions of Engineer-in-charge. Necessary shop drawings should be prepared by the contractor and work shall be executed after obtaining approval from Engineer-in-charge. The thickness of glazing

should not be less than 8 mm.

- 10.6** All fittings and fixtures shall be procured well in advance and the approved samples shall be kept at site till completion of the work.

**11.0 FIRE CHECK/RATED DOOR:**

CPWD Specification 2019 Vol. I & II with revisions, amendments, correction slips upto last date of bid submission (including extensions, if any), National Building Code (NBC) 2016 and manufacturer's specification shall be followed. Fire Check doors shall be provided in buildings wherever necessary and required as per National Building Code 2016. Unless otherwise specified elsewhere in tender document, all fire check doors should be fire rated for 120 minute and doors of fire exit corridor should meet the requirement of fire exit corridor specified in NBC 2016. Before taking up any procurement/construction activity, shop drawings (for fixing of all kind of doors, showing all hardware) shall be prepared and submitted for obtaining approval from Engineer-in-Charge.

- 11.1** The fire check/rated door should not collapse during the rated period of the fire under specified fire conditions. The fire door should not allow the passage of hot gases or the flames through the rebate or the gap between the door frame and shutter. The integrity or smoke sealing function is achieved by fire door by incorporating an "Intumescent Seal". This intumescent seal in the form of a strip under fire conditions expands many times its original size and forms a hard char which has high insulation properties and does not permit the smoke or flames to escape through the gap between the shutter and frame.
- 11.2** Observation, if any, made by the fire officer on the fire check/rated doors, shall be incorporated suitably.
- 11.3** Execution of Fire Check Doors shall be carried out through the specialized agencies having sufficient work experience in the same field and shall be got approved from the Engineer-in-Charge well in advance. Specialized firm shall furnish all materials, labour, accessories, equipment, tool and plant and incidentals required for providing and installing the fire check/rated doors. Contractor has to select one specialized agency from list of preferred makes and specialized agencies.
- 11.4** Fire resistance and smoke check doors shall be made of proper sizes and section as per the available opening at the site. Before proceeding with manufacturing, the contractor shall prepare and submit complete manufacture and installation drawing for approval of the Engineer-in-Charge and no work shall be performed until the approval of these drawings is obtained.
- 11.5** The term "Fire Rating" referred in tender documents means fire rating of complete assembly of fire check door e.g. frames, shutter, vision panel, glass, hinges and other hardware's. Doors will be approved only after door passes the required tests from fire testing lab approved by the Engineer-in-Charge. Cost of sample door and testing shall be borne by contractor.
- 11.6** Doors shall be fabricated to size in factory. Fabricated material shall be protected against any damage during transportation. Loading and unloading shall be carried out with utmost care. On receipt of material at site it shall be carefully examined to detect any damaged units/members. Arrangements shall be made for expeditious replacement of damaged units or members. Materials found acceptable on inspection shall be repacked in crates and stored safely.
- 11.7** Just prior to installation, the doors shall be uncartered and stacked on edge on level bars and supported evenly. The frame shall be fixed into position true to line and level using adequate

number of fasteners of approved size and manufacture and in an approved manner. The holes in concrete /masonry member for housing anchor bolts shall be drilled with an electric drilling machine only.

**11.8** Stainless steel ball bearing hinges, panic bars, door trims, fire rated hydraulic door closers, handles, tower bolts, lock and other fittings shall be provided as per requirement and shall be got approved from Engineer-in-Charge. All hardware's should have a minimum 02 Years of manufacturer warrantee from the date of supply. Hardware should be "CE" / "UL" certified with required fire ratings and relevant documents to this effect shall be produced at the time of approval of samples.

**11.9** The design of fire check/rated doors and material to be used in their construction have to be such that the doors shall be capable of providing an effective barrier of desired rating.

## **12.0 ALUMINIUM WORK:**

- (a) Before taking up any procurement/construction activity, shop drawings (for fixing of all kind of Aluminum Works, showing all hardware) shall be prepared and submitted for obtaining approval from Engineer-in-Charge.
- (b) Minimum weight of aluminum section for door, windows and ventilators shall be as per relevant standards.
- (c) Kiln seasoned hard wood shall be filled inside door frames on hinged side and top of frames wherever hydraulic door closers are to be provided.
- (d) Frames shall be fixed with dash fastener of minimum size 10 x 100 mm as per approved shop drawings.
- (e) Gap between aluminum frame / uPVC window and adjacent RCC / masonry work shall be filled by providing weather silicon sealant over backer rod of approved quality as per direction of Engineer-in-Charge.
- (f) The material for the work shall be procured from the approved manufacturer as per list of preferred make for materials in this contract. The Contractor shall procure and submit samples of various materials to be used in the work for the approval of Engineer-in-Charge and no work shall commence before such samples are approved. Samples of un-anodized as well as polyester powder coated aluminum sections, microwave cured EPDM gaskets, glass, stainless steel screws, anchor fasteners, hardware and any other material or components requiring approval of samples, in opinion of Engineer-in-Charge, shall be submitted for the approval as mentioned above. The above samples shall be retained as standards of materials and workmanship.
- (g) Fabrication: The factory for fabrication and coating of windows/doors/frameworks shall be got approved from Engineer-charge.
- (h) All joints shall be accurately fabricated and be hairline in appearance. The finished surface shall be free from visible defects. All the windows, ventilators, doors shall be factory made and shall be brought to site for assembly and fixing.
- (i) All hardware used shall conform to the relevant specifications. Design, quality, type, number and fixing of hardware shall be generally in accordance with shop drawings and as approved by the Engineer-in-Charge before use.

- (j) All doors, windows, ventilators and glazing etc. shall be made water tight with microwave cured EPDM gaskets and weather silicone sealants to the satisfaction of the Engineer-in-Charge.
- (k) The corners of the frame being fabricated to the true right angles. Both the fixed frames and openable shutter frames shall be fabricated out of sections cut to required length, mitered and mechanically jointed for satisfactory performance. All members shall be accurately machine milled and fitted to form hairline joints. The jointing accessories such as aluminum cleats, stainless steel screws etc. shall not to cause any bi-metallic reaction by providing separators, wherever required. Vertical members of the aluminum frame work shall be embedded in the floors, wherever required, by cutting and making good of the floor.

#### **(l) FIXING OF ALUMINIUM FRAME WORK**

- i. The screws used for fixing fixed aluminum frames of the aluminum windows to masonry walls / RCC members and aluminum members to other aluminum members shall be of stainless steel of approved make and quality and of stainless-steel grade 304. Threads of machine screws used shall conform to requirement of I.S. 4218.
- ii. For the aluminum windows, the gap between the aluminum frames and the R.C.C / Masonry and also any gaps in the various sections shall be filled with weather silicone sealant DC 795 of Dow Corning or equivalent in the required bite size, to ensure water tightness including providing and fixing backer rod, wherever required. The weather silicone sealant shall be of such approved colour and composition that it would not stain or streak the masonry / R.C.C. work. It should not sag or flow and shall not set hard or dry out under any conditions of weather and shall be tooled properly. The weather silicone sealant shall be used as per the manufacturer's specifications and shall be of approved colour and shade. Any excess sealant shall be removed / cleared.
- iii. Fixing of glass panes shall be designed in such a way that replacing damaged / broken glass pans is easily possible without having to remove or damage any members or interior finishing materials.

#### **(m) PROTECTIONS AND CLEANING**

- i) All glass pans shall be retained within aluminum framing by use of exterior grade microwave cured EPDM gaskets. Use of glazing or caulking compounds around the perimeter of glass will not be permitted. There shall be no whistling or rattling. Before installation of glass, Contractor shall ensure the following:
  - All glazing rebates shall be square, to plumb, true to plane, dry and free from dust.
  - Glass edge shall be clean and cut to exact size and grounded.
- ii) Glass of specified thickness in doors, windows, ventilators and fixed glazing etc. shall be of approved make and standard quality conforming to C.P.W.D. Specifications.

### **13.0 FLOORING, MARBLE, CLADDING WORK:**

All flooring work and cladding work in Granite, Tile, Marble, Stones, Wooden, PVC, Vinyl etc. in general shall be carried out as per CPWD Specifications 2019, Volume-I & II with

revisions, amendments, correction slips upto last date of bid submission (including extensions if any). The tiles, stones shall be of approved colours and shades and will be laid in pattern as per approved architectural drawings or shop drawings. Nothing extra shall be paid for laying tiles, different stones in specific design/pattern. The tiles shall be of first quality of approved make and nothing extra shall be paid for use of cut/sawn tiles in the work. Before taking up any procurement/construction activity, shop drawings shall be prepared and submitted for obtaining approval from Engineer-in-Charge.

- 13.1** Proper gradient shall be given to flooring for toilets, verandah, kitchen, courtyard, corridors etc. so that the wash water flows towards the direction of floor trap. Any reverse slope if found, these shall be made good by the contractor by ripping open the floor/grading concrete and nothing shall be paid for such rectifications.
- 13.2** Samples of flooring material are to be deposited well in advance to the Engineer-in-Charge for approval. Approved samples should be kept at site with the Engineer-in-Charge and the same shall not be removed except with the written permission of Engineer-in-Charge.
- 13.3** The samples shall be submitted along with the following details:
- a) Three representative samples for each type of flooring/cladding specified.
  - b) Details of physical characteristics such as dimensional tolerances (within the specified limits), water absorption, compressive strength, Mohs Hardness, Specific gravity with reference to IS or International standards.
  - c) Source of supply and confirmation of availability in full quantity and uniformity of colour, tone and textures.
  - d) Company profile of Suppliers.
- 13.4** The Engineer-in-Charge or his representative may, if required, visit the source of supply of the various materials (Granite/Stones/Marble/Tiles/Cladding etc.) to assess the quality as well as availability of the material in the required quantities.
- 13.5** The entire supply for each type of granite/stone slabs shall be procured preferably from one location (in one quarry), and supplied preferably, in one lot to keep variations to the minimum. The Contractor shall also segregate and sort the slabs according to colour, shade, texture and size of grains etc. to keep variation(s) in stones used at any one floor to the minimum. Any slab with variation in the colour, shade, texture and size of grains etc., not acceptable to the Engineer-in-Charge, shall not be used in the work and shall be removed and replaced by the Contractor. Nothing extra shall be payable on these accounts.
- 13.6** Based on the samples approved by the Engineer-in-Charge for various flooring and dado / cladding materials as specified hereinafter, the contractor shall prepare mock up(s) at site of work for approval of quality of workmanship and material specified. If the quality of the workmanship and the material is as per the required standards and approved by the Engineer-in-Charge, the mock up shall be allowed as part of the work. Otherwise, it shall be dismantled by the contractor as directed by the Engineer-in-Charge and taken away from the site of the work at his own cost. The mock up(s) so made shall be kept till completion of respective works for reference.
- 13.7** The material (Granite, Stones, Marble, Tiles, Cladding etc.) shall be transported to site well packed in boxes or otherwise. These shall be handled carefully to prevent any damage. Granite stone slabs shall be individually packed in cardboard paper. The various types of stones and tiles, procured shall be free of any surface defect or any edge damage. The damaged (Stones, Marble, Tiles, Cladding etc.) shall not be allowed to be used in the work.



So, the contactor shall procure additional quantity of the stone and tiles to cover such contingencies. The stone slabs shall not be waxed or touched up with dyes / colours.

**13.8** The following tolerances shall be allowed in the dimension of granite stone slab:

- a) Length  $\pm$  1mm
- b) Width  $\pm$  1mm
- c) Thickness - 1mm
- d) Angularity at corners  $\pm$  0.25%

The stone (slab and tiles) not meeting the above tolerance limits shall be rejected and not permitted to be used in the work. Nothing extra shall be payable on this account.

**13.9** Stone slabs shall have uniform thicknesses within the tolerance limits and linear items like treads, sills and jambs, coping, risers, urinal partitions, kitchen and wash basin platforms, vanity counters, facias and other similar locations etc. shall have edge polished calibrated thickness i.e. exposed edges shall have edge polished uniform thickness throughout the length of the work.

**13.10** The flooring work shall be carried out as per the architectural drawings in design and pattern (geometric, abstract etc.) and in linear and / or curvilinear portions and in combination with stones of different colour and shade and ceramic tiles etc. For the flooring portions curved in plan, the stone slabs (at the edge) shall be cut to the required profile and shape as per the architectural drawings. Nothing extra shall be payable on this account and any consequent wastages and incidental charges on such accounts shall be deemed to be included in the cost.

**13.11** The granite slabs used for providing and fixing in the sills, soffits and jambs of doors, windows, ventilators and similar locations shall be in single piece unless otherwise directed by the Engineer-in-Charge. Wherever stone slab other than in single piece is allowed to be fixed, the joints shall be provided as per the architectural drawings and as per the directions of the Engineer-in-Charge. In the cabin areas, the joints in sills shall preferably be provided in line with the partition wall. Depending on the number of joints, as far as possible, the stone slabs shall be procured and fixed in slabs of equal lengths as per the architectural drawings and as directed by Engineer-in-Charge.

**13.12** The specifications for dressing, laying, curing, finishing etc. for the granite stone flooring shall be same as that of works for the Marble flooring, skirting and risers of steps under Flooring Sub Head of the CPWD Specifications. The wall lining / veneer work with granite stone shall be as per the CPWD Specifications for Marble work Sub Head.

**13.13** For flooring work, the joints between the different types of flooring shall be located as per the architectural drawings. Also, the contractor shall maintain the uniform level of the finished flooring of the different types unless specifically mentioned on the architectural drawings.

**13.14** All the flooring works specified under this sub-head shall be adequately protected by a layer of plaster of paris which shall be laid over a 400 micron PVC film. POP protection layer shall be laid on all finished floors for protection from damage during execution of other items of work in that area which shall be removed and cleaned just before handing over of the premises.

**13.15** One piece Granite stone for treads / risers in staircase shall be used including rounding of nose.

**13.16** For the skirting in the enclosures with curvilinear profiles, the (Stones, Marble, Tiles,



Cladding etc.) shall be cut to the required size and the shape to match the profile and/ or the joints as per the architectural drawings. Similarly, the skirting shall be fixed in a manner as to flush or project from the finished face of the wall as per the architectural drawings and as directed by the Engineer – in– Charge. Any chasing of the masonry works required for such fixing is deemed to be included in the cost of masonry.

- 13.17** Granite stone tiles and slabs shall be pre polished (mirror polished), eggshell polished, flame finished or given any other surface treatment as specified in architectural drawings and as directed by the Engineer-in-Charge.
- 13.18** Machine polishing and cutting to required size shall be done with water (as lubricant) only. Sawing shall also be done preferably with water as lubricant but as a special case, the Engineer-in-Charge may permit, at his discretion, oil or kerosene as lubricant subject to all kerosene or oil in the body and surface of tiles / slabs being thoroughly dried in ovens. Tiles / slabs with stains or patches due to the use of oil or otherwise, either before or after installation, shall be rejected and shall be replaced by the contractor at his own cost.
- 13.19** The exposed cut edges of the kota stone slab in risers and treads along its width (sides of the risers and treads of the steps i.e. along the shorter dimensions of the kota stone slab for the risers and treads) shall be polished in a workmanlike manner. The top exposed edge of the kota stone skirting shall also be polished in a workmanlike manner.
- 13.20** Nosing / edge moulding shall be provided to the front edge of the kota stone slab treads along its length i.e. along the longer dimensions of the kota stone slab, as per the architectural drawings.
- 13.21** At the time of handing over, flooring & dado / cladding shall be free of any scratches, stains etc. The flooring & dado / cladding shall be properly cleaned before handing over. However, abrasive cleaners shall not be used to clean the marks and other scratches.

#### **14.0 ROOFING WORK:**

All roofing work in general shall be carried out as per CPWD Specifications 2019, Volume-I & II with revisions, amendments, correction slips upto last date of bid submission (including extensions if any). Before taking up any procurement/construction activity, shop drawings shall be prepared and submitted for obtaining approval from Engineer-in-Charge.

- 14.1** At inlet mouth of rain water pipe, cast iron grating 15 cm diameter and weighing not less than 440 grams shall be provided.

#### **15.0 FINISHING WORK:**

- 15.1** Necessary drip course shall be provided in Chajja, Balcony, Projecting Roof, Beams etc.
- 15.2** All the internal surfaces including exposed ceiling (non false ceiling areas) shall be finished with 2 mm thick POP, one coat of cement primer and two or more coats of paints.
- 15.3** Application of paints shall be done with mechanical equipment. Mechanical sanding machine (for scrubbing & preparation of surface) shall be used by the contractor.
- 15.4** All the steel work shall be applied two or more coats of synthetic enamel paint over a coat of suitable primer of approved brand and manufacture with ready mixed red oxide zinc

chromatic on steel / iron works having VOC content less than 250 grams/litre.

## **16.0 STAINLESS STEEL WORK:**

Stainless steel of grade SS 316 grade Aluminum Mild steel/GI railings and grills shall be provided as per architectural design in Balconies, staircases, steps, Ramp's corridors and in other common circulation area as indicated in drawings and in accordance with provisions of NBC 2016.

Unless otherwise specified, stainless steel generally shall be of SS 316. Lower grades shall not be used. Before taking up any procurement/construction activity, shop drawings shall be prepared and submitted for obtaining approval from Engineer-in-Charge.

Factory-made stainless-steel railing shall be provided with SS 316 grade stainless steel with adequate rods parallel to handrail, balusters, flanges, end caps, newel posts with caps etc. complete as per approved drawings and direction of Engineer-in-charge.

Surface finish of all the stainless-steel materials will be in 240 grit satin finish / matt finish. All stainless-steel material will have to be coated by a solution of Inox to avoid finger in prints and avoidance of settlement of environment / atmospheric dust. Stainless steel railing, both sides in staircase and external ramp with double handrail shall be used for barrier free accessibility requirements with adequate SS balusters, runners etc as per approved architectural drawing. Fixing shall be done by stainless steel expansion bolts of approved size and make as per direction of Engineer-in-Charge. Welding shall be done by using organ welding rods and the surface being duly finished and cleaned by K2 passivation, which is nitric acid plus florid acid solution treatment by which the chances of corrosion will be eliminated and any burn out makes on the metal will also be eliminated.

## **17.0 WATER PROOFING & INSULATION WORK:**

For waterproofing of works below plinth/ground/road level complete envelope/box shall be ensured. All the RCC works shall be given waterproofing treatment by adding the cementitious integral crystalline admixture in reinforced cement concrete at site of work.

1. The work shall be got executed as per CPWD Specifications and as per the manufacturer's specification through specialized agency as approved by the Engineer-in-charge.

The contractor shall furnish the following particulars immediately after the issue of letter of acceptance by the department.

- a) The name of the specialized firm.
- b) The trade names of the product, which would be used.
- c) List of works where the treatment has been used.
- d) Quantity of chlorides and sulphides used in the product.

### **GUARANTEE FOR WATER PROOFING TREATMENT**

2. The contractor shall be fully responsible for and shall guarantee proper performance of the entire waterproofing system for a period of 10 (Ten) years from the final completion of works. In addition, specific 10 years written guarantee (to be furnished in a non-judicial stamp paper of value not less than Rs.100/-) in approved proforma shall be submitted for the performance of the system, before final payment and shall not in any way limit any other rights the Employer may have under the contract. Guarantee for water proofing shall comprises of all the items described above in particular specification.

3. All water-proofing work shall be carried out through approved specialist agency as per method

of working approved by the Engineer-in-charge. However, the contractor shall be solely responsible for waterproofing treatment until the expiry of the above guarantee period.

4. TEN years guarantee in prescribed proforma attached shall be given by the contractor for the water proofing treatment. Towards that 10% (ten percent) of the cost of these items of water proofing under this sub head worked out on prevailing market rate shall be retained as guarantee to watch the performance of the work executed. However, half of this amount (withheld) would be released after five years from the date of completion of the work, if the performance of the waterproofing works is satisfactory. The remaining withheld amount shall be released after completion of ten years from the date of completion of work, if the performance of the waterproofing work is satisfactory. If any defect is noticed during the guarantee period, it should be rectified by the contractor within seven days of issuing of notice by the Engineer-in-Charge and, if not attended to, the same shall be got done through other agency at the risk and cost of the contractor and recovery shall be effected from the amount retained towards guarantee. In any case, the contractor and the specialist agency, during the guarantee period, shall inspect and examine the treatment once in every year and make good any defect observed and confirm the same in writing. The security deposit can be released in full, if bank guarantee of equivalent amount, valid for the duration of guarantee period, is produced and deposited with the department.

## **18.0 ROAD WORK:**

- 18.1 All roads will be cement concrete roads, as per MORTH specifications (Latest edition), laid over sub grade (duly prepared with power roller) of required thickness as per design. The drainage, signages (Informative, Mandatory, Regulatory etc.) other works associated with road works shall be provided as per relevant standards and specification MORTH Specifications for Road and bridge work (Latest edition).

## **19.0 SIGNAGES:**

Signages inside/outside buildings shall be as per NBC 2016 guidelines and of approved design and make with LED backlit. Each room shall be provided with Name Boards, Numbering of rooms, Signages etc. The contractor shall prepare the detailed shop drawing in compliance to the NBC 2016 guidelines and Harmonized Guidelines & Standards for Universal Accessibility in India 2021 (available on CPWD Website) of Ministry of Housing and Urban Affairs, Government of India.

Signage works include providing and fixing Building Entrance signage, Tactile Layout, Emergency Evacuation Layout on the wall or with any other required structure. Each signboard shall be fixed strictly as per the Harmonised Guidelines & Space Standards for Barrier Free Built Environment for persons with Disability, issued by MOUD, Govt. of India, and as per approved drawings and complete as per the directions of Engineer - In - Charge.

## **20.0 Sanitary Installations and Water Supply:**

All the work in general shall be carried out as per CPWD Specifications 2019, Volume-I & II with revisions, amendments, correction slips upto last date of submission of bid. The work shall be in conformity with the bye-laws, regulations and standards of the local authorities concerned. The contractor shall be responsible for the protection of the sanitary and water supply fittings, other fittings and fixtures against pilferage and breakage during the period of installation and thereafter until the building/work is handed over.

- a) All Storm pipes/ NP2 RCC pipes shall be complete with fittings.

- b) All concealed work shall include cutting chases and making good the walls etc.
- c) In toilets and other waste water disposal areas sanitary pipe lines shall be suspended from the floor slabs i.e. the floor slabs should not be depressed on account of accommodating sanitary lines. These overhanging sanitary lines shall be camouflaged by moisture resistant false ceiling.
- d) Plumbing system shall be designed and provided as per the functional requirements of the buildings.
- e) Double stack system shall be followed. All sewerage to be connected to one stack and all drainage to be connected to other stack.
- f) Water supply and sanitary fittings shall be provided as per the functional and architectural requirements.
- g) Pipes shall be duly fixed to the wall by bracket. All pipes shall be fixed with clamps at maximum 1.00 m spacing.
- h) All drainage in balconies shall have their inlets in plan. All drainage through balconies shall be connected to Rain Water Harvesting.
- i) Utility balcony drainage shall be suitably treated and shall not be connected to Rain Water Harvesting System.
- j) For buildings, the stacks shall be provided in shafts which shall be covered with weather proof doors and accessible for maintenance.
- k) **Soil, Waste, Vent & Rainwater Pipes & Fittings:** Two pipe system as recommended in code of practice for soil and waste pipes as per (IS: 5329). Separate vertical stacks for **Soil pipes** (to carry the wastes from WC's & urinals) and **Waste pipes** (to carry the wastes from waste appliances e.g. showers, lavatory basins, kitchen sinks etc.) shall be provided.
- l) The soil, waste, vent pipes system shall include horizontal soil, waste and vent pipes, and all fittings, joints, clamps, connections to fixtures, floor and urinal traps, cleanout plugs, inlet fittings, UPVC rain water pipes, testing of all pipe lines.
- m) All sanitary ware & C.P brass fittings shall be low flow rate fixtures to meet the green rating requirement. Single lever basin mixer shall be provided with all wash basins. Urinal shall be provided with automatic sensor based flushing system.
- n) Contractor shall furnish without cost all such accessories and fixing devices that are necessary and required but not supplied along with the plumbing fixtures & CP fittings by the manufacturers as a part of the original and standard supply. All fittings and fixtures shall be fixed in a neat workmanlike manner true to level and heights shown on the drawings and in accordance with the manufacturer's recommendations. Care shall be taken to fix all inlet and outlet pipes at correct positions. Faulty locations shall be made good and any damage to the finished floor, tiling or terrace shall be made good at contractor's cost. Fixing screws shall be half round head

chromium plated brass screws with C.P. washers where necessary. Contractor shall seal all fixtures fixed near wall, marble and edges. With an approved type of poly-sulphide sealant appropriate for its application.

**21.0 Drainage (External Water-Supply/Sewerage/Storm Water Drainage/Rain Water Harvesting System):** Inspection chambers/manholes/ gullies chambers/ valves and other accessories of approved specifications and make shall be provided considering all the site conditions and reduced level as per design parameters. As far as possible green and recyclable materials shall be preferred.

- a) All drainage work shall be done in accordance with the local municipal bye-laws. Location of all manholes, etc. shall be got approved from the engineer in charge. No drains or sewers shall be laid in the middle of road unless otherwise specifically shown on the drawings or directed by the Engineer in charge.
- b) The contractor shall design the rain water harvesting system and construct the same for entire campus in holistic manner. Rainwater harvesting system shall be designed and provided as appropriate to the site and as per municipal byelaws and Central Ground Water Board norms.
- c) Unless otherwise specified, minimum & maximum velocity of sewer pipe shall be 0.75 m/sec & 2.0 m/sec respectively. Unless otherwise specified, minimum & maximum velocity of Storm water pipe shall be 0.6 m/sec & 2.0 m/sec respectively.
- d) Manhole shall be built in brick masonry with common burnt clay F.P.S. (Non-modular) bricks class designation 7.5 with cover and frame (SFRC) or as specified/shown in drawings. Size and depth of manholes shall be as per NBC 2016 / CPWD specifications.
- e) Gully traps: Gully traps shall be fixed in cement concrete mix and a brick masonry chamber 30x30 cms inside in cement mortar 1:5 with 15x15 cms grating inside and 30x30 cms C.I sealed cover and frame weighing not less than 7.0 kg (approx.) to be constructed as per detailed drawing.

## **22.0 Façade Work:**

This specification covers the general requirements of external facade work (e.g. Structural Glazing, Curtain Wall, GRC Panel, ACP, Aluminum composite, Exterior Grade HPL etc.) including engineering design involving structural stability of system as a whole e.g. supply, fabrication, installation, testing, ensuring water tightness and maintenance etc. Work under this section shall be performed by specialized agency, who is regularly engaged in the engineering, fabrication, finishing and installation of façade work including glazing and sealing of glass etc. and having experience in similar works. Only after written approval of engineer in charge, the contractor will engage such specialized agency.

### **22.1 SCOPE OF WORK:**

- a) The scope of work includes all labour, material, equipment and services as required for the complete design, engineering, testing, and fabrication, assembly, delivery, anchorage, installation and water tightness of the façade system. The scope of work also includes complete design, engineering, testing, fabrication, assembly, delivery, anchorage and installation of a suitable gondola/jib system for cleaning of the vertical glass, stone, GRC facade.

- b) The contract documents define only the design intent and general performance requirements. The contractor is fully responsible for detailed design, structural calculations, shop drawings, procurement of materials, fabrication, installation, warranties, certifications and related documentation. The entire work shall be carried out strictly in accordance with the true intent and meaning of the specification and drawings taken together regardless of whether the same may or may not be shown particularly on the drawings or described in the specification provided that the same can be reasonably inferred.
- c) Only suggestive sizes and details are proposed by the Engineer-in-charge that has a visual impact on facade. Contractor's fabrication / shop drawing will seek these suggestions and design the final construction details. The complete design of façade system will be submitted by contractor to engineer- in-charge for approval.
- d) The facade shall be designed, fabricated at works, supplied, delivered and installed in accordance with the shop drawings and samples of materials approved by the Engineer-in-charge and shall be constructed to meet the performance requirements and standards.
- e) In general, the façade system should be designed to suit the aesthetics and performance requirements, taking into consideration the necessary factors to suit fabrication and the site conditions for erection.
- f) The contractor must comply with all applicable local-building regulations and all the safety guidelines particularly specified for facade work as per relevant I.S codes.
- g) Shop and field materials and workmanship shall be subject to inspection of the Engineer-in-charge and his authorized representative at all time. Such inspections do not relieve the contractor from obligations to provide materials conforming to all requirements of the contract documents and industry standards for material quality.
- h) All approvals, instructions, permission, checking, review etc. whatsoever by the Engineer-in-charge shall not relieve the contractor of his responsibility and obligation regarding adequacy, correctness, completeness, safety, strength, quality, workmanship etc. of the facade system.
- i) Testing will be done as per nomenclature of the DSR item of typical DGU Panel of approved size in factory and in field through an approved testing agency.

## **22.2 Façade System Description**

- a) The contractor shall devise a suitable framing system for vertical/roof façade application keeping in view the performance characteristics and aesthetics requirements.
- b) The vertical/roof structural glazing system shall be fully unitized / Toggle based curtain wall or Semi-unitised and shall be designed to suit sealed insulated glass units (hereafter referred to as "IG unit"). Aesthetically the design of the glazing system shall provide a filtering envelope to the building/structure and provide a uniform appearance. The glazing system shall have flush glazed exterior joints both horizontal and vertical. The structural glazing system shall be designed to receive fixed glazing as well as structurally glazed operable vents with protection of the glass edges. The contractor shall take adequate measures to ensure the thermal performance of the glazing system under the increased solar radiation prevalent in the region. No onsite sealant application will be permitted except for weather sealant in case of unitized system. The system shall comprise of factory prefabricated glazed vision and spandrel panels. The system should



preferably permit re-glazing of vision panels from outside the building. The contractor should choose an approved system also keeping in view the various requirements arising during future maintenance during the life span of the glazing system.

- c) The structural glazing system shall be designed to allow for three-dimensional adjustments due to dead load, live load, wind load, seismic load and thermal movement. The framing system must be designed to provide adequate support for the IG units to prevent transfer of loads to the glazing below and to provide uniform support to both lites of the IG unit. Intermediate mullions should be of same size as that of outer mullions.
- d) The structural aspects of the structural glazing system must be carefully integrated with the glazing rabbet and drainage details to ensure proper performance. The structural glazing system shall be designed on the rain screen principle with provision for pressure equalization.
- e) The structural silicon sealant to be used in this structural glazing system shall be of such quality & designed to transfer wind, seismic, live and dead loads from the glass to the framed structure of the structural glazing.
- f) The façade system shall have floor-to-floor noise isolators, fire and smoke stops between the floor slabs and sill flashing etc. as per the NBC of India and also of the best international practices.
- g) The façade system shall have spandrel panel (over solid surfaces e.g. columns, masonry wall etc.) of Aluminium composite panel or toughened glass backed by shadow box (made of Al assembly).

### **22.3 PERFORMANCE REQUIREMENTS FOR FAÇADE SYSTEM**

#### **(i) Façade System design parameters:**

- a. The façade system and its components shall be designed to withstand dead loads and live loads caused by positive and negative wind loads acting normal to the plane of the façade system. Design wind loads shall be 1.74 Kpa and proof load of 2.61 KPa. The contractor is required to submit the design calculation and weight of aluminium per meter. The system shall also be designed to withstand seismic forces as calculated in accordance with IS: 1893 (latest revision) under seismic zone classification applicable to the site.
- b. Apart from the above, the glass and the glazing system should also be designed to withstand a concentrated load of 100kg applied at any location so as to produce the maximum stresses in the glazing components. This load is envisaged to- be encountered during cleaning of the glass facade.
- c. The stress on structural sealant shall not exceed 20 psi under any circumstances. Thermal breaks shall be considered unable to transfer shear stress for composite action of flexural members. Assume elements joined by thermal breaks to act separately.

#### **(ii) Deflection:**

- a. The deflection of any structural member in the plane normal to the glass surface when subjected to the specified loads shall not exceed  $L/175$  of its clear span and shall be fully recoverable on withdrawal of the specified loads. Deflection of any



framing member shall not exceed 19mm within any glass panel.

- b. Parallel to façade plane, deflection of a framing member when carrying full design load shall not exceed an amount reducing the glazing unit bite below 75% of the design dimension. It shall also not reduce the edge clearance to less than 3mm nor shall it damage or impair the function of any joint seals.
- c. The deflection of the horizontal member due to the weight of the glass shall be limited to 3mm or 25% of the design edge clearance of the glass or panel below whichever is less.
- d. Twisting or rotation of the horizontal member under dead load of glass shall be limited to 1° by calculation from the horizontal plane.
- e. There shall be no in plane raking.
- f. In case either lite of the IG unit develops crack, the remaining lite should be capable of supporting the entire load. The overall strength and deflection behaviour shall be calculated on the basis of the weakest lite.

(iii) **System assembly:**

The system assembly should accommodate the following without damage to the system, components or deterioration of seals.

- Movement within the system
- Movement between system and perimeter framing components.
- Dynamic loading and release of loads
- Deflection of structural support framing
- Tolerance of supporting components
- Shortening of building concrete structural columns
- Creep of concrete structural members
- Inter story drift
- A mid span slab edge deflection: of 25mm
- Accommodate building construction tolerance of +30mm. These tolerances are not cumulative.

(iv) **Water Tightness:**

Water penetration shall be defined as the appearance of uncontrolled water on inside face of any part of the structural glazing. No water leakage will be permitted when tested in accordance with ASTM E331. The test shall be carried out for duration of 15 minutes with a test pressure difference of 20% of design pressure with a minimum differential of 137 N / mm<sup>2</sup> and a maximum of 575 N / mm<sup>2</sup>. The minimum uniform water flow rate of 3.4L/m<sup>2</sup>/min.

## **22.4 LABORATORY TESTS FOR WATER INFILTRATION:**

(i) Tests:

- a) TESTS FOR WATER INFILTRATION: Static Pressure Test: No water infiltration shall occur when the mock-up is tested accordance with ASTM E-331 with the static pressure differential and the total time as specified.
- b) Dynamic Pressure Test: No water infiltration shall occur when the mock-up is

tested in accordance with AAMA 501.1 with the dynamic pressure differential and the total time as specified.

(ii) **FILED MOCK – UP:**

In the presence of representatives of Owner, Engineer-in-charge, Contractor, Installer and Manufacturers, the Testing Agency shall conduct field tests on each of the installed Mock-Ups in accordance with methods described in AAMA 501.2 "Filed Check of Metal Curtain Walls for Water Leakage" using the loads specified in "performance Criteria". Notice for testing to allow for witnessing test shall be given several weeks before. Approximately 50% of each Field Mock-Up shall be field water tested. All interior finishes including trims should be left off to allow for clear viewing.

(iii) **REMEDIAL WORK:**

If the Field test of any Mock-Up reveals leakage, points of entry and paths of flow of water shall be identified, analyzed, and necessary remedial work shall be established, subject to Engineer-in-charge's review and comment. Repairs and/or modifications shall be made to the entire mock-up based on these findings and, after adequate curing of all sealants, re-test to successful conclusion. Re-testing after remedial work shall be from 50 percent to 80 percent of the mock-up at the Engineer-in-charge's recommendation. The re-test area designated does not necessarily have to be exactly the same as the original test area of the mock-up.

**22.5 METHOD STATEMENT FOR HOSE TESTING (ON SHORE) AT SITE: -**

- (i) **STANDARD:** - AAMA 501.2 — 94 Field Check of Metal Storefronts, Curtain Walls, and Sloped Glazing Systems for Water Leakage.
- (ii) **TEST AREA:** - Area (s) to be tested will be selected by the Engineer-in-charge accordance with the standard. The total area will be not more than that can be tested in one day. Testing shall be done at least one area of 100 square feet, in accordance with the test standard, or more, depending on the time, and availability of suitable access to the exterior. In case of failure the prescribed procedure for a reasonable time but not more than that can be completed on the same day shall be followed. The test will be supervised via two-way radio from the inside.
- (iii) **EQUIPMENT:** - Testing equipments generally consists of the following and any other equipments as required for carrying out the test-
  - The 'Monarch' nozzle with pressure gauge and valve as prescribed by AAMA and recommended by CWCT.
  - Two-way headset radio for communication between engineers and the people in the cradle.
- (iv) **Other Requirements:**
  - a. (Optional) washing of the area as recommended in Paragraph 7.4 of the CWCT Standard.
  - b. Visual checking of test area for snags, visible defects etc.

- c. A cradle or scaffolding on the exterior at the locations (s) of the test specimen (s) with an operator, a person to stabilise the cradle, a person to hold and point the nozzle, technical person to communicate between the people on the exterior and test engineer.
- d. Clean water in a minimum supply hose with approximately 4 bar pressure. Note that the pressure given for the test is with the water flowing, much higher actual pressure is necessary. Water pressure drops 1 bar for every 10m rise in height.
- e. Drying of test area and application and removal of tape if necessary to locate leaks.

(v) TEST CRITERIA: -

Water will be sprayed at a pressure of 30 —35 psi (2.07-2.41 Bar) in accordance with the test standard. The flow rate will not be monitored. The nozzle will be held 30 cm. from the wall spraying 1.5m lengths back and forth along each joint, successively, for five minutes each, working from the bottom up. Joints are interfaces between materials, and where these are less than 120mm apart are to be considered one joint.

(vi) TEST PROCEDURE

- a) The initial area shall be the width of the cradle. The lowest horizontal joint will be wetted first, covering each 1.5m length in five minutes.
- b) Next the cradle will be positioned so that the first 1.5m above the bottom horizontal joint can be reached and each vertical will be sprayed in turn over a period of 5 minutes.
- c) The cradle will then be raised to test the next 1.5m and then the next horizontal and so on.

(vii) LEAKAGE:

If there is any leakage the test will be stopped and the procedure described in the Standard will be followed up to the time allowed. A compliance report suggesting any modification / corrective steps to be taken if any leakage was observed.

**22.6 Air Infiltration:** When tested in accordance with ASTM E283, air infiltration shall not exceed 0.03 l/s/sqm of wall area, measured at a reference differential pressure across assembly of 200 Pa.

**22.7 System internal drainage:** Water entering joints, condensation occurring in glazing channels, or route moisture occurring within the system is drained to the exterior by a weep drainage network. The system shall be designed such that water being drained in the system shall not cause any damage to the permanent works. The system shall not be face sealed and shall not rely on wet seals.

**22.8 Expansion/Contraction:** The system shall provide for expansion and contraction within system components caused by a cyclical temperature range of 80<sup>0</sup> cover a 12hour period without causing any detrimental effect to the system components.

**22.9 Test for structural performance:** When tested in accordance with; ASTM E330, the glazing

system shall conform to the performance requirements.

**22.10 Special instructions:** Vibration harmonics, wind whistles, noises caused by thermal movement, thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of the system will not be permitted.

**22.11 HEAT SOAKING OF GLASS:** To minimize nickel sulphide (NIS) fractures at site, heat soaking test is to be conducted within the factory. Minimizing NiS fractures at site is mainly about making sure that fractures happen within the factory rather than at site after installation. Heat soaking tempered glass is the most-common form of ensuring that the chance of NiS infected panes leaving the factory is minimized. The goal during heat soaking is to induce breakage at the factory to avoid on site breakage after installation. It is heating of glass to 280<sup>0</sup> C for 24 to 48 hours over temperature gradients to induce fracture. Due to inherent safety and security benefits it is highly recommended for tempered glass to be heat-soaked.

## **22.12 PRODUCTS/MATERIALS**

(i) Glass: Standard certification requirements are as under :

a) Float glass : ASTM C 1036

b) Tempered/ Toughened Glass: Toughened / Tempered glass shall be examined by the glass manufacturer to detect and discard any glass which exceed the following tolerance: 1.5mm bow in 600mm; 3mm bow in 1500mm; 6mm bow in 3000mm; 9mm bow in 4500mm. Where, the strengthening process results in essentially parallel ripples or waves, the deviation from flatness at any peak shall not exceed 0.13mm, and the difference between adjacent peaks shall not exceed 0.13mm. Where bow tolerance and wave tolerance differ, the stricter requirements shall govern. Direction of ripples shall be consistent and in conformance with architectural design. Following test shall be carried out by the glass processor at his own cost as per following provisions and the test report shall be submitted.

Thickness	Impact strength	Fragmentation	Surface Compression	Bending Strength
IS 2835-1987	IS-2553-PART-I	IS-2553-PART-1	ASTM C-1048-90	DIN 1249-PART:12

c) Laminated glass: (ASTM C 1172) : The laminated glass shall comprise of two glasses of equal thickness as per design and bonded with a poly vinyl butyral (PVB) interlayer, meeting criteria of ANSI Z97.1 for safety glazing. The PVB interlayer shall be minimum 0.38mm thick. No deviation will be accepted with respect to the PVB interlayer. Laminated Glass Units shall comply to EN12543.

d) General Requirements for all types of Glass: All base supply float/coated glass are to comply with the requirement of BS EN 572 parts 1, 2 and 3 or ASTM C1036 and assessed for optical and visual faults as described in BS EN 572-2. Spot faults shall not be no worse than category C. There will be no linear / extended faults. Optical faults shall be within the limits set in BS EN 572-2.

e) Fully Toughened / Heat Strengthened Glass: It shall comply with the

requirements of EN12150 or ASTM 1048 or EN 1863 -1 for heat treated Soda Lime Silicate Safety Glass. The residual surface compressive stress in the heat strengthened glass shall be below 52N/mm<sup>2</sup> when measured by GASP in accordance with ASTM F218-95 (2000) or > 69 N/mm<sup>2</sup> for Fully Toughened glass.

- f) Insulating glazed units: Hermetically sealed insulated glazed unit shall comply with BS5713 or EN 1279. Primary seal shall be of poly-isobutylene located between glass and spacer (Lisec / Alupro/ Profil glass or equivalent) providing a continuous vapor proof barrier of a minimum width of 2mm and a secondary two-part silicone sealant of approved make extending around the perimeter of the unit. The insulating glass unit shall be certified under a program approved by the sealed insulating glass manufacturer's association (SIGMA) providing third party validation of compliance to ASTM E 773 & E 774. All glass quality shall be glazing as per relevant ASTM standards.
  - g) Coating: Method of coating shall be of vacuum (sputtering) deposition. This coating is applied to control the solar heat gain and enhance the energy performance and comfort level of the building. The coating shall meet the requirements of ASTM C 1376-97 or EN 1096 part 2 and satisfy the thermal performance of the facade.
  - h) Performance requirements: Probability of breakage of glass shall not exceed 8/1000 for vertical glass upon first application of design pressures or due to anticipated thermal stresses.
- (ii) Openable panel (IGU), side hung or top hung, shall be provided as per extant guidelines of NBC, Indian standards and local bodies. These panels shall be installed with all accessories and hardware for the openable panels as specified/required and of approved make such as heavy-duty stainless-steel friction hinges, minimum 4-point cremone locking sets with stainless steel plates, handles, buffers etc. including necessary stainless steel screw, nuts, fasteners, bolts, washers etc.
- (iii) Sealant:
- a) The insulated glass unit shall have poly-Iso-butylene as primary sealant with low moisture vapour transmission rate and a structural silicone sealant for secondary seal. The secondary edge sealant shall conform to ASTM C 1369-97. The contractor shall indicate the classification of the edge sealant as per clause 5.0 of the ASTM C 1369. Structural flush glazed joints shall be a neutral cure high performance silicone sealant applied in accordance with the sealant manufacturer's instructions. Weather seal joints shall be a neutral cure medium modulus silicone sealant applied in accordance with the sealant manufacturer's instructions. Sealants shall be black color. Unexposed, low movement flashing joints shall be non-drying, non-skimming, non-oxidizing, non-bleeding glazing sealant meeting MMA 809.2. The sealant proposed by the contractor shall not bleed or stain under any circumstances. Contractor shall identify the sealant to be used along with the structural glazing system and submit detailed technical parameters of the sealant by way of the sealant manufacturer's printed data sheets. The Contractor will be responsible to carry out all the compatibility tests as listed below but not restricted to the following, with respect to the particular sealant from a laboratory approved by the engineer-in-charge. The following tests shall be carried out with respect to the sealant:

- ASTM C 794 Peel test

- ASTM C1135 -Test method for determining Tensile-Adhesion Properties of elastomeric sealant
  - ASTM C-719 -Test method for adhesion and cohesion of elastomeric joint sealant under cyclic movement
  - ASTM C-1087 -Compatibility test between the proposed structural silicone sealant and the finished aluminium extrusions (mullions and transom)
- b) For all sealant proposed to be used for the work, the contractor shall submit a letter of certification from the sealant manufacturer stating that the sealant has been tested for adhesion and compatibility on production of samples of metals, glass and other glazing components and that all sealant details and application procedures shown on the shop drawings are acceptable for use.
- c) To prevent excessive shelf life and facilitate the correlation of batches of sealant with panel production, silicone sealant generally shall be used in the sequence of their manufacture.
- d) The structural glazing contractor shall obtain from the manufacturer and the supplier written confirmation of that the material has not been subjected to temperatures in excess of 27 degree centigrade between manufacture and delivery to the contractor's factory. The contractor shall store all silicone sealant at or below 27 degrees centigrade up to the day of its application.
- e) Silicones which cure by different chemical reactions or which release different chemical by-products, e.g. acetic acid, alcohols, amines etc. during cure, should not come in contact to each other during fabrication, assembly and erection of the glazing system.
- f) All adjoining surfaces not to receive sealant's shall be protected against staining by masking tape.
- (iv) Other materials:
- a) The aluminium extrusions shall be 6063 alloy T6 temper conforming to ASTM 8221 or equivalent. They shall be clean, straight, with sharply defined edges and free from distortion and defects impairing appearance, strength and durability. It shall be of suitable wall thickness and profile for strength with respect to tension, shear and bending stresses, and lateral stability. The aluminum extrusions shall be coated with minimum 70% Kynar 500 based PVDF fluoropolymer resin coating (minimum 35 micron thick) of approved color and shade to comply with AAMA 605.2-1980.
- b) Fixing bolts, screws and nuts, where in contact with aluminium, will be of stainless steel 304.
- c) All dissimilar metal surfaces shall be isolated to prevent anti galvanic action. Materials used for this purpose shall be non-absorptive. Metal surfaces shall be separated in such a manner that metal does not move on metal.
- d) Aluminium surface in contact with mortar, concrete fireproofing, plaster, masonry and absorptive materials shall be coated with anti-galvanic moisture-barrier material and nothing extra will be paid for this.

(v) Accessories:



- a) Extruded gaskets, weather stripping, extruded seals and spacers which do not come into contact with structural silicone sealant shall be of ethylene propylene diene monomer (EPDM). Where in parallel contact with structural silicone sealant, all gaskets, setting blocks and spacers other than foam glazing tapes shall be of heat-cured silicone rubber, chemically compatible with the silicone sealant and suitable for the specific purpose intended. All extruded gaskets, weather stripping and spacers other than foam glazing tapes shall have continuous mechanical engagement to framing members; any adhesive attachment is not acceptable. Unless otherwise approved, gaskets, weather stripping, extruded seals and spacers shall have a hardness of 40+5 durometer Shore A.
- b) The cladding system shall be constructed with (and shall maintain during its design life) a standard of seal which shall not result in any reduction of sound insulation performance. Gaskets, weather stripping and seals used to achieve the required weatherproofing and/or air tightness shall be selected to accommodate fully the range of dimensional tolerances associated with fabrication and installation of the cladding system. Gaskets, weather stripping and seals shall be formed from materials capable of retaining their elastic qualities, dimensions and resistance to physical and chemical attack sufficient to maintain the full water tightness, air tightness and acoustic performance for the design life of the structural glazing system.
- c) Extruded gaskets, weather stripping, seals and spacers mechanically engaged by flutes or pockets extruded in framing member shall be installed without residual tension or extension. Dry lubricants may be used to reduce drag during installation of synthetic rubber extrusions and to induce compression so as to prevent gradual elastic shrinkage and retraction from their ends. Wet lubricants containing detergent shall not be used in any location from which spillage onto glass and aluminum surfaces cannot be immediately and completely removed at the factory. Concentrated detergents shall not be used for any purpose which may bring the liquid into contact with the coated surfaces of vision and spandrel glass.
- d) Setting blocks shall be dense heat-cured silicone rubber with a hardness of 80 to 90 durometer Shore A. Side blocks and anti-walking blocks shall be dense heat-cured silicone rubber with a hardness of 60 to 70 durometer Shore A.
- (vi) Flashing: To prevent leakage, flashing shall be formed from either stainless steel or aluminium or sheer neoprene of 1.5mm thickness with joints tapped and sealed 150mm minimum. Flashing shall be provided on all sides of glazing where external glazing terminates and wherever else required to provide a completely watertight installation. Wherever visible, it shall have the matching finish of Aluminium.
- (vii) Column closers: The Contractor shall supply and install suitable closer section to seal up the gap between columns and / or walls, which abuts the line of the external glazing. The principal function of the closer piece shall be to provide a neat connection with the external glazing as well as a means of cutting off stray artificial light from the outer face of the column / wall. The column closer shall be installed in such a way as to provide a flexible connection to allow for tolerances, external glazing movements and dimensional differences between the external glazing and the column and / or wall face. The column closer shall also be designed in such a way as to allow the following:
- Easy removal for maintenance.
  - Installation after finishes are applied to the column / wall.
  - Easy removal of internal glazing units for cleaning/ maintenance replacement.



- Compatibility with the requirements of the fire safety requirements.
- (viii) Fire Stop: At each floor edge, the required fire protection is to be maintained between elements of structure by using fire stop insulation to give a minimum of 2 hours fire protection between floors including in front of columns or blank walls. The fire stop material is to be installed to completely seal up the void between the face of the structure and the glazing and shall fully comply with local Codes and Regulations. The fire stop material must be flexible to allow movement between the structure and the external glazing. The fire stop material shall be located and held in position in such a way so as to ensure integrity of the fire protection as well as preventing accidental damage or loss of materials. The contractor is required to provide full details of all fire stop material including fire test certificates and confirmation of local fire service approved material status. Shop drawings shall also be submitted for approval showing the full details of fire stops.
- (ix) Finishes: All exposed framing members shall be free of scratches and other blemishes. All aluminium surfaces shall be electrostatic powder coated in stainless steel colour or as approved by the Engineer-in-charge. The anodic coating shall conform to IS:1868 - 1968 / IS- 5523:1983 and shall be of AC25 grade with minimum thickness of 20 microns when measured as per IS: 660/2-1970 and density shall be at least 32 Mg/sqm. The anodic coating shall be tested in an approved laboratory by eddy current method as per IS:6012 for thickness. Sulphuric acid shall be used as the electrolyte for the anodic process. Prior to anodizing, all aluminium shall be rendered uniform in appearance free from disfiguring scratches, stains or other blemishes and etched in caustic soda solution. Requisite tests shall also be carried out at the site as required by the Employer and the contractor shall arrange all assistance and equipment required for the purpose.

**22.13 PROGRAMME OF WORK:** The contractor shall submit a detailed program of work along with time schedule indicating the various items of work pertaining to the structural glazing work as below-

- Design and approval
- Shop drawings
- Submission of samples
- Mock-up
- Test reports
- Material co-ordination, ordering and delivery
- Fabrication
- Installation
- Inspection and remedial measures.

**22.14 DESIGN CALCULATIONS:**

- a. The contractor shall be responsible' for the design of the facade system including all its various components like glass, sealant, framing system, gaskets, fixing and anchorages proposed by respective specialists. The contractor shall submit structural design calculations prepared in accordance with relevant Indian/International codes and standards as applicable. The design shall be carried out under the direct supervision of a professional engineer experienced in design of this type of work and licensed at the place where the project is located. Structural design shall include, but not limited to, computations for the justification of external facade sections and connections including fasteners, welds and anchorage assemblies.
- b. The contractor shall submit for Engineer-in-charge's approval all structural calculations

with reference to structural properties and physical characteristics and dimensional limitations of the framing members of the facade system. The contractor shall also submit design calculations for all connections, the dimensions of all extrusions and complete data to be used for the project. Approval of structural calculations shall not relieve the contractor from any of the responsibilities and requirements specified therein.

- c. The contractor shall submit the, glass manufacturer's wind pressure analysis, seismic load analysis and thermal analysis showing that the specified maximum deflections and probabilities of breakage are not exceeded.

## **22.15 SHOP DRAWINGS**

- a. The contractor shall submit shop drawings showing clearly the relationship of the structural glazing facade to the building structure, Mechanical and electrical systems, floor slabs and any other related works. They shall show the arrangement of components, instructions and explanatory details for the sequence of fabrication, assembly, erection and installation of all materials including the glass and de-glazing procedures. They shall include the following:
  - i) Plan, elevation and details required to fully describe the structural glazing system.
  - ii) System dimensions, framed opening requirements and tolerances for squareness, corner offset and bows.
  - iii) Dimensional position of glass edge/face relative to the aluminium framing, full size junction details between mullion and transom and end details.
  - iv) Isometric drawings of flashing, joints between transom and mullions, end details etc.
  - v) Expansion and contraction joint location and details.
  - vi) Weep and condensation drainage network
  - vii) Full size details including isometric drawing of sealing, flashing and jointing Methods
  - viii) Materials, type, size, location, spacing of all screws, bolts, weld; anchoring devices and all accessories.
  - ix) Die drawings for, all gaskets, extrusions
  - x) Relationship of edge members with architectural stone/ wall finish and flashing at joints.
- b. The contractor shall submit a fully detailed program for the presentation of shop drawings to the Engineer-in-charge for approval, and in no case shall the contractor proceed with any of these works without approved shop drawings.
- c. The contractor shall review and submit all shop drawings in a sequence consistent with the sequence of erection, installation and assembly of the various elements of the work. He shall be deemed to have determined and verified all materials, site measurements and construction criteria related thereto and to have checked the shop drawings for complete dimensional accuracy.
- d. Any approval by the Engineer-in-charge of the shop drawings shall not relieve the contractor of his responsibility for any deviation from the requirements of the contract unless he has specifically informed the engineer in writing of such deviation at the time of submission and the Engineer-in-charge has given written approval to the specific deviation.

## **22.16 SAMPLES**

The contractor shall submit all samples at his own cost. Samples shall be submitted for approval well in advance of the date, on which the particular work involving the use of materials for which samples are submitted, is scheduled to begin. The work shall be carried out in accordance with the approved samples. The following shall be submitted:

- a) 2 samples of 600mm x 600mm in size illustrating pre-coated aluminium mullion and transom junction detail complete with glass skin and glazing materials illustrating edge and corner.
- b) 4 nos. 12" x 12" samples of each type of glass.
- c) 4 nos. 6" long samples of principal extrusions.
- d) 4 nos. manufacturer's samples of each type of aluminium finish.
- e) 4 nos. manufacturer's samples of each type of sealant
- f) 2 nos. manufacturer's samples of all accessories and hardware envisaged to be used for the structural glazing system.
- g) All other samples as per requirement and direction of engineer in charge.

**22.17 MOCKUP:** The contractor shall construct a mockup including intermediate and edge mullion, vision and spandrel panel. The mockup should illustrate component assembly including framing, glass, glazing materials, weep drainage system, attachments, anchors and perimeter sealant. Location for mockup will be at site approved in advance. Mockup will not remain as part of the work.

**22.18 TEST REPORTS:** The contractor shall arrange for all testing required with regard to this work at his own cost, at such test laboratories in India or abroad as approved by the Engineer-in-charge. Apart from the tests carried out, the contractor shall substantiate engineering data and provide test results of previous tests, which purport to meet performance criteria and any other supportive data.

**22.19 SUBMITTALS:** The contractor shall submit 4(four) copies of the following documents pertaining to the engineering of the structural glazing using structural glazing system to the engineer for approval, review etc.

- a. Shop drawings
- b. Structural design calculations for aluminium framing, glass thickness and sealant byte sizes
- c. Calculations for deflection
- d. Test reports as per the performance requirements
- e. Special installation requirements, special procedures, safety precautions and perimeter conditions requiring special attention as stated by the manufacturer.
- f. Samples
- g. As-built drawings

**22.20 ORDERING AND DELIVERY:** Before commencement of any fabrication or ordering of any materials, goods or works, the contractor shall be required to submit shop drawings, samples etc. with all relevant details as to materials, sizes, manufacturer's printed specifications and all other details and information as desired by the engineer in charge. Mockup shall have to be approved by engineer-in-charge before placing final order for delivery of the approved products.

**22.21 PRODUCT HANDLING:** Handling of glass and aluminium frame, to be incorporated in to the facade system, shall be done with utmost care to avoid any damage or surface scratch. Field cutting of anodized components shall not be permitted.

**22.22 LIGHTNING PROTECTION:** Each complete frame shall be provided with a single bolt, to which the bonding conductor may be connected by the electrical contractor on site. The bolt

shall be high tensile, size MB stainless steel, and shall be securely fastened to and in sound electrical connection with the frame. The bolt shall be supplied with two plain washers and locking washers and nuts, by which the bonding conductor will be connected to the bolt. The bolt shall be supplied and fixed at works before delivery to site.

**22.23 FABRICATION & INSTALLATION:** The façade work shall be fabricated and installed by experienced workmen having specialized skill in façade work/ structural glazing and strictly in accordance with the approved shop drawings. All welding shall be done by the heliarc process and all exposed welds ground to minimum 100 grit finish.

**22.24 PROTECTION:**

- a) The contractor shall be responsible for all materials against damage from mechanical abuse and foreign matter during installation. A layer of clear transparent laquer based methacrylates or cellulose butyrate shall be applied on anodized members before they are brought to site. The laquer shall be removed on completion of erection. On virtual completion and receiving instruction from the Engineer-in-charge, the contractor shall remove all protective coverings, manufacturer's seals, labels etc. The contractor shall thoroughly clear the internal and external glazing area and members with cleaning solution recommended by the respective manufacturers. The contractor shall ensure that the highest possible standards of material protection are maintained both in the fabrication and installation of the external glazing system. The contractor shall ensure that all materials and completed panels are delivered to site without damage and that all components are fully protected. In this respect a method statement will be required describing the protection measures to be adopted when transporting material to site and hoisting it into the floors for final installation. Panels awaiting installation are to be stacked on pallets to a height to be stored separately on site for possible fabrication in-situ.
- b) All materials stored at site are to be protected in such a manner as to prevent damage from falling objects, dust, water and dirt. The material must be safe from mishandling or damage by any contractor, agency, sub-agency either in the pursuit or their own works or by their personnel.
- c) During installation, the contractor shall provide protection to the external glazing to prevent the ingress of water from either rain or any other reasons. This protection shall be strong enough to withstand adverse wind conditions, and shall provide complete protection at the top level of the installation necessary to prevent the ingress of water into or behind the cladding.
- d) The external glazing shall be screened from weld splatter, spray-on fire proofing, concrete, alkaline masonry washes, paint and other deleterious substances. Any such soiling shall be promptly and completely removed. The design of protective screening shall be such as to provide adequate ventilation of the space between the glass and the protective screen and not induce thermal stresses in the glass. In no case shall the protective screening be placed in contact with the glass.
- e) The contractor shall provide at each completed floor an internal protection of 1000 gauge heavy polyethylene sheet suspended from the top of the external glazing at slab soffit and extending to the floor. These drop sheets must be maintained until all wet trades are completed on each floor.
- f) The fixing method for sheets is to be indicated in shop drawings and a sample approved by the Engineer-in-charge.

## 22.25 CLEANING

- a. The contractor shall ensure that all actions are taken during Installation to eliminate the effects of corrosive substances on the finishes of the external glazing.
- b. The contractor shall clean both internal and external surfaces to remove corrosive substances. The internal surfaces of glass and aluminium frame are to be cleaned with compatible cleaning agents prior to the installation of the internal protective sheeting.
- c. The contractor shall provide written verification that cleaning agents are compatible with aluminium, stainless steel, glass coatings, granite, glazing materials and sealants. In no case shall alkaline or abrasive agent be used to clean the surface. Care shall be taken during cleaning to avoid scratching of the surface by dirt particles.
- d. Prior to snagging inspections the contractor shall remove the internal protection sheets and carry out a thorough cleaning of all glass, aluminium and spandrel panels as per the direction of Engineer-in-charge.
- e. The protective sheeting shall then be removed permanently provided that no other wet works or services work are required in the immediate vicinity of the external glazing. The contractor shall also make good any physical drainage to the wall including scratches, dents, abrasions, pittings, etc., to the satisfaction of the Engineer-in-charge.
- f. Manufacturer's delivery or job marking on glass and adhesive for manufacturers cables shall be either a neutral or slightly acidic material and in no case shall such material be alkaline. Any staining of glass by alkaline material will be cause to rejection of the glass.
- g. After the installation of each panel of glass all markings and labels shall be carefully and completely removed from the panes. Thereafter, no markings or labels of any sort shall be placed on the glass.
- h. Glazed openings shall be identified by suitable warning tapes or flags attached with a non-staining adhesive or other suitable means to the framing of the opening. Tapes or flags shall not be in contact with glass.
- i. Prior to the handing over of each floor to the Engineer-in-charge, the contractor shall carry out a final cleaning of the external glazing. As soon as it is practically possible after the issuance of the occupation certificate for the building, the contractor shall carry out a complete cleaning of the external face of the external glazing

**22.26 REMOVAL OF IMPROPER WORK AND MATERIALS:** Any materials/or works which, in the opinion of the Employer, are not in accordance with the specification, shop drawings and instructions shall be removed from the site immediately.

**22.27 PERFORMANCE GUARANTEE:** The contractor shall be solely responsible for the design including shop drawings and performance of the installed façade system. The installations shall be guaranteed by the contractor for materials used, workmanship, water tightness (wherever specified), structural design, performance requirements and other requirements as given in the specifications. The contractor shall submit in the enclosed format a written guarantee for the same for a period of 10 years from the date of completion of the work.

**22.28 MAINTENANCE MANUAL:** On completion of the works, the contractor shall prepare a detailed maintenance manual for the structural glazing system. The manual should cover the following:

- a) Complete and detailed explanation of operating principles of the structural glazing system  
Description of all the various components of the glazing system,
- b) Recommended Inspection schedule and periodic inspection procedure,
- c) Complete parts list,
- d) Instructions for proper cleaning procedures and routine maintenance of the facade including frequency,
- e) Cleaning products and their source
- f) Method statement for reglazing and replacement of component parts with appropriate drawings;

**23.0 HORTICULTURE & LANDSCAPE WORK:** Contractor shall furnish all materials, labour etc. terms necessary to complete the work indicated on drawing and specified here in.

**23.1 MATERIALS:**

a) **Plant materials:**

- (i) All plant materials shall be healthy, sound, and vigorous, free from plant disease, insect pests or their eggs, and shall have healthy, well-developed root systems.
  - (ii) All plants shall be hardy under climatic conditions similar to those in the locality of the project. No plant material will be accepted if branches are damaged or broken. All material must be protected from the sun and weather until planted.
  - (iii) Any nursery stock shall have been inspected and approved by the Engineer-in-Charge.
  - (iv) Plants shall be delivered with legible identification labels.
- b) **Topsoil:** Topsoil or good earth shall be a friable loam, typical of cultivated topsoil of the locality containing at least 2% of decayed organic matter (humus). It shall be taken from a well-drained arable site. It shall be free of subsoil, stones, earth clods, sticks, roots or other objectionable extraneous matter or debris. It shall contain no toxic material. No topsoil shall be delivered in a muddy condition. Good earth shall have PH range 6.5 to 7.5
- c) **Manure (as locally available):** Dry farm yard manure shall be used. It shall be free from extraneous matter, harmful bacteria insects or chemicals.
- d) **Root System:** The root system shall be conducive to successful transplantation. Where necessary, the root-ball shall be preserved by support with hessian or other suitable material. On soils where retention of a good ball is not possible, the roots should be suitably protected in some other way which should not cause any damage to roots.



- e) **Condition:** Trees and shrubs shall be substantially free from pests and diseases, and shall be materially undamaged. Torn or lacerated roots shall be pruned before dispatch. No roots shall be subjected to adverse conditions, such as prolonged exposure to drying winds or subjection to water-logging, between lifting and delivery.
- f) **Supply and substitution:** Upon submission of evidence that certain materials including plant materials are not available, the contractor shall be permitted to substitute other material and plants, with an equitable adjustment of price. All substitutions shall be of the nearest equivalent species and variety to the original specified and shall be subject to the approval of the engineer-in-charge.
- g) **Packaging:** Packaging shall be adequate for the protection of the plants and such as to avoid heating or drying out.
- h) **Marking:** Each specimen of tree and shrub, or each bundle, shall be legibly labelled with the name of the supplier and the date of dispatch from the nursery, unless otherwise agreed.

## 23.2 TREES, ORNAMENTAL PLANTS & PALMS PLANTING:

- a. Trees should be supplied with adequate protection as approved. After delivery, if planting is not to be carried out immediately, balled plants should be placed cheek to cheek and the ball covered with sand to prevent drying out. Bare-rooted plants can be heeled in by placing the roots in a prepared trench and covering them with earth which should be watered into avoid air pockets round the roots.
- b. **Digging of Pits:** Tree pits shall be dug a minimum of three weeks prior to backfilling. The pit sizes shall be as specified further herein. It shall be replaced with soil mixture as specified further herein. While digging the pits, the top soil up to a depth of 30 cm may be kept aside, if found good (depending upon site conditions) and mixed with the rest of the soil. If the soil is bad below, it shall be replaced with the soil mixture as specified further herein. The bottom of the pit shall be forked to break up the sub-soil.
- c. **Backfilling:** If the excavated soil is normal, it shall be mixed with manure. River sand shall be added to the soil if it is heavy. However, if the soil is bad, the pit shall be refilled with imported good garden soil mixed with manure 2:1 by volume (2 parts of stacked volume of earth after 20% reduction: 1 part of stacked volume of manure after 8% reduction). The soil backfilled has to be watered through and gently pressed down a day previous to planting to make sure that it may not further settle down after planting. The rest 100mm shall be filled with manure. The soil shall be pressed down firmly by treading it down, leaving a shallow depression all around for watering.
- d. **Planting:** No tree pits shall be dug until final tree positions have been pegged out for approval. Care shall be taken that the plant sapling when planted is not buried deeper than in the nursery, or in the pot. Planting should not be carried out in water logged soil. Plant trees at the original soil depth; the soil marks on the stem are an indication of this and it should be maintained on the finished level, allowing for setting of the soil after planting. All plastic and other imperishable containers should be removed before planting. Any broken or damaged roots should be cut back to sound growth. The bottom of the planting pit should be covered with 50mm to 75mm of soil. Bare roots should be spread evenly in the planting pit; and small mound in the center of the pits on which the roots are placed will aid an even spread. Soil should be placed around the roots, gently shaking the tree to allow the soil particles to sift into the root system to ensure close



contact with all roots and to prevent air pockets. Backfill soil should be firmed as filling proceeds, layer by layer, care being taken to avoid to avoid damaging the roots, as follows:

- Chlorpyrifos emulsifiable concentrate 0.2% shall be applied on walls of pit, and initially pit shall be filled to 200 depths with earth mixed Chlorpyrifos emulsifiable concentrate 0.2%. The balance earth shall be filled in with manure in proportion as specified further herein. Chlorpyrifos emulsifiable concentrate 0.2% shall be applied every 15 days.
- e. **Staking:** Newly planted trees must be held firmly although not rigidly by staking to prevent a pocket forming around the stem and newly formed fibrous roots being broken by mechanical pulling as the tree rocks.
- f. **Methods:** The main methods of staking shall be:
  - i) A single vertical stake, 900mm longer than the clear stem of the tree, driven 600mm to 900mm into the soil.
  - ii) Two stakes as above driven firmly on either side of the tree with a cross-bar to which the stem is attached. Suitable for bare-rooted or balled material.
  - iii) A single stake driven in at an angle at 45° and leaning towards the prevailing wind, the stem just below the lowest branch being attached to the stake. Suitable for small bare-rooted or balled material.
  - iv) For plant material 3m to 4.50 m high with a single stem a three-wire adjustable guy system may be used in exposed situations.
  - v) The end of stake should be pointed and the lower 1.0m to 1.20m should be coated with a non-injurious wood preservative allowing at least 150mm above ground level.
- g. **Tying:** Each tree should be firmly secured to the stake so as to prevent excessive movement. Abrasion must be avoided by using a buffer, rubber or hessian, between the tree and stake. The tree should be secured at a point just below its lowest branch, and also just above ground Level; normally two ties should be used for tree. These be adjusted or replaced to allow for growth.
- h. **Watering:** The contractor should allow for the adequate watering in of all newly planted trees and shrubs immediately after planting and he shall during the following growing seasons, keep the plant material well-watered.
- i. **Fertilizing:** Fertilizing shall be carried out by application in rotation of the following fertilizers, every 15 days from the beginning of the monsoon till the end of winter: - sludge of organic well-rotted dry farmyard manure or vermicomposting or approved organic manure as per directions of engineer-in-charge.

### 23.3 SHRUBS, GROUND COVERS, CREEPERS PLANTING IN PLANTERS AND BEDS

- a) All areas to be planted with shrubs shall be excavated, trenched to a depth of 600 mm, refilling it with finely mixed good black garden soil and excavated earth (after breaking the clods and mixing with sludge in the ratio as specified further herein.

Backfill soil should be firmed as filling proceeds, layer by layer, care being taken to avoid to avoid damaging the roots, as follows:

- Chlorpyrifos emulsifiable concentrate 0.2% shall be applied on walls of pit. The balance earth shall be filled in a mixture with manure in proportion as specified further herein. Chlorpyrifos emulsifiable concentrate 0.2% concentration shall be applied every 15 days.
- b) Tall shrubs may need staking, which shall be provided if approved by the engineer-in-charge depending upon the conditions of individual plant specimen.
- c) For planting shrubs and ground cover shrubs in planters, good earth shall be mixed with sludge in the proportion as above and filled in planters.
- d) Positions of shrubs to be planted should be marked out in accordance with the planting plan. When shrubs are set out, precautions should be taken to prevent roots drying. Planting holes (of sizes as specified further herein) should be excavated for longer shrubs. Polythene and other non-perishable containers should be removed and any badly damaged roots carefully pruned. The shrubs should then be set in holes so that the soil level, after settlement, will be at the original soil mark on the stem of the shrub. The hole should be backfilled to half pots depth and firmed by treading. The remainder of the soil can then be returned and again firmed by treading.

#### **23.4 GRASS AREAS:**

- a. Mixing earth and manure in proportion 8:1 and spreading to a thickness of 200mm.
- b. Fine dressing the ground (to levels specified).
- c. Grassing with selection No. 1 grass including watering and maintenance of the lawn for 60 days or more till the grass forms a thick lawn, free from weeds and fit for mowing including supplying good earth, if needed.
- d. In rows 5 cm apart in both directions
- e. Flooding the ground with water including making kiaries and dismantling the same.

#### **23.5 GROUND COVER AND HERBAL PLANTS**

- a) Pit Preparation: Preparing planting beds for ground covers planting by excavating and refilling the same with sweet earth mixed with manure 8:1 by volume (8 parts of stacked volume of earth after 20 % reduction: 1 part of stacked volume of manure after 8 % reduction), flooding with water, dressing including removal of rubbish and surplus earth if any with all leads and lifts; excluding cost of earth and manure. Unless otherwise specified, pit size shall be 0.15m x 0.15m x 0.30 m.
- b) Supply and plantation: Planting best quality ground covers of species and height as specified. All ground covers to be planted should be best quality pot-grown healthy ground covers inclusive of preparation and cultivation of ground cover beds as specified. All plants to be approved before planting.

#### **23.6 CREEPERS**

- a) Pit Preparation: Preparing planting beds for creepers planting by excavating and refilling the same with sweet earth mixed with manure 8:1 by volume (8 parts of stacked volume of earth after 20 % reduction: 1 part of stacked volume of manure

after 8 % reduction), flooding with water, dressing including removal of rubbish and surplus earth if any with all leads and lifts; excluding cost of earth and manure. Unless otherwise specified, the pit size shall be 0.6m x0.6m x 0.6m.

- b) Supply and plantation: Planting best quality creepers of species and height as specified. All ground covers to be planted should be best quality pot-grown healthy ground covers inclusive of preparation and cultivation of creeper beds as specified. All plants to be approved before planting.

**LIST OF PREFERRED MAKE / MANUFACTURERS FOR DIFFERENT MATERIALS TO BE USED IN THIS PROJECT FOR CIVIL & HORTICULTURE WORKS**

S. NO.	DETAILS OF MATERIALS	MANUFACTURERS NAME
1	ANTI TERMITE PESTICIDES	BAYER, FMC INDIA, HINDUSTAN INSECTICIDES
2	ALUMINIUM COMPOSITE PANEL	ALUCOBOND, REYNOBOND, ALSTONE, ALUDECOR
3	ADHESIVE TAPE	3M, NORTON, TESA
4	AAC BLOCK	TATA TISCO BUILD, ULTRATECH (XTRLITE), BIRLA AEROCON, SIPOREX
5	ALUMINIUM SECTIONS FOR DOORS & WINDOWS ETC.	JINDAL, HINDALCO
6	AAC BLOCK ADHESIVE	ULTRATECH, ARDEX ENDURA, WEBER
7	ACOUSTIC SEAL / DOOR SEAL	LORIENT, RAVEN, DORMA, 3M, HAFELE
8	AIR TRANSFER GRILL	RUSKIN, SYSTEM AIR, TROX, TREMCO
9	ACOUSTICAL PANELS, ACOUSTICAL FALSE CELING, ACOUSTICAL CLADDING, ACOUSTICAL CLOUD CEILING, ACOUSTICAL CARPET FLOORING, ACOUSTICAL GLASS FIBER REINFORCED GYPSUM PANEL/ BOARD, ACOUSTICAL SPRAY	ARMSTRONG, GYPTECH, ECOPHON- SAINT GOBAIN
10	BITUMEN MEMBRANE FOR WATERPROOFING, HDPE MEMBRANE FOR WATERPROOFING, POLYUREA MEMBRANE FOR WATERPROOFING	SIKA, SAINT GOBAIN, SOPREMA, FOSROC, PIDILITE
11	BAMBOO DECKING, ROOFING & CLADDING	ECO GREEN FLOORING, LAMIWOOD, EPITOME BAMBOOWOOD
12	BACKER ROD	SUPREME/SYSTRANS
13	CEMENT	ACC, AMBUJA, ULTRATECH, JK CEMENT, WONDER
14	CERAMIC GLAZED TILES	SOMANY, KAJARIA, RAK
15	CRYSTALLIANE CEMENTITIOUS WATERPROOFING COMPOUND	XYPEX, KRYTON
16	CALCIUM SILICATE BOARD FOR FIRE DOOR	PROMOTECH, PROMINA, RAMCO
17	CPVC PIPES	ASTRAL, PRINCE, SFMC
18	CALCIUM SILICATE TILES FALSE CEILING	AEROLITE, RAMCO, HILUX
19	C.P. BRASS FITTING AND ACESSORIES	ROCA, KOHLER, TOTO, GROHE
20	DASH, ANCHORING FASTENERS	HILTI, FISCHER
21	EPDM GASKET	HANU, ANAND, VICTOR
22	EPOXY MORTAR	FOSROC, SIKa, MYK LATICRETE
23	EXPANSION JOINT	MIGUA, CS, CAMEO
24	ENGINEERED WOODEN FLOORING AND SKIRTING	MIKASA (GREENLAM), TARKETT, HAVWOODS, PARADOR (HIL), PERGO, KAHRS
25	ENGINEERED MARBLE	HR JOHNSON, KALINGA STONE
26	FIRE SEALANT	HILTI, 3M, MCCOY

S. NO.	DETAILS OF MATERIALS	MANUFACTURERS NAME
27	FLOAT GLASS, REFLECTIVE GLASS, TINTED GLASS, HIGH PERFORMANCE GLASS, LOOKING GLASS / MIRROR LACQUERED GLASS, HIGH PERFORMANCE GLASS, FIRE RESISTANT GLASS	MODI GLASS, SAINT GOBAIN GLASS
28	FIRE CHECK DOORS (METAL/ROLLING/GLAZED)	PACIFIC FIRE CONTROLS, JC FIRE DOOR
29	FLOOR HARDENER, POLYSULPHIDE SEALANT, WATERPROOFING COMPOUND, ADMIXTURES/ CURING COUMPOUND	FORSROC, PIDILITE, SOPREMA
30	FIRE STOP IN CURTAIN WALL SYSTEM	HILTI, 3M, FISCHER, LORIENT
31	FLY ASH BRICKS	SIPOREX, SUNVIK, HIL
32	GYPSUM BOARD	SAINT GOBAIN, ARMSTRONG, LAFARGE, GYPTECH
33	GI PIPES	JINDAL HISAR, TATA
34	GI FITTINGS	UNIK, TATA, JINDAL
35	GLASS MOSAIC TILE	ITALIA, CORAL, KAJARIA
36	HIGH PERFORMANCE EPOXY BASED RESIN ANCHOR SYSTEM	HILTI, FOSROC, CICO
37	HDPE PIPES	SUPREME, FINOLEX, ASTRAL, RELIANCE
38	HYDRAULIC DOOR CLOSER, FLOOR SPRING, DOOR AUTOMATION, HARDWARES FOR FIRE RATED DOORS, STAINLESS STEEL FITTINGS/HARDWARE FOR WOODEN/METAL/GLAZED/STEEL DOOR & WINDOWS, FRICTION STAY HINGES, HARDWARE FITTINGS FOR ALUMINIUM WINDOWS & DOORS	DORMA, GEZE, EBCO, HAFELE, HORMANN
39	INTUMESCENT FIRE / SMOKESEAL	ASTRO FLAME, RAVEN, SEALZ, LORIENT
40	MECHANICAL COUPERS	USHA MARTIN, DEXTRA, HALFEN, SANFIELD
41	MS SECTIONS (PIPES, BOXES CHANNELS)	JINDAL HISAR, TATA
42	METAL/ALUMINUM FALSE CEILING	SAINT GOBAIN, HUNTER DOUGLUS, ARMSTRONG, GYPTECH
43	OUTDOOR SIGNAGES	3M, AVERY DENNISON, VEDAAANSHI SIGNS
44	PLY BOARD, PLYWOOD (PINE BOARD), LAMINATE, FLUSH DOOR (ALL FLUSH DOORS SHALL BE PROCURED FROM FULLY OWNED FACTORY OF THE MANUFACTURER AND NOT FROM JV / OUTSOURCED), PRELAMINATED PARTICLE BOARD	GREENLAM, MERINO, CENTURY, DURO, KIT PLY
45	POLYCARBONATE SHEET	DANPALON, SOLALITE, DPI SYSTEM, EVERLITE, CPI
46	POP OUT VENT FOR FAÇADE AND SYSTEM WINDOW HARDWARE	COTSWOLD, SCHUCO, ALUK, REYNAERS
47	PRECAST PAVER BLOCK	ACC, NOVACO, ULTRATECH, MODI COVER BLOCKS
48	READY MIXED CEMENT CONCRETE	ACC, ULTRA TECH, AFCON, LAFARGE (NUVACO)
49	READY MIX GYPSUM PLASTER	SAINT GOBAIN, ULTRATECH
50	READY MIX CEMENT PLASTER	WEBER, ULTRATECH, BIRLA
51	ROLLER BLIND	VISTA, MAC, HUNTER DOUGLUS
52	CORROSION RESISTANT STEEL (TMT FE-500D OR MORE)	TATA., RINL, JINDAL STEEL & POWER LTD, JSW STEEL LTD., SAIL
53	STRUCTURAL STEEL SECTIONS	TATA, JINDAL, SAIL, RINL
54	SILICON SEALANT	GE, DOW CORNING, PIDILITE

S. NO.	DETAILS OF MATERIALS	MANUFACTURERS NAME
55	S.S. MATERIAL/HADRAILS/RAILINGS	JINDAL STAINLESS STEEL LTD., TATA STEEL, SAIL
56	SOIL, WASTE, VENT PIPES & FITTINGS	ASTRAL, PRINCE, SFMC, SUPREME
57	SS SINK	NILKANTH, NIRALI, JAYNA
58	SANITARY WARE (URINAL, WASH BASIN, WC ETC.)	GROHE, KOHLER, TOTO
59	SS TACTILE	EMINENT, FERROTECH, SUNDARAM, JINDAL
60	SLUICE VALVES, GATE / BALL VALVES	ZOLOTO, KIRLOSKAR, LEADER
61	TILE ADHESIVE, STONE ADHESIVE, EPOXY GROUTING COMPOUND	PIDILITE, ARDEX ENDURA, WEBER
62	UPVC WINDOWS	FENESTA, ALUPLAST, KOENMERLING
63	VITRIFIED TILES (DOUBLE CHARGED / FULL BODY/ULTRA SLIM /ANTISKID / ACID-ALKALI RESISTANT)- (ALL TILES SHALL BE PROCURED FROM FULLY OWNED FACTORY OF THE MANUFACTURER AND NOT FROM JV / OUTSOURCED)	SOMANY, KAJARIA, RAK
64	VINYL / CONDUCTIVE FLOORING, DADO SKIRTING	FORBO, TARAKETT, ARMSTRONG, GERFLOOR
65	WHITE CEMENT	BIRLA, J.K. WHITE, ULTRATECH
66	WATER-PROOF CEMENT PAINT, SYNTHETIC ENAMEL PAINT, PLASTIC EMULSION PAINT, DISTEMPER/ACRYLIC EMULSION PAINT, TEXTURED PAINT, STEEL PRIMER, WOOD PRIMER, EXTERIOR WATERPROOFING PAINT, WOOD FINISH (MELAMINE & PU POLISH)	ASIAN PAINT, NEROLAC, ICI
67	WOOD ADHESIVE	FEVICOL, 3M, ARAOLDITE
68	WALL PUTTY	JK, BIRLA, ASAIN PAINT
69	WPC (WOOD POLYMER COMPOSITE) DOOR SHUTTER, FRAME	GREENPLY, CENTURY, RAJSHREE, ALSTONE INDUSTRIES PVT LTD
70	WEATHER/STRUCTURE SILICON SEALANT	WACKER, MCCOY, DOW CORNING
71	AUTOMATIC SLIDING GLASS DOOR WITH COMPLETE MECHANISM	DORMA, AUTO INGRESS, GEZE, GODREJ, HAFELE

**Note: - The articles / materials which are not mentioned in the above said list shall be approved by the NIT approving authority before execution of work.**

**GUARANTEE BOND TO BE EXECUTED BY THE CONTRACTOR FOR REMOVAL OF DEFECTS AFTER COMPLETION OF SPECILAISED WORKS**

The agreement made this..... day of ..... (Two Thousand----- only) ..... between .....S/o .....(hereinafter called the GUARANTOR of the one part) and the PRESIDENT OF INDIA (hereinafter called the Government of the other part)

WHEREAS THIS agreement is supplementary to a contract (Hereinafter called the Contract) dated ..... and made between the GUARANTOR OF THE ONE PART AND the Government of the other part whereby the contractor inter alia undertook to remove all the defects in .....(name of specialized work) in said contract completely.

AND WHEREAS THE GUARANTOR agreed to give a guarantee to the affect that the said work will remain intact without any defect for ..... (No. of years) from the date of completion of the work.

NOW THE GUARANTOR hereby guarantee that the works executed by him will remain intact and full functional without any defects of any kind for .....(No. of years) to be reckoned from the date of completion of work under the contract.

The decision of the Engineer-in-Charge with regard to nature and cause of defects shall be final.

During this period of guarantee, the guarantor shall make good all defects and in case of any defect being found in the .....(name of specialized works) to the satisfaction of the Engineer-in-Charge at his cost and shall commence the work for such rectification within seven days from the date of issue of the notice from Engineer-in-Charge calling upon him to rectify the defects failing which the work shall be got done by the Department by some other contractor at the Guarantor's risk and cost. The decision of the Engineer -in-charge as to the cost payable by the Guarantor shall be final and binding.

That if the guarantor fails to make good all defects or commits breach there under, then the Guarantor will indemnify Engineer-in-Charge and his successor against all loss, damage, cost expense or otherwise which may be incurred by him by reason of any default on the part of the GUARANTOR in performance and observance of this supplementary agreement. As to the amount of loss and/or damage and / or cost incurred by the Government, the decision of the Engineer-in-charge will be final and binding on both the parties.

IN WITNESS WHEREOF these presents have been executed by the obligator ..... and ..... by ..... for and on behalf of the PRESIDENT OF INDIA on the day, month and year first above written.

SIGNED, sealed and delivered by OBLIGATOR in the presence of :-

1. .... 2. ....

SIGNED FOR AND BEHALF OF THE PRESIDENT OF INDIA BY ..... in the presence of

1. .... 2. ....



## **TENDER DRAWINGS**

<b>S. NO.</b>	<b>DRAWINGS TITLE</b>	<b>DRAWING NO.</b>
	<b>CIVIL WORKS (Architectural drawing)</b>	
1	BASEMENT & GROUND FLOOR PLAN	4195-01-AR-01
2	FIRST & SECOND FLOOR PLAN	4195-01-AR-02
3	THIRD & FOURTH FLOOR PLAN	4195-01-AR-06
4	TERRACE PLAN & EAST ELEVATION	4195-01-AR-06
5	NORTH, SOUTH & WEST ELEVATION (REAR)	4195-01-AR-08
6	SECTION AA, BB, CC	4195-01-AR-09

# Schedule of Quantity for Civil Work

## SCHEDULE OF QUANTITY

**Name of Work: Construction of Integrated Regional Office at Chennai.**

Item No.	Description of Item	Qty	Unit	Rate (Rs.)	Total Amount (In Rs.)
<b>1.0</b>	<b>EARTH WORK</b>				
1.1	Earth work in surface excavation not exceeding 30 cm in depth but exceeding 1.5 m in width as well as 10 sqm on plan including getting out and disposal of excavated earth upto 50 m and lift upto 1.5 m, as directed by Engineer-in- Charge:				
1.1.1	All kinds of soil	260.00	Sqm	142.77	37,120
1.2	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excavated earth lead upto 50 m and for all lift, as directed by Engineer-in-charge.				-
1.2.1	All kinds of soil	503.00	Cum	195.16	98,165
1.3	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan)including getting out and disposal of excavated earth lead upto 50 m and lift upto 1.5 m, as directed by Engineer-in-charge				-
1.3.1	Ordinary rock	1010.00	Cum	548.54	5,54,025
1.3.2	Hard Rock (blasting prohibited).	1010.00	Cum	1575.51	15,91,265
1.4	Earth work in excavation by mechanical means (Hydraulic excavator) / manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms for all lifts, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.				-
1.4.1	All kinds of soil	66.00	Cum	286.20	18,889
1.5	Excavation work by mechanical means (Hydraulic excavator)/ manual means in foundation trenches or drains (not exceeding 1.5m in width or 10 sqm on plan), including				-

	dressing of sides and ramming of bottoms, lift upto 1.5 m, including getting out the excavated soil and disposal of surplus excavated soils as directed, within a lead of 50 m.				
1.5.1	Ordinary rock	27.00	Cum	695.92	18,790
1.5.2	Hard Rock (blasting prohibited).	27.00	Cum	1674.58	45,214
1.6	Excavating trenches by mechanical means / manual means of required width for pipes, cables, etc including excavation for sockets, and dressing of sides, ramming of bottoms for all depth, including getting out the excavated soil, and then returning the soil as required, in layers not exceeding 20 cm in depth, including consolidating each deposited layer by ramming, watering, etc. and disposing of surplus excavated soil as directed, within a lead of 50 m :				-
1.6.1	All kinds of soil				
1.6.1.1	Pipes, cables etc. exceeding 80 mm dia. But not exceeding 300 mm dia	94.00	Metre	387.19	36,396
1.7	Excavating trenches of required width for pipes, cables, etc, including excavation for sockets, depth upto 1.5 m, including getting out the excavated materials, returning the soil as required in layers not exceeding 20 cm in depth, including consolidating each deposited layers by ramming, watering etc., stacking serviceable material for measurements and disposal of unserviceable material as directed, within a lead of 50 m :				-
1.7.1	Ordinary rock :				-
1.7.1.1	Pipes, cables etc. exceeding 80 mm dia. But not exceeding 300 mm dia	71.00	Metre	1098.01	77,959
1.7.2	Hard rock (blasting prohibited)				-
1.7.2.1	Pipes, cables etc. exceeding 80 mm dia. But not exceeding 300 mm dia	71.00	Metre	2250.99	1,59,820
1.8	Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not exceeding 20cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 and for all lift.	569.00	Cum	215.50	1,22,620
1.9	Extra for every additional lift of 1.5 m or part thereof in excavation / banking excavated or stacked materials.				-
1.9.1	Ordinary or hard rock	869.00	Cum	250.02	2,17,267

1.10	Supplying and filling in plinth with sand under floors, including watering, ramming, consolidating and dressing complete.	69.00	Cum	2335.04	1,61,118
1.11	Excavating, supplying, stacking and filling of local earth (including royalty) by mechanical transport upto a lead of 5km also including ramming and watering of the earth in layers not exceeding 20 cm in foundation trenches, plinth, sides of foundation etc. complete for all lift.	331.00	Cum	770.19	2,54,933
1.12	Credit for excavated rock obtained from earth work to be disposed off from site as and when required, by the agency as per the direction of Engineer-in-charge. The surplus rock shall be the property of the agency and removed from the work site at its own cost.	1515.00	Cum	769.64	- 11,66,005
	<b>TOTAL EARTH WORK :</b>			<b>Rs.</b>	<b>22,27,576</b>
<b>2.0</b>	<b>CONCRETE WORK</b>				
2.1	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level :				
2.1.1	1:5:10 (1 Portland Pozzolana Cement : 5 coarse sand (zone-III) derived from natural sources : 10 graded stone aggregate 40 mm nominal size derived from natural sources)	66.00	Cum	7167.14	4,73,031
2.2	Providing and laying cement concrete in retaining walls, return walls, walls (any thickness) including attached pilasters, columns, piers, abutments, pillars, posts, struts, buttresses, string or lacing courses, parapets, coping, bed blocks, anchor blocks, plain window sills, fillets, sunken floor etc., up to floor five level, excluding the cost of centering, shuttering and finishing				
2.2.1	1:2:4 (1 Portland Pozzolana Cement : 2 coarse sand (zone-III) derived from natural sources : 4 graded stone aggregate 20 mm nominal size derived from natural sources)	3.00	Cum	10879.67	32,639
2.3	Centering and shuttering including strutting, propping etc. and removal of form <b>work</b> for:				
2.3.1	Foundations, footings, bases for columns	70.00	Sqm	431.17	30,182

2.3.2	Retaining walls, return walls, walls (any thickness) including attached pilasters, buttresses, plinth and string courses fillets, kerbs and steps etc.	26.00	Sqm	926.32	24,084
2.3.3	Moulding as in cornices, window sills, string courses, bands, copings, bed plates, anchor blocks and the like.	28.00	Sqm	921.05	25,789
2.4	Providing and laying damp-proof course 40mm thick with cement concrete 1:2:4 (1 Portland Pozzolana Cement : 2 coarse sand (zone-III) derived from natural sources : 4 graded stone aggregate 12.5mm nominal size derived from natural sources)	76.00	Sqm	451.73	34,331
2.5	Providing & applying a coat of residual petroleum bitumen of grade of VG-10 of approved quality using 1.7kg per square metre on damp proof course after cleaning the surface with brushes and finally with apiece of cloth lightly soaked in kerosene oil.	76.00	Sqm	160.69	12,212
2.6	Providing and laying in position ready mixed or site batched design mix cement concrete for plain cement concrete work; using coarse aggregate and fine aggregate derived from natural sources, Portland Pozzolana Cement (PPC), admixtures in recommended proportions as per IS: 9103 to accelerate / retard setting of concrete, to improve durability and workability without impairing strength; including pumping of concrete to site of laying, curing, carriage for all leads; but excluding the cost of centering, shuttering and finishing as per direction of the engineer-in-charge; for the following grades of concrete. <b>Note:</b> Extra cement up to 10% of the minimum specified cement content in design mix shall be payable separately. In case the cement content in design mix is more than 110% of the minimum specified cement content, the contractor shall have discretion to either re-design the mix or bear the cost of extra cement.				
2.6.1	All works upto plinth level :				
2.6.1.1	Concrete of M10 grade with minimum cement content of 220 kg /cum	233.00	Cum	9714.16	22,63,399
	<b>TOTAL CONCRETE WORK :</b>			<b>Rs.</b>	<b>28,95,667</b>

<b>3.0</b>	<b>REINFORCED CEMENT CONCRETE WORK</b>				
3.1	Reinforced cement concrete work in beams, suspended floors, roofs having slope up to 15° landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral stair cases above plinth level up to floor five level, excluding the cost of centering, shuttering, finishing and reinforcement with 1:1.5:3 (1 Portland Pozzolana Cement : 1.5 coarse sand (zone-III) derived from natural sources : 3 graded stone aggregate 20 mm nominal size derived from natural sources).	2.00	Cum	12650.18	25,300
3.2	Centering and shuttering including strutting, propping etc. and removal of form for:				
3.2.1	Foundations, footings, bases of columns, etc. for mass concrete	473.00	Sqm	431.17	2,03,943
3.2.2	Walls (any thickness) including attached pilasters, buttresses, plinth and string courses etc.	1315.00	Sqm	926.32	12,18,111
3.2.3	Suspended floors, roofs, landings, balconies and access platform	4108.00	Sqm	1019.50	41,88,106
3.2.4	Shelves (Cast in situ)	34.00	Sqm	1019.50	34,663
3.2.5	Lintels, beams, plinth beams, girders, bressumers and cantilevers	4375.00	Sqm	809.66	35,42,263
3.2.6	Columns, Pillars, Piers, Abutments, Posts and Struts	2218.00	Sqm	1056.94	23,44,293
3.2.7	Stairs, (excluding landings) except spiral-staircases	195.00	Sqm	841.05	1,64,005
3.2.8	Edges of slabs and breaks in floors and walls				
3.2.8.1	Under 20 cm wide	62.00	Metre	229.30	14,217
3.2.9	Weather shade, Chajjas, corbels etc., including edges	65.00	Sqm	1045.72	67,972
3.3	Extra for additional height in centering, shuttering where ever required with adequate bracing, propping etc., including cost of de-shuttering and decentering at all levels, over a height of 3.5 m, for every additional height of 1 metre or part thereof (Plan area to be measured).				
3.3.1	Suspended floors, roofs, landing, beams and balconies (Plan area to be measured)	4842.00	Sqm	422.53	20,45,890
3.4	Steel reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete upto plinth level.				



3.4.1	Corrosion Resistance Thermo-Mechanically Treated bars of grade Fe-500D or more.	156794.00	Kg	118.58	1,85,92,633
3.5	Steel reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete above plinth level.				
3.5.1	Corrosion Resistance Thermo-Mechanically Treated bars of grade Fe-500D or more.	193648.00	Kg	118.58	2,29,62,780
3.6	Providing and laying in position ready mixed or site batched design mix cement concrete for reinforced cement concrete work; using coarse aggregate and fine aggregate derived from natural sources, Portland Pozzolana cement (PPC), admixtures in recommended proportions as per IS: 9103 to accelerate / retard setting of concrete, to improve durability and workability without impairing strength; including pumping of concrete to site of laying, curing, carriage for all leads; but excluding the cost of centering, shuttering, finishing and reinforcement as per direction of the engineer-in-charge; for the following grades of concrete. <b>Note:</b> Extra cement up to 10% of the minimum specified cement content in design mix shall be payable separately. In case the cement content in design mix is more than 1.10 times of the specified minimum cement content, the contractor shall have discretion to either re-design the mix or bear the cost of extra cement.				
3.6.1	All works upto plinth level				
3.6.1.1	Concrete of M30 grade with minimum cement content of 350 kg /cum	850.00	Cum	10616.35	90,23,898
3.6.2	All works above plinth level upto floor V level				
3.6.2.1	Concrete of M30 grade with minimum cement content of 350 kg /cum	1397.00	Cum	11007.38	1,53,77,310
3.7	Add / deduct for using extra or less cement in the items of design mix over the specified cement content therein.	674.00	Quintal	806.48	5,43,568
3.8	Providing and fixing parallel threaded couplers conforming to IS code on "Reinforcement Couplers for Mechanical Splices of Bars for				

	Concrete Reinforcement - Specification”, to reinforcement bars including threading, enlargement at connection by forging, protecting the prepared reinforcement bars and related operations as required to complete the works per direction of Engineer- in-Charge.				
3.8.1	Coupler for 20 mm diameter reinforcement bar	960.00	each	176.03	1,68,989
3.8.2	Coupler for 25 mm diameter reinforcement bar	2490.00	each	251.73	6,26,808
3.9	Providing and applying water based curing compound to the newly provided concrete surface. Curing compound of approved make shall be sprayed/ applied as per manufacturer's specification or at the rate of 200 to 300 ml per square meter.	10701.00	Sqm	73.75	7,89,199
3.10	Providing and fixing of expansion joint system related with wall joint (internal/external) location as per drawings and direction of Engineer-In- Charge. The joints shall be of extruded aluminum base members, self aligning / centering arrangement and support plates as per ASTM B221- 02. The material shall be such that it provides an Expansion Joints System suitable for vertical wall to wall/ wall to corner application, both new and existing construction in office Buildings & complexes with no slipping down tendency amongst the components of the Joint System. The Joint System shall utilize light weight aluminum profiles exhibiting minimal exposed aluminum surfaces mechanically snap locking the multicellular to facilitate movement. (Material shall conform to ASTM 6063).				
3.10.1	Wall Joint of 100 mm gap	39.00	Metre	5833.51	2,27,507
	<b>TOTAL REONFORCED CEMENT CONCRETE WORK :</b>			<b>Rs.</b>	<b>8,21,61,455</b>
<b>4.0</b>	<b>BRICK WORK</b>				
4.1	Brick work with common burnt clay F.P.S. (non modular) bricks of class designation 7.5 in foundation and plinth in:				
4.1.1	Cement mortar 1:6 (1 cement : 6 coarse sand)	92.00	Cum	7841.84	7,21,449

4.2	Brick work with non modular fly ash bricks conforming to IS:12894, class designation 10 average compressive strength in super structure above plinth level up to floor V level in :				
4.2.1	Cement mortar 1 : 6 (1 cement : 6 coarse sand)	310.00	Cum	9623.34	29,83,235
4.3	Half brick masonry with non modular fly ash bricks of class designation 10, conforming to IS :12894, in super structure above plinth and upto floor V level.				
4.3.1	Cement mortar 1 : 4 (1 cement : 4 coarse sand)	883.00	Sqm	1215.82	10,73,569
4.4	Providing and laying Autoclaved Aerated concrete (AAC) blocks masonry with 150 mm to 300 mm thick with Grade-1 AAC blocks of density 551 to 650 kg/cum conforming to IS:2185 (Part 3) in super structure above plinth level up to floor V level with RCC band at sill level and lintel level with approved block laying polymer modified adhesive mortar all complete as per direction of Engineer-in-Charge. (The payment of RCC band and reinforcement shall be made for separately).	622.00	Cum	9162.76	56,99,237
	<b>TOTAL BRICK WORK:</b>			<b>Rs.</b>	<b>1,04,77,490</b>
<b>5.0</b>	<b>CLADDING WORK</b>				
5.1	Providing and laying 18 mm thick gangsaw cut, mirror polished granite stone slabs for Wall Lining and Skirting etc., and similar locations in required design (Simple geometrical, abstract etc.) and in patterns in combination with granite stones of different colours, shades and finished surface texture etc., in linear & curvilinear portions of the building, all complete as per the shades and finished surface texture etc., all complete as per the architectural drawings, with a bed of 6mm thick adhesive in proportion recommended by the manufacturer including pointing with polymer modified grout of matching shade including providing a rough backing to the granite slabs with iron dust using approved adhesives etc. to improve adherence to the base mortar, to be secured to the backing by means of	524.00	Sqm	3,497.95	18,32,926

	cramps/fasteners etc., all complete as specified and as per the direction of Engineer in charge.				
5.2	Providing & Fixing of Granite edge strip 50 mm wide on top of the cladding (Item No. 5.1) with one edge moulding including machine polishing to edge to give high gloss finish etc. complete as per the direction of Engineer in charge.	184.00	Metre	776.25	1,42,830
5.3	Providing and laying Vitrified Tiles in Wall of minimum sizes 600x1200 (thickness to be specified by manufacturer), with water absorption less than 0.08 % and conforming to I.S. 15622, of approved make, in all colours & shade, in skirting, dado, riser of steps, over 12 mm thick bed of cement mortar 1:3 (1 Portland Pozzolana Cement: 3 coarse sand), jointing with grey cement slurry @ 3.3 kg/ sqm including grouting the joint with white cement & matching pigments etc. complete.	2019.00	Sqm	1784.53	36,02,966
5.4	Designing, fabricating, testing, installing and fixing in position Curtain Wall with Aluminium Composite Panel Cladding, with open grooves for linear as well as curvilinear portions of the building , for all heights and all levels etc. including: (a) Structural analysis & design and preparation of shop drawings for pressure equalisation or rain screen principle as required, proper drainage of water to make it watertight including checking of all the structural and functional design. (b) Providing, fabricating and supplying and fixing panels of aluminium composite panel cladding in pan shape in metallic colour of approved shades made out of 4mm thick aluminium composite panel material consisting of 3mm thick FR grade mineral core sandwiched between two Aluminium sheets (each 0.5mm thick). The aluminium composite panel cladding sheet shall	111.00	Sqm	5514.00	6,12,054

	<p>be coil coated, with Kynar 500 based PVDF / Lumiflon based fluoropolymer resin coating of approved colour and shade on face # 1 and polymer (Service) coating on face # 2 as specified using stainless steel screws, nuts, bolts, washers, cleats, weather silicone sealant, backer rods etc.</p>				
	<p>(c) The fastening brackets of Aluminium alloy 6005 T5 / MS with Hot Dip Galvanised with serrations and serrated washers to arrest the wind load movement, fasteners, SS 316 Pins and anchor bolts of approved make in SS 316, Nylon separators to prevent bi-metallic contacts all complete required to perform as per specification and drawing The item includes cost of all material &amp; labour component, the cost of all mock ups at site, cost of all samples of the individual components for testing in an approved laboratory, field tests on the assembled working curtain wall with aluminium composite panel cladding, cleaning and protection of the curtain wall with aluminium composite panel cladding till the handing over of the building for occupation. Base frame work for ACP cladding is payable under the relevant aluminium items. The Contractor shall provide curtain wall with aluminium composite panel cladding, having all the performance characteristics all complete, as per the Architectural drawings, as per item description, as specified, as per the approved shop drawings and as directed by the Engineer-in-Charge. However, for the purpose of payment, only the actual area on the external face of the curtain wall with Aluminum Composite Panel Cladding (including width of groove) shall be measured in sqm. up to two decimal places.</p>				

5.5	Providing and supplying aluminium extruded tubular and other aluminium sections as per the architectural drawings and approved shop drawings, the aluminium quality as per grade 6063 T5 or T6 as per BS 1474, including super durable powder coating of 60-80 microns conforming to AAMA 2604 of required colour and shade as approved by the Engineer-in-Charge. (The item includes cost of material such as cleats, sleeves, screws etc. necessary for fabrication of extruded aluminium frame work. Nothing extra shall be paid on this account). The weight of aluminium extruded section shall be taken for purpose of payment. (This item is for Base Frame work for ACP & Structural glazing).	5543.00	Kg	455.52	25,24,947
	<b>TOTAL CLADDING WORK:</b>			<b>Rs.</b>	<b>87,15,723</b>
<b>6.0</b>	<b>WOOD WORK</b>				
6.1	Providing wood work in frames of doors, windows, clerestory windows and other frames, wrought framed and fixed in position with hold fast lugs or with dash fasteners of required dia & length (hold fast lugs or dash fastener shall be paid for separately).				
6.1.1	Second class teak wood	5.00	Cum	157171.77	7,85,859
6.2	Providing and fixing panelled or panelled and glazed shutters for doors, windows and clerestory windows, fixing with butt hinges of required size with necessary screws, excluding panelling which will be paid for separately, all complete as per direction of Engineer-in-charge. (Note: 1. Butt hinges and necessary screws shall be paid separately. 2. The shutters are to be provided as per the Pattern/ drawing approved by the Engineer in Charge.)				
6.2.1	Second class teak wood				
6.2.1.1	35 mm thick shutters	52.00	Sqm	4521.05	2,35,095
6.3	Providing and fixing panelling or panelling and glazing in panelled or panelled and glazed shutters for doors, windows and clerestory windows (Area of opening for panel inserts excluding portion inside grooves or rebates to be measured). Panelling for panelled or panelled and				

	glazed shutters 25 mm to 40 mm thick.				
6.3.1	Second class teak wood	42.00	Sqm	3653.83	1,53,461
6.4	Providing and fixing ISI marked flush door shutters conforming to IS : 2202 (Part I) decorative type, core of block board construction with frame of 1st class hard wood and well matched teak 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters.				
6.4.1	35 mm thick including ISI marked Stainless Steel butt hinges with necessary screws	157.00	Sqm	3819.46	5,99,655
6.5	Extra for providing vision panel not exceeding 0.1 sqm in all type of flush doors (cost of glass excluded) (overall area of door shutter to be measured):				
6.5.1	Rectangular or square	157.00	Sqm	218.96	34,377
6.6	Extra for cutting rebate in flush door shutters (Total area of the shutter to be measured).	52.00	Sqm	117.32	6,101
6.7	Providing and fixing Antique finished decorative brass Sliding Door bolts of size 450 x 16mm with necessary nuts and screws etc. complete as per direction of Engineer-in-Charge.	24.00	Each	4,535.30	1,08,847
6.8	Providing and fixing Antique finished decorative brass handles of required size with necessary screws etc. complete as per direction of Engineer-in-Charge. - 450mm x 20mm	48.00	Each	4,747.10	2,27,861
6.9	Providing and fixing bright finished brass butt hinges with necessary screws etc. complete :				
6.9.1	125x85x5.5 mm (heavy type)	192.00	Each	295.38	56,713
6.10	Providing and fixing bright finished brass tower bolts (barrel type) with necessary screws etc. complete :				
6.10.1	250x10 mm	48.00	Each	485.53	23,305
6.11	Providing and fixing bright finished brass hanging type floor door stopper with necessary screws, etc. complete as per direction of Engineer-in-Charge.	48.00	Each	133.75	6,420



6.12	<p>Providing and fixing factory made single extruded WPC (Wood Polymer Composite) solid door/window/Clerestory windows &amp; other Frames/Chowkhat comprising of virgin PVC polymer of K value 58-60 (Suspension Grade), calcium carbonate and natural fibers (wood powder/ rice husk/wheat husk) and non toxic additives (maximum toxicity index of 12 for 100 gms) fabricated with miter joints after applying PVC solvent cement and screwed with full body threaded star headed SS screws having minimum frame density of 750 kg/cum, screw withdrawal strength of 2200 N (Face) &amp; 1100 N (Edge), minimum compressive strength of 58 N/mm<sup>2</sup>, modulus of elasticity 900 N/mm<sup>2</sup> and resistance to spread of flame of Class A category with property of being termite/borer proof, water/moisture proof and fire retardant and fixed in position with M.S hold fast/lugs/SS dash fasteners of required dia and length complete as per direction of Engineer-In- Charge. (M.S hold fast/lugs or SS dash fasteners shall be paid for separately). Note: For WPC solid door/window frames, minus 5mm tolerance in dimensions i.e depth and width of profile shall be acceptable. Variation in profile dimensions on plus side shall be acceptable but no extra payment on this account shall be made.</p>				
6.12.1	Frame size 50 x 100 mm	151.00	Metre	1041.99	1,57,340
6.13	<p>Providing and fixing factory made single extruded WPC (Wood Polymer Composite) solid plain flush door shutter of required size comprising of virgin polymer of K value 58-60 (Suspension Grade), calcium carbonate and natural fibers (wood powder/ rice husk/wheat husk) and non toxic additives (maximum toxicity index of 12 for 100 gms) having minimum density of 650 kg/cum and screw withdrawal strength of 1800 N (Face) &amp; 900 N (Edge), minimum compressive strength 50 N/mm<sup>2</sup>, modulus of elasticity 850 N/mm<sup>2</sup> and resistance</p>				

	to spread of flame of Class A category with property of being termite/borer proof, water/moisture proof and fire retardant and fixing with stainless steel butt hinges of required size with necessary full body threaded star headed counter sunk S.S screws, all as per direction of Engineer-In- Charge. (Note: stainless steel butt hinges and necessary S.S screws shall be paid separately)				
6.13.1	30 mm thick	53.00	Sqm	4779.15	2,53,295
6.14	Providing and fixing IS : 12817 marked stainless steel butt hinges (heavy weight) with stainless steel screws etc. complete :				
6.14.1	100x60x2.50 mm	90.00	Each	116.93	10,524
6.15	Providing and fixing SS sliding door bolts (316 grade) of required finish from approved make with necessary SS screws etc. complete as per direction of Engineer-in-Charge.				
6.15.1	300x16 mm	70.00	Each	2,382.40	1,66,768
6.15.2	250x16 mm	30.00	Each	2,345.40	70,362
6.16	Providing and fixing SS tower bolts (316 grade) of required finish from approved make with necessary SS screws etc. complete as per direction of Engineer-in-Charge.				
6.16.1	250x10 mm	140.00	Each	751.45	1,05,203
6.16.2	150x10 mm	30.00	Each	613.05	18,392
6.17	Providing and fixing SS hanging floor door stopper (316 grade) of required finish from approved make with necessary screws etc. complete as per the direction of Engineer in charge : 125 mm				
6.17.1	Single rubber stopper	30.00	Each	301.60	9,048
6.17.2	Twin rubber stopper	70.00	Each	343.10	24,017
6.18	Providing and fixing SS Handles made of hollow pipe of 1.5mm thick (316 grade) of required finish and shape from approved make with necessary screws etc. complete as per the direction of Engineer in charge :				
6.18.1	300 mm long x 19mm dia	70.00	Pair	1,798.60	1,25,902
6.18.2	150 mm long x 19mm dia	30.00	Pair	1,175.65	35,270
6.19	Providing and fixing aluminium die cast body tubular type universal hydraulic door closer (having brand logo with ISI, IS : 3564, embossed on the body, door weight upto 35 kg and door width upto 700 mm), with	118.00	Each	1236.76	1,45,938

	necessary accessories and screws etc. complete.				
6.20	<p>Providing and fixing of ISI marked medium duty hollow metal fire rated doors as per IS 3614: 2021, for 120 min integrity &amp; 30 min. insulation made of pressed galvanized steel confirming to IS 277 with the following specification. Recommended fire door shall be tested as per IS 17518 (Part 1) : 2022 / ISO 3008-1: 2019 from CBRI/TBW/Exova lab and manufactured in ISO 9001: 2015 certified company for quality management. ISI labled fire door shall be provided with fire rated hardware and vision panel all as a complete assembly. Proper label confirming the type of door and the hourly rating is mandatory. The Door frame shall be step rebate grooved profile of size 125 x 75 mm made out of 1.20 mm minimum thick galvanized steel sheet. Frames shall be mitered and field assembled with self tabs. Frames shall have inbuilt grooved sealing system for taking fire rated seals. All provision should be mortised, drilled and tapped for receiving appropriate hardware. Frames should be provided with back plate bracket and anchor fasteners for installation on a finished plastered masonry/concrete wall opening. Frames shall be filled with fire rated puff . Door frame shall be finished with pure polyester powder coating (minimum thickness of 50 micron) and shall have passed minimum 500 hours of salt spray test. The Door leaf shall be of 60 mm thick fully flush double skin step design door, insulated with or without vision panel. Door leaf shall be manufactured from 1.2 mm minimum thick galvanised steel sheet. The internal construction of the door should be rigid reinforcement pads for receiving appropriate hardware. The infill material shall be 120 kg/m<sup>3</sup> high density mineral wool insulation material. Intumescent seals 15 x 1.5 mm shall be provided. All doors shall be factory prepared for receiving</p>	102.00	Sqm	9,445.30	9,63,421

	appropriate hardware and provided with necessary reinforcement for hinges, locks, and door closers. The edges should be interlocked with a bending radius of 1.4mm. For pair of doors integrated astragals has to be provided on the meeting stile for both active and inactive leaf. Vision panel wherever applicable shall be maximum 200 x 300 mm (or max 0.06sq.mt) with clear borosilicate fire rated glass of minimum 6mm thickness. Glass shall be fixed with suitable gasket and with clip-on arrangement. Door Shutter shall be finished Pure Polyester Powder coating (minimum thickness of 50 micron) and shall have passed minimum 500 hours of salt spray test. All Fittings, Vision Glass to be paid separately.				
6.21	Providing and fixing Ball bearing butt hinge, SS 316 grade, of size 100 x 75 x 3mm with necessary accessories and screws etc. complete as per direction of Engineer-in-Charge.	192.00	Each	385.50	74,016
6.22	Providing & Fixing CE/UL certified Extruded aluminum body Heavy duty Fire Rated Door Closers (Make: DormaTS89, Hormann HDC35, Geze TS5000, Hafele DCL-97) with full body cover as per direction of Engineer-in-Charge. The Door Closers should be spring adjustable type 2-6, Non handed with back check. The door closer shall have 10 years mechanical warranty from the manufacturer and complies with EN 1154- for 50000 cycles + A1: 2002.	32.00	Each	12,572.80	4,02,330
6.23	Providing & Fixing Panic bar / latch (Two point or Double point) with vertical rod and top and bottom latch suitable for double doors or inactive leaf of door of make -Hafele - 903.10.625/ Dorma-PHCR/ Geze-8026302 or Hormann XDB5120SV all complete with screws etc. as per direction of Engineer-in-Charge.	64.00	Each	10,348.85	6,62,326
6.24	Providing & Fixing of S.S. Lever Handle of approved make and model with necessary accessories and screws etc. all complete as per direction of Engineer-in-Charge.	32.00	Each	6,105.60	1,95,379
6.25	Providing & Fixing Fire rated Gasket of 4mm x 13mm, Black colour	201.00	Metre	315.00	63,315

	Complete as per direction of Engineer-in-Charge.				
6.26	Providing & Fixing Fire and smoke seal black colour, all complete as per direction of Engineer-in-Charge.	201.00	Metre	446.50	89,747
6.27	Providing & Fixing 6 mm thick Clear fire rated glass, 120min integrity, of size 200 x 300mm for Vision Panel in fire check door of approved make with necessary accessories and screws etc. complete as per direction of Engineer-in-Charge.	32.00	Each	2,557.45	81,838
6.28	Supply & fixing of 120 min fire rated, anchor fasteners of HILTI/ FISHER/ Equivalent of maximum 80mm length all complete as per the directions of Engineer-in-charge.	192.00	Each	91.40	17,549
6.29	Providing and fixing 25 mm thick shutters for cup board etc. :				
6.29.1	Panelled or panelled & glazed shutters :				
6.29.1.1	Second class teak wood including ISI marked anodised aluminium butt hinges with necessary screws	12.00	Sqm	4840.89	58,091
6.30	Providing & Fixing Toilet Cubicle made up of 12mm thick compact board with standard height of 1995mm and 600mm door size width (Greenlam (Sturdo)/Fundermax/Merino make) made up of thermosetting resin treated high pressure, self-supporting decorative compact laminates with permanently incorporating anti-bacterial agents during manufacturing. Compact board should be Moisture resistant, Impact resistant, termite resistant, Scratch resistant, Weather and climatic shock resistant. Compact board should satisfy criteria of FSC and green guard gold certification. It should be manufactured under IS2046 and EN438-2&3:2005 standard and shall have resistance to water immersion through permissible increase on thickness and mass <0.60% and board density >1.35kg/cm <sup>3</sup> . Finish of compact laminates should be suede finish which includes door, pilasters and intermediate panels finished with approved texture/shades as per IS2046 and fulfilling the criteria of fire retardant under BS-476/97 and EN438-6 with classification of	20.00	each	40,398.70	8,07,974

	BS1D0 standard. Pilaster may be supported with SS (grade316) adjustable foot and intermediate panels will be attached to the wall with the help of approved SS (grade316) channels and all required hardware, made up of stainless steel as per manufacturer's specification. All required hardware (e.g. Door knob, gravity hinges, Thumb turn locksets with occupancy indicators, coat hooks with door stopper, U channel, top rail with corner connector, adjustable foot/pedestal, Rubber noise deafening tape, screw & wall plugs) shall be approved by Engineer-in-Charge. All screw will be of 316 grade in SS with stain finish. All pilasters are supported by SS bottom cladding. The base of the stainless-steel bottom cladding will be anchored to the floor with a clearance height upto 150 mm for European W/C whereas no clearance from floor shall be kept for Indian W/C.				
	<b>TOTAL WOOD WORK :</b>			<b>Rs.</b>	<b>67,75,739</b>
<b>7.0</b>	<b>STEEL WORK</b>				
7.1	Structural steel work riveted, bolted or welded in built up sections, trusses and framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete.	200.00	Kg	147.00	29,400
7.2	Supplying and fixing rolling shutters of approved make, made of required size M.S. laths, interlocked together through their entire length and jointed together at the end by end locks, mounted on specially designed pipe shaft with brackets, side guides and arrangements for inside and outside locking with push and pull operation complete, including the cost of providing and fixing necessary 27.5 cm long wire springs manufactured from high tensile steel wire of adequate strength conforming to IS: 4454 - part 1 and M.S. top cover of required thickness for rolling shutters.				
7.2.1	80x1.25 mm M.S. laths with 1.25 mm thick top cover	16.00	Sqm	4016.66	64,267
7.3	Providing and fixing ball bearing for rolling shutters.	3.00	Each	541.33	1,624

7.4	Extra for providing grilled rolling shutters manufactured out of 8 mm dia M.S. bar instead of laths as per design approved by Engineer-in-charge, (area of grill to be measured).	7.00	Sqm	844.68	5,913
7.5	Steel work in built up tubular (round, square or rectangular hollow tubes etc.) trusses etc., including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer, including welding and bolted with special shaped washers etc. complete.				
7.5.1	Hot finished welded type tubes	2250.00	Kg	213.74	4,80,915
7.6	Steel work welded in built up sections/ framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required.				
7.6.1	In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works	4366.00	Kg	189.77	8,28,536
7.7	Providing and fixing carbon steel galvanised (minimum coating 5 micron) dash fastener of 10 mm dia double threaded 6.8 grade (yield strength 480 N/mm <sup>2</sup> ), counter sunk head, comprising of 10 mm dia polyamide PA 6 grade sleeve, including drilling of hole in frame , concrete/ masonry, etc. as per direction of Engineer-in-charge.				
7.7.1	10 x 140 mm	804.00	Each	200.33	1,61,065
7.8	Providing and fixing <b>stainless steel (Grade 304)</b> railing made of Hollow tubes, channels, plates etc., including welding, grinding, buffing, polishing and making curvature (wherever required) and fitting the same with necessary stainless steel nuts and bolts complete, i/c fixing the railing with necessary accessories & stainless steel dash fasteners , stainless steel bolts etc., of required size, on the top of the floor or the side of waist slab with suitable arrangement as per approval of Engineer-in-charge, (for payment purpose only weight of stainless steel members shall be considered excluding fixing accessories such as nuts, bolts, fasteners etc.).	1670.00	Kg	849.25	14,18,248
	<b>TOTAL STEEL WORK :</b>			<b>Rs.</b>	<b>29,89,968</b>



<b>8.0</b>	<b>FLOORING WORK</b>				
8.1	Providing and laying Heavy duty Floor Tiles of size approved by Engineer-in-charge (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS: 15622, of approved make, in all colours and shades, laid on 20mm thick cement mortar 1:4 (1 cement : 4 coarse sand), jointing with grey cement slurry @ 3.3 kg/ sqm including grouting the joints with white cement and matching pigments etc., complete.	537.00	Sqm	1,454.30	7,80,959
8.2	Providing and fixing 18 mm thick gang saw cut, mirror polished, premoulded and prepolished, machine cut for kitchen platforms, vanity counters, window sills, facias and similar locations of required size, approved shade, colour and texture laid over 20 mm thick base cement mortar 1:4 (1 Portland Pozzolana Cement : 4 coarse sand), joints treated with white cement, mixed with matching pigment, epoxy touch ups, including rubbing, curing, moulding and polishing of edges to give high gloss finish etc. complete at all levels.				
8.2.1	Granite stone slab of colour black, Cherry/Ruby red				
8.2.1.1	Area of slab upto 0.50 sqm	54.00	Sqm	5952.09	3,21,413
8.2.1.2	Area of slab over 0.50 sqm	55.00	Sqm	5647.31	3,10,602
8.3	Extra for fixing marble /granite stone, over and above in Item No. <b>8.2</b> , in <b>facia</b> and drops of width upto 150 mm with epoxy resin based adhesive, including cleaning etc. complete.	5.00	Metre	625.12	3,126
8.4	Extra for providing opening of required size & shape for wash basin/kitchen sink in kitchen platform, vanity counter and similar location in marble/ Granite/ stone work, including necessary holes for pillar taps etc. including moulding, rubbing and polishing of cut edges etc. complete.	29.00	Each	1076.07	31,206

8.5	Providing and laying Anti skid vitrified floor tiles of any size (as approved by engineer-in-charge) (thickness to be specified by the manufacturer) of 1st quality conforming to IS : 15622 of approved make in colours, shades, as approved by Engineer-in-charge laid on 20 mm thick cement mortar 1:4 (1 Portland Pozzolana Cement : 4 Coarse sand), including providing spacers of 3mm wide and grouting the joints of flooring tiles having joints of 3 mm width, using matching colour epoxy grout mix of 0.70 kg of organic coated filler of desired shade of approved make (0.10 kg of hardener and 0.20 kg of resin per kg), including filling / grouting and finishing complete as per direction of Engineer-in-charge. (For Toilets & Kitchen)	363.00	Sqm	1,800.80	6,53,690
8.6	Providing and laying Vitrified tiles in floor in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS:15622, of approved brand & manufacturer, in all colours and shade, laid on 20 mm thick cement mortar 1:4 (1 Portland Pozzolana Cement: 4 coarse sand) jointing with grey cement slurry @3.3 kg/sqm including providing spacers of 3mm wide and grouting the joints with white cement and matching pigments etc. The tiles must be cut with the zero chipping diamond cutter only . Laying of tiles will be done with the notch trowel, plier, wedge, clips of required thickness, leveling system and rubber mallet for placing the tiles gently and easily.				
8.6.1	Glazed vitrified floor tiles polished finish of size				
8.6.1.1	Size of Tile 600 x 1200 mm	2516.00	Sqm	1977.76	49,76,044
8.7	Providing and laying Leather finish Granite stone flooring in all colours in required design and patterns, in linear as well as curvilinear portions of the building all complete as per the architectural drawings with 18 mm thick stone slab over 20 mm (average) thick base of cement mortar 1:4 (1 Portland Pozzolana cement : 4 coarse sand) laid and jointed with cement slurry and pointing with white cement				

	slurry admixed with pigment of matching shade including rubbing , curing and polishing etc. all complete as specified and as directed by the Engineer-in-Charge.				
8.7.1	Leather finish granite stone slab (For Ramps, Entry Steps, Staircase Tread in Single Piece)	82.00	Sqm	3414.75	2,80,010
8.8	Providing and laying Polished Granite stone flooring in all colours in required design and patterns, in linear as well as curvilinear portions of the building and staircase treads with single piece granite stone including making 3 grooves parallel to the nosing all complete as per the architectural drawings with 18 mm thick stone slab over 20 mm (average) thick base of cement mortar 1:4 (1 Portland Pozzolana cement : 4 coarse sand) laid and jointed with cement slurry and pointing with white cement slurry admixed with pigment of matching shade including rubbing, curing and polishing etc. all complete as specified and as directed by the Engineer-in-Charge.				
8.8.1	Polished Granite stone slab of all colour.	786.00	Sqm	3,286.30	25,83,032
8.9	Providing and laying 18 mm thick Polished Granite stone in all colours in required design and patterns in staircase risers with single piece granite stone, in linear as well as curvilinear portions of the building over 12 mm thick bed of cement mortar 1:3 (1 Portland Pozzolana cement : 3 coarse sand) laid and jointed with cement slurry and pointing with white cement slurry admixed with pigment of matching shade etc. all complete as per the architectural drawings and direction of the Engineer-in-Charge.				
8.9.1	Polished Granite stone slab of all colour.	61.00	Sqm	3360.85	2,05,012
8.10	Providing edge moulding to 18 mm thick granite stone in all colours (Staircase steps), including machine polishing to edge to give high gloss finish etc. complete as per design approved by Engineer-in-Charge.	422.00	Metre	561.78	2,37,071

8.11	<p>Providing and laying cement concrete flooring of mix M-30 with ready mixed or site batched design mix cement concrete shall be laid and finished with screed board vibrator, vacuum dewatering process and finally finished by floating, brooming with wire brush etc. including curing, making provision for contraction / expansion, construction &amp; longitudinal joints (10 mm wide x 40 mm deep) by groove cutting machine, providing and filling joints with approved joint filler and sealants, complete all as per direction of Engineer-in-charge (Item of groove cutting, joint fillers, sealants to be paid separately) complete as per specifications and directions of Engineer-in-charge. (The panel shuttering work shall be paid for separately).</p> <p>Note:- 1) Cement content considered in this item is @ 350 kg/cum. 2) Extra cement up to 10% of the minimum specified cement content in design mix shall be payable separately. In case the cement content in design mix is more than 110% of the specified minimum cement content, the contractor shall have discretion to either re-design the mix or bear the cost of extra cement.</p>	73.00	Cum	10,031.70	7,32,314
8.12	Cutting of grooves of size 10mm wide and 40mm deep using stand-on groove cutting machine between the panels in both directions with perfect lines and grid as specified and directed and filling the grooves with sealing compound of approved make all complete, as per direction of Engineer-in-Charge.	553.00	Metre	167.65	92,710
8.13	Providing and laying 12 mm thick AC-4, grade laminate wooden flooring & skirting of having 2 mm thick direct laminate on top of specially developed substrate core (high density fibre board) of plank size as per manufacturer's specification having smart lock, joint tongue and groove construction i/c top of skirting should be sealed with 4mm thick teak wood lipping. The under layer has to be a 2 mm thick alkali resistant polyethylene sheet of	213.00	Sqm	2,122.20	4,52,029

	density 30-32 kg. per cum on top to secure the floor. The work shall be carried out as per manufacturer's installation procedure and as per direction of Engineer-in-charge.				
	<b>TOTAL FLOORING WORK :</b>			<b>Rs.</b>	<b>1,16,59,218</b>
<b>9.0</b>	<b>ROOFING WORK</b>				
9.1	<p>Providing and Fixing 15 mm thick densified tegular edged eco friendly light weight calcium silicate false ceiling tiles of approved texture of size 595 x 595 mm in true horizontal level, suspended on inter locking metal grid of hot dipped galvanised steel sections (galvanising @ 120 grams per sqm including both side) consisting of main 'T' runner suitably spaced at joints to get required length and of size 24x38 mm made from 0.33 mm thick (minimum) sheet, spaced 1200 mm centre to centre, and cross "T" of size 24x28 mm made out of 0.33 mm (Minimum) sheet, 1200 mm long spaced between main 'T' at 600 mm centre to centre to form a grid of 1200x600 mm and secondary cross 'T' of length 600 mm and size 24 x28 mm made of 0.33 mm thick (Minimum) sheet to be inter locked at middle of the 1200x 600 mm panel to from grid of size 600x600 mm, resting on periphery walls /partitions on a Perimeter wall angle pre-coated steel of size(24x24X3000 mm made of 0.40 mm thick (minimum) sheet with the help of rawl plugs at 450 mm centre to centre with 25 mm long dry wall screws @ 230 mm interval and laying 15 mm thick densified edges calicum silicate ceiling tiles of approved texture in the grid, including, cutting/ making opening for services like diffusers, grills, light fittings, fixtures, smoke detectors etc., wherever required. Main 'T' runners to be suspended from ceiling using G.I. slotted cleats of size 25x35x1.6 mm fixed to ceiling with 12.5 mm dia and 50 mm long dash fasteners, 4 mm G.I. adjustable rods with galvanised steel level clips of size 85 x 30 x 0.8 mm, spaced at 1200 mm centre to centre along main 'T', bottom</p>	2215.00	Sqm	2372.86	52,55,885

	<p>exposed with 24 mm of all Tsections shall be pre-painted with polyster baked paint, for all heights, as per specifications, drawings and as directed by Engineer-in-Charge.Note :- Only calcium silicate false ceiling area will be measured from wall to wall. No deduction shall be made for exposed frames/opening (cut outs) having area less than 0.30 sqm. The calcium silicate ceiling tile shall have NRC value of 0.50 (Minimum), light reflection &gt; 85%, non- combustible as per B.S. 476 part IV, 100% humidity resistance and also having thermal conductivity &lt;0.043 w/mK.</p>				
9.2	<p>Providing &amp; fixing false ceiling at all height including providing &amp; fixing of framework made of special section, power pressed from M.S. sheets and galvanised with zinc coating of 120 gms/ sqm (both side inclusive) as per IS : 277 and consisting of angle cleat of size 25mm wide x 1.6mm thick with flanges of 27mm and 37mm, at 1200mm c/c, one flange fixed to the ceiling with dash fastener 12.5mm dia x 50mm long with 6mm dia bolts, other flange of cleat fixed to the angle hangers of 25 x10 x0.50mm of required length with nuts &amp; bolts of required size and other end of angle hanger fixed with intermediate G.I channels 45 x15 x 0.90mm running at the spacing of 1200 mm c/c, to which the ceiling section 0.5mm thick bottom wedge of 80mm with tapered flanges of 26 mm each having lips of 10.5mm, at 450mm c/c, shall be fixed in a direction perpendicular to G.I intermediate channel with connecting clip made out of 2.64mm dia x 230mm long G.I wire at every junction, including fixing perimeter channels 0.50mm thick 27mm high having flanges of 20mm and 30mm long, the perimeter of ceiling fixed to wall/ partitions with the help of Rawl plugs at 450mm centre, with 25mm long dry wall screws @ 230mm interval, including fixing of Calcium Silicate Board to ceiling section and perimeter channels with the help of dry wall screws of size 3.5 x25mm at 230mm c/c, including jointing &amp;</p>				

	finishing to a flush finish of tapered and square edges of the board with recommended jointing compounds, jointing tapes, finishing with jointing compounds in three layers covering up to 150mm on both sides of joints and two coats of primer suitable for boards, all as per manufacture's specification and also including the cost of making opening for light fittings, grills, diffusers, cut outs 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 with:				
9.2.1	8 mm thick Calcium Silicate Board made with Calcareous & Siliceous materials reinforced with cellulose fiber manufactured through autoclaving process.	391.00	Sqm	1728.73	6,75,933
9.3	Supply & Installation of U Baffle Aluminium panel ceiling of consisting of Wood finish panel size 50 mm width X 150 mm deep (0.6mm thick), panel length up to 4 metre, Coil Coated on a Continuous Paint Line, Double baked and roll formed from enamelled corrosion resistance Aluminium alloy AA 3005 (Al. Mg) for higher strength and good roll forming characteristics. Panels shall be clipped to a baked enamelled Aluminium carrier of 30 mm wide x 47 mm high x 0.5 mm thick, Black Colour coated, one leg of the carriers with cut outs to hold the panels in a module of 200 mm. Panel carrier shall be suspended by means of threaded rod of same make of panel ceiling at a distance of 1.8 metre c/c. Aluminium panels shall be achromatised for maximum bond between metal and paint enamelled twice under high temperature, Exposed side with a full primer and finish coat on a Continuous Paint Line. Ceiling area above U Baffle to be painted in black colour before fixing this system. The work shall be executed as per manufacturer's specifications, drawings and as directed by Engineer-in-Charge.	43.00	Sqm	12,284.05	5,28,214



9.4	Providing and fixing precoated galvanised iron profile sheets (size, shape and pitch of corrugation as approved by Engineer-in-Charge) of total coated thickness 0.50mm (base metal of minimum 0.45mm thickness with total coating thickness of 0.05mm) with zinc coating 120 grams per sqm as per IS: 277, in 240 mpa steel grade, 5-7 microns epoxy primer on both side of the sheet and polyester top coat 15-18 microns. Sheet should have protective guard film of 25 microns minimum to avoid scratches during transportation and should be supplied in single length upto 12 metre or as desired by Engineer-in-charge. The sheet shall be fixed using self-drilling /self-tapping screws of size (5.5x 55 mm) with EPDM seal, complete upto any pitch in horizontal/ vertical or curved surfaces, excluding the cost of purlins, rafters and trusses and including cutting to size and shape wherever required.	150.00	Sqm	812.14	1,21,821
9.5	Providing and fixing precoated galvanised steel sheet roofing accessories of total coated thickness 0.50mm (base metal of minimum 0.45mm thickness with total coating thickness of 0.05mm) with Zinc coating 120 grams per sqm as per IS: 277, in 240 mpa steel grade, 5-7 microns epoxy primer on both side of the sheet and polyester top coat 15-18 microns using self-drilling/ self-tapping screws complete :				
9.5.1	Flashings/ Aprons. ( Upto 600 mm)	15.00	Metre	525.45	7,882
9.5.2	Gutter (600 mm over all girth)	15.00	Metre	1421.52	21,323
9.6	Extra for providing and fixing wind ties of 40x 6 mm flat iron section.	120.00	Metre	211.65	25,398
9.7	Providing and fixing tiled false ceiling of specified 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) 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 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 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.				
9.7.1	GI Metal Ceiling Lay in perforated Tegular edge global white color tiles of size 595x595 mm and 0.5 mm thick with 8 mm drop; made of GI sheet having galvanizing of 100 gms/sqm (both sides inclusive) and 20% perforation area with 1.8 mm dia holes and having NRC (Noise Reduction Coefficient ) of 0.5, electro statically polyester powder coated of thickness 60 microns (minimum), including factory painted after bending and perforation and backed with a black Glass fiber acoustical fleece.	363.00	Sqm	2274.57	8,25,669
9.8	Providing and fixing Heat Resistant Terrace Tiles (300 mm x 300 mm x 20 mm) with SRI (solar refractive index) > 78, solar reflection > 0.70 and initial emittance > 0.75 on waterproof and sloped surface of terrace, laid on 20 mm thick cement sand mortar in the ratio of 1:4 (1 cement : 4 coarse sand) and grouting the joints with mix of white cement & marble powder in ratio of 1:1, including rubbing and polishing of the	841.00	sqm	1873.48	15,75,597

	surface upto 3 cuts complete, including providing skirting upto 150 mm height along the parapet walls in the same manner.				
	<b>TOTAL ROOFING WORK :</b>			<b>Rs.</b>	<b>90,37,722</b>
<b>10.0</b>	<b>FINISHING WORK</b>				
10.1	Providing and applying 12 mm thick (average) premixed formulated one coat gypsum lightweight plaster having additives and light weight aggregates as vermiculite/ perlite respectively conforming to IS: 2547 (Part - 1 & II) 1976, applied on hacked / uneven background such as bare brick/ block/ RCC work on walls & ceiling at all floors and locations, finished in smooth line and level etc. complete.	8153.00	Sqm	515.55	42,03,279
10.2	12 mm cement plaster of mix :				
10.2.1	1:6 (1 Portland Pozzolana Cement : 6 Coarse sand)	1578.00	Sqm	377.84	5,96,232
10.3	15 mm cement plaster on the rough side of single or half brick wall of mix :				
10.3.1	1:6 (1 Portland Pozzolana Cement : 6 Coarse sand)	2692.00	Sqm	434.68	11,70,159
10.4	12 mm cement plaster finished with a floating coat of neat cement of mix :				
10.4.1	1:3 (1 Portland Pozzolana Cement : 3 Coarse sand)	617.00	Sqm	482.95	2,97,980
10.5	6 mm cement plaster of mix including mixing of synthetic polyester triangular fibre of length 6mm, effective diameter 10-40 microns and specific gravity 1.34 to 1.40 in cement plaster / mortar by using 125 grams of synthetic polyester triangular fibre for 50 kgs cement used in cement mortar as per direction of Engineer-in-charge.:				
10.5.1	1:3 (1 Portland Pozzolana Cement : 3 fine sand)	1749.00	Sqm	329.55	5,76,383
10.6	Applying one coat of water thinnable cement primer of approved brand and manufacture on wall surface : Note: 1. This item to be operated wherever cement based water proof wall putty is not applied. 2. No plastering and painting is to be done wherever false ceiling is provided. Only priming coat	3384.00	Sqm	81.20	2,74,781

	shall be applied. Water thinnable cement primer				
10.7	Finishing walls with textured exterior paint of required shade :				
10.7.1	New work (Two or more coats applied @ 3.28 ltr/10 sqm) over and including priming coat of exterior primer applied @ 2.20kg/10 sqm	433.00	Sqm	245.85	1,06,453
10.8	Finishing walls with Acrylic Smooth exterior paint of required shade :				
10.8.1	New work (Two or more coat applied @ 1.67 ltr/10 sqm over and including priming coat of exterior primer applied @ 0.9 kg/10 sqm)	2832.00	Sqm	176.58	5,00,075
10.9	Painting with synthetic enamel paint approved brand and manufacture to give an even shade:				
10.9.1	Two or more coats on new work	210.00	Sqm	171.41	35,996
10.10	Wall painting with premium acrylic emulsion paint of interior grade, having VOC (Volatile Organic Compound) content less than 50 grams/litre with a best mid sheen luxury finish of approved brand and manufacture, including applying additional coats wherever required to achieve even shade and colour.				
10.10.1	Two coats	9952.00	Sqm	157.01	15,62,564
10.11	Providing and fixing Chiken wire mesh of 28G x 12.5mm hexagonal mesh in junctions of Columns/beams and walls & at all locations of conduits, pipes etc, for all floors and heights etc. including fixing with U-nails 150mm center to center before plastering as per the direction of Engineer in charge.	1029.00	Sqm	173.00	1,78,017
10.12	Extra for plastering exterior walls of height more than 10 m from ground level for every additional height of 3 m or part thereof.	1082.00	Sqm	95.77	1,03,623
10.13	Polishing in high gloss/matt finish melamine clear polish on wood work in required color/wooden shade texture with following process in the sequence as detailed below: 1. The surface to be polished is rubbed with sand paper 80/120 no. and then with sand paper of 160/180 nos. 2. Applying two coats of sealer with spray gun and allowing sufficient drying time for 1st coat and 2nd coat	250.00	Sqm	1,453.05	3,63,263

	<p>is allowed to dry for 8 to 12 hrs.</p> <p>3. On drying of sealer coat, wet rubbing with emery cloth of finer grading with ample water to remove excess sealer layer and make the surface further smooth after this wet rubbing, then surface is applied with special grade melamine fillers to fill all the small and big holes/grooves etc. Filler coat to be allowed to dry for 4 to 6 hrs on which again a light wet rubbing is done this surface is further allowed to dry for 12 hrs.</p> <p>4. On this, 1st coat of melamine polish is applied with spray gun using melamine clear polish and melamine thinner in required proportion. This 1st coat is allowed to dry for 24 hrs then this dry surface is again fine wet rubbed smooth, which is further allowed to dry for 12 hrs. The final melamine polish is applied with compressor pressure spray gun using melamine clear polish and melamine thinner mixed in required proportion complete as per direction of Engineer-in-Charge. (Final coat to be done in 1 or 2 layers without gap of time.)</p>				
10.14	Finishing walls with water proofing cement paint of required shade :				-
10.14.1	New work (Two or more coats applied @ 3.84 kg/10 sqm)	1006.00	Sqm	128.53	1,29,301
	<b>TOTAL FINISHING WORK :</b>			<b>Rs.</b>	<b>1,00,98,106</b>
<b>11.0</b>	<b>WATER PROOFING WORK :</b>				
11.1	<p>Suppling, applying, and installation of pre-applied waterproofing membrane of minimum 1.5 mm thick (with bare virgin HDPE membrane thickness of 0.9 mm or more) flexible sheets for waterproofing treatment below horizontal surface of foundations or underground structures exposed to soil (e.g. grade slab, raft, footing, lift pit base, UG tank, etc.). The Membrane shall confirm to following properties (minimum)-</p> <p>i) Puncture resistance of &gt;1000N as per ASTM E 154,</p> <p>ii) Tensile strength of &gt; 25 Mpa as per ASTM D 412,</p> <p>iii) Resistance to hydrostatic head of &gt;70m ss per ASTM D 5385,</p> <p>iv) Elongation of &gt;500% as per ASTM D 412,</p>	603.00	Sqm	919.45	5,54,428

	<p>v) Peel adhesion to concrete of &gt;900 N/m as per ASTM D 903.</p> <p>vi) Joint strength in shear: 15000 N/m <math>\pm</math>10%</p> <p>The pre-applied, fully bonded HDPE sheet membrane shall be loosely laid on PCC. The fully bonded HDPE sheet membrane shall consist of a high-performance PE film, self-adhesive polymer layer and unique particulate layer with pressure sensitive adhesive, which bonds fully to the poured concrete above it. The membrane shall have minimum of 75mm side laps and end laps which shall be sealed with double sided adhesive tape. Third party test report from NABL accredited approved laboratory along with MTC of product should be submitted. Test report should not be older than 5 years. All detailing components of the system has to be compatible with the proposed waterproofing membrane and has to be manufactured and supplied by the manufacturer of waterproofing membrane. The system shall be installed as per manufacturer's specification and executed by manufacturer's certified applicators (in house team) after successful mock-up at site etc. (The product performance shall carry tripartite guarantee for 10 years against any leakage.)</p>				
11.2	<p>Supplying and installing post applied SBS based self-adhesive waterproofing membrane having minimum thickness of 1.5 mm on vertical sides of foundation system or underground structures (e.g. lift pit walls, retaining walls, walls in continuation with the foundations, basement wall, UG tank etc.). The membrane shall be topped with HDPE cross laminated film. The installation involves cleaning the surface, priming the surface with cold applied bituminous primer@4-6 sqm./litre, properly sealing the joints &amp; maintaining 75 mm overlap between the membrane selvedge &amp; 100 mm overlap on the end joints of the membrane over the slab etc. complete.</p>	353.00	Sqm	1289.45	4,55,176

	<p>The self-adhesive membrane shall have following minimum properties:</p> <p>(i) Tensile strength (ASTM D 412): &gt; 3.5 N/mm<sup>2</sup> ,</p> <p>(ii) Resistance to Hydrostatic Head (ASTM D 5385) : &gt; 6 bar,</p> <p>(iii) Tear Resistance (ASTM D 4073) : &gt; 30 N/mm, Longitudinal 165 N and transfer 135.</p> <p>(iv) Puncture Resistance (ASTM E 154) : &gt; 200 N.</p> <p>(v) Lap adhesion (ASTM D 1876) : &gt; 1.8 N/mm.</p> <p>(vi) Peel adhesion to prime surface (ASTM D1000): 3N/mm.</p> <p>(vii) elongation (ASTM D412: min. 200%</p> <p>The membrane shall be protected by spot bonding 7-8mm thick dimpled HDPE protection board, spot bonded onto the self-adhesive membrane with liquid mastic which shall be applied prior to backfilling. The backfilling shall be done within 2-3 days of fixing protection board. Third party test report from NABL accredited approved laboratory along with MTC should be submitted. Test report should not be older than 5 years. All detailing components of the system has to be compatible with the proposed waterproofing membrane and has to be manufactured and supplied by the manufacturer of waterproofing membrane. The system shall be installed as per manufacturer's specification and executed by manufacturer's certified applicators (in house team) after successful mock-up at site etc. (The product performance shall carry tripartite guarantee for 10 years against any leakage.)</p>				
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11.3	<p>Providing and laying integral cement based water proofing treatment including preparation of surface as required for treatment of roofs, balconies, terraces etc consisting of following operations:(a) Applying a slurry coat of neat cement using 2.75 kg/sqm of cement admixed with water proofing compound conforming to IS. 2645 and approved by Engineer-in-charge over the RCC slab including adjoining walls upto 300 mm height including cleaning the surface before treatment.(b) Laying brick bats with mortar using broken bricks/brick bats 25 mm to 115 mm size with 50% of cement mortar 1:5 (1 cement : 5 coarse sand) admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge over 20 mm thick layer of cement mortar of mix 1:5 (1 cement :5 coarse sand) admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge to required slope and treating similarly the adjoining walls upto 300 mm height including rounding of junctions of walls and slabs. (c) After two days of proper curing applying a second coat of cement slurry using 2.75 kg/ sqm of cement admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge.(d) Finishing the surface with 20 mm thick jointless cement mortar of mix 1:4 (1 cement :4 coarse sand) admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge including laying glass fibre cloth of approved quality in top layer of plaster and finally finishing the surface with trowel with neat cement slurry and making pattern of 300x300 mm square 3 mm deep.(e) The whole terrace so finished shall be flooded with water for a minimum period of two weeks for curing and for final test. "All above operations to be done in order and as directed and specified by the Engineer-in-Charge:</p>				
11.3.1	With average thickness of 120 mm and minimum thickness at khurra as 65 mm.	841.00	Sqm	1852.20	15,57,700

11.4	<p>Water proofing treatment to vertical and horizontal surfaces in all internal wet areas of building (e.g. Toilets/Kitchens/ AHU/balconies etc.) shall be done with two-component, high elasticity acrylic modified cementitious coating system made from best quality Portland cement, properly selected &amp; graded aggregates additives &amp; acrylic emulsion polymer as a binder. The product consumption shall be at least @ 3kg/sqm in two or more coats. The coating system must have the following characteristics:</p> <p>i) Tensile strength &gt;1 Mpa  ii) Bond Strength with concrete &gt; 1 Mpa,  iii) Elongation &gt; 175%  iv) Crack bridging ability not less than 1.5 mm.  v) Shore A hardness 60 ASTM D 2240:2010</p> <p>and shall be applied as per manufacturer specification. The coating shall be continued to the entire horizontal area and should be terminated at 300mm above the floor finish level complete as per manufacturer's specification. The coating shall be followed by providing and applying 15 mm thick Protective mortar of (1 Cement: 4 Coarse Sand) mixed with integral waterproofing compound of approved make as per manufacturer's specifications. All systems shall be installed by authorized applicators (in house team of manufacturer) as per manufacturer's recommendations and includes all lead and lift for all materials and labor complete. (The product performance shall carry tripartite guarantee for 10 years against any leakage.)</p>	363.00	Sqm	791.10	2,87,169
11.5	<p>Providing and mixing integral crystalline admixture for water proofing treatment to RCC structures like basement raft, retaining walls, reservoir, sewage &amp; water treatment plant, tunnels / subway and bridge deck etc. at the time of transporting of concrete into the drum of the ready-mix truck , using integral crystalline admixture @0.80% (minimum) to the</p>	2975.00	Kg	426.60	12,69,135

	weight of cement content per cubic meter of concrete) or higher as recommended by the manufacturer's specification in reinforced cement concrete at site of work. The material shall meet the requirements as specified in ACI-212-3R- 2010 i.e. by reducing permeability of concrete by more than 90%, compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure. The crystalline admixture shall be capable of self-healing of cracks up to a width of 0.50mm. The work shall be carried out all complete as per specification and the direction of the Engineer-in-charge.(The product performance shall carry guarantee for 10 years against any leakage.)				
11.6	Providing and applying integral crystalline slurry of hydrophilic in nature for waterproofing treatment to the RCC structures like retaining walls of the basement, water tanks, roof slabs, podiums, reservoir, sewage & water treatment plant, tunnels / subway and bridge deck etc., prepared by mixing in the ratio of 5 : 2 (5 parts integral crystalline slurry : 2 parts water) for vertical surfaces and 3 : 1 (3 parts integral crystalline slurry : 1 part water) for horizontal surfaces and applying the same from negative (internal) side with the help of synthetic fiber brush. The material shall meet the requirements as specified in ACI- 212-3R-2010 i.e by reducing permeability of concrete by more than 90% compared with control concrete as per DIN 1048 and resistant to 16 bar hydrostatic pressure on negative side. The crystalline slurry shall be capable of self-healing of cracks up to a width of 0.50mm. The work shall be carried out all complete as per specification and the direction of the engineer-in-charge. (The product performance shall carry guarantee for 10 years against any leakage.)				-
11.6.1	For vertical surface two coats @ 0.70 kg per sqm per coat	434.00	Sqm	519.95	2,25,658
11.6.2	For horizontal surface one coat @1.10 kg per sqm.	108.00	Sqm	398.89	43,080

11.7	Providing and placing in position suitable PVC water stops conforming to IS:12200 for construction/ expansion joints between two RCC members and fixed to the reinforcement with binding wire before pouring concrete etc. complete as per direction of engineer in charge.				
11.7.1	Serrated with central bulb (225 mm wide, 8-11 mm thick)	526.00	Metre	360.25	1,89,492
	<b>TOTAL WATER PROOFING WORK :</b>			<b>Rs.</b>	<b>45,81,838</b>
<b>12.0</b>	<b>STRUCTURAL GLAZING</b>				
12.1	Designing, fabricating, testing, protection, installing and fixing in position semi (grid) unitized system of structural glazing (with open joints) for linear as well as curvilinear portions of the building for all heights and all levels, including: (a) Structural analysis & design and preparation of shop drawings for the specified design loads conforming to IS 875 part III (the system must passed the proof test at 1.5 times design wind pressure without any failure), including functional design of the aluminum sections for fixing glazing panels of various thicknesses, aluminium cleats, sleeves and splice plates etc. gaskets, screws, toggles, nuts, bolts, clamps etc., structural and weather silicone sealants, flashings, fire stop (barrier)-cum-smoke seals, microwave cured EPDM gaskets for water tightness, pressure equalisation & drainage and protection against fire hazard including: (b) Fabricating and supplying serrated M.S. hot dip galvanised / Aluminium alloy of 6005 T5 brackets of required sizes, sections and profiles etc. to accommodate 3 Dimentional movement for achieving perfect verticality and fixing structural glazing system rigidly to the RCC/ masonry/structural steel framework of building structure using stainless steel anchor fasteners/ bolts, nylon seperator to prevent bimetallic contacts with nuts and washers etc. of stainless steel grade 316, of the required capacity and in required numbers.	554.00	Sqm	3859.76	21,38,307

	<p>(c) Providing and filling, two part pump filled, structural silicone sealant and one part weather silicone sealant compatible with the structural silicone sealant of required bite size in a clean and controlled factory / work shop environment, including double sided spacer tape, setting blocks and backer rod, all of approved grade, brand and manufacture, as per the approved sealant design, within and all around the perimeter for holding glass.</p> <p>(d) Providing and fixing in position flashings of solid aluminium sheet 1 mm thick and of sizes, shapes and profiles, as required as per the site conditions, to seal the gap between the building structure and all its interfaces with curtain glazing to make it watertight.</p> <p>(e) Making provision for drainage of moisture/ water that enters the curtain glazing system to make it watertight, by incorporating principles of pressure equalization, providing suitable gutter profiles at bottom (if required), making necessary holes of required sizes and of required numbers etc. complete. This item includes cost of all inputs of designing, labour for fabricating and installation of aluminium grid, installation of glazed units, T&amp;P, scaffolding and other incidental charges including wastages etc., enabling temporary structures and services, cranes or cradles etc. as described above and as specified. The item includes the cost of getting all the structural and functional design including shop drawings checked by a structural designer, dully approved by Engineer-in-charge. The item also includes the cost of all mock ups at site, cost of all samples of the individual components for testing in an approved laboratory, field tests on the assembled working structural glazing as specified, cleaning and protection till the handing over of the building for occupation. In the end, the Contractor shall provide a water tight structural glazing having all the performance characteristics etc. all</p>				
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	complete as required, as per the Architectural drawings, as per item description, as specified, as per the approved shop drawings and as directed by the Engineer- in-Charge.				
	<p><b>Note:- 1.</b> The cost of providing extruded aluminium frames, shadow boxes, extruded aluminium section capping for fixing in the grooves of the curtain glazing and vermin proof stainless steel wire mesh shall be paid for separately under relevant items under this sub- head. However, for the purpose of payment, only the actual area of structural glazing (including width of grooves) on the external face shall be measured in sqm. up to two decimal places.</p> <p><b>Note:- 2.</b> The following performance test are to be conducted on structural glazing system if area of structural glazing exceeds 2500 Sqm from the certified laboratories accredited by NABL(National Accreditation Board for Testing and Calibration Laboratories), Department of Science &amp; Technologies, India. Cost of testing is payable separately.</p> <p>1. Performance Laboratory Test for Air Leakage Test (-50pa to - 300pa) &amp; (+50pa to +300pa) as per ASTM E-283-04 testing method for a range of testing limit 1 to 200 mVhr.</p> <p>2. Static Water Penetration Test. (50pa to 1500pa) as per ASTM E-331-09 testing method for a range up to 2000 ml.</p> <p>3. Dynamic Water Penetration (50pa to 1500pa) as per AAMA 501.01- 05 testing method for a range upto 2000 ml.</p> <p>4. Structural Performance Deflection and deformation by static air pressure test (1.5 times design wind pressure without any failure) as per ASTM E-330-10 testing method for a range upto 50 mm</p>				

	<p>5. Seismic Movement Test (upto 30 mm) as per AAMA 501.4-09 testing method for Qualitative test, Tests to be conducted on site.</p> <p>6. Onsite Test for Water Leakage for a pressure range 50 kpa to 240 kpa (35psi) upto 2000 ml</p>				
12.2	<p>Providing, assembling and supplying vision glass panels (IGUs) comprising of hermetically-sealed 6-12-6 mm insulated glass (double glazed) vision panel units of size and shape as required and specified, comprising of an outer heat strengthened float glass 6mm thick, of approved colour and shade with reflective soft coating on surface # 2 of approved colour and shade, an inner Heat strengthened clear float glass 6mm thick, spacer tube 12mm wide, dessicants, including primary seal and secondary seal (structural silicone sealant) etc. all complete for the required performances, as per the Architectural drawings, as per the approved shop drawings, as specified and as directed by the Engineer-in-Charge. The IGUs shall be assembled in the factory/ workshop of the glass processor. (Payment for fixing of IGU Panels in the curtain glazing is included in cost of item No.25.2) For payment, only the actual area of glass on face # 1 of the glass panels (excluding the areas of the grooves and weather silicone sealant) provided and fixed in position, shall be measured in sqm. (i) Coloured tinted float glass 6mm thick substrate with reflective soft coating on face # 2, + 12mm Airgap + 6mm Heat Strengthened clear Glass of approved make having properties as visible Light transmittance (VLT) of 25 to 35 %, Light reflection internal 10 to 15%, light reflection external 10 to 20 %, shading coefficient (0.25- 0.28) and U value of 3.0 to 3.3 W/m2 degree K etc. The properties of performance glass shall be decided by technical sanctioning authority as per the site requirement.</p>	808.00	Sqm	4088.67	33,03,645



12.3	Extra for openable side / top hung vision glass panels (IGUs) including providing and supplying at site all accessories and hardwares for the openable panels as specified and of the approved make such as heavy duty stainless steel friction hinges, min 4 -point cremone locking sets with stainless steel plates, handles, buffers etc. including necessary stainless steel screws/ fasteners, nuts, bolts, washers etc. all complete as per the Architectural drawings, as per the approved shop drawings, as specified and as directed by the Engineer- in-Charge.	283.00	Sqm	4036.78	11,42,409
12.4	Providing, fabricating and supplying shadow box of required size and shape, for fixing in the spandrel portion of the structural glazing, in linear as well as curvilinear portions of the building by providing semi - rigid, inorganic, non-combustible fibre glass wool insulation 50 mm thick, conforming to IS: 8183 and BS: 3958 Part 5. The insulation layer shall have facing (factory bonded on surface # 1 of the fibre glass insulation layer), of black non-woven fibre glass tissue of nominal thickness 0.5 mm and nominal mass not less than 60 gm /sqm, made of randomly oriented glass fibres distributed in a binder by a wet-lay process including fixing 1.5 mm thick solid aluminum sheet backing using, 6 mm thick cement board including SS rivets, nuts, bolts, washers etc complete.	81.00	Sqm	2374.51	1,92,335
12.5	Providing and supplying Spandrel Glass Panels comprising of 6 mm thick heat strengthened monolithic float glass of approved colour and shade with reflective soft coating on surface # 2 of approved colour and shade so as to match the colour and shade of the IGUs in the vision panels etc. ,all complete for the required performances as specified, as per the Architectural drawings, as per the approved shop drawings, as specified, and as directed by the Engineer- in-Charge. For payment, only the actual area of glass on face # 1 of the glass panels (but excluding the area of grooves	81.00	Sqm	2693.92	2,18,208

	and weather silicone sealant) provided and fixed in position, shall be measured in sqm. (Payment for fixing of Spandrel Glass Panels in the curtain glazing is included in cost of relevant Item*).“(i) Coloured tinted float glass 6 mm thick substrate with reflective soft coating on face # 2, having properties as visible Light transmittance (VLT) of 25 to 35 %, Light reflection internal 10 to 15%, light reflection external 10 to 20 %, shading coefficient (0.25- 0.28) and U value of 3.0 to 3.3 W/m <sup>2</sup> K etc. . The properties of performance glass shall be decided by technical sanctioning authority as per the site requirement.				
	<b>TOTAL STRUCTURAL GLAZING WORK :</b>			<b>Rs.</b>	<b>69,94,904</b>
<b>13.0</b>	<b>ALUMINIUM WORKS</b>				
13.1	Providing and fixing factory made Alloy Aluminium Sliding and Fixed Windows, Sliding Doors, Ventilators etc. <b>with DGU</b> as per drawings using extruded built-up sections of Aluminium Alloy grade 6063 T6, design confirming to IS:1948-1961 and Polyester powder coated aluminium (minimum thickness of polyester powder coating 50 micron as per IS: 138731-1993), multi-chambered frame, sash and mullion/coupler (where ever required) extruded profiles of required shape & size as per approved drawing, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminium snap beading for glazing / panelling, C.P. brass / stainless steel screws. After fixing frame the gap between frame and adjacent finished wall shall be filled with weather proof silicon sealant over backer rod of approved size and quality, all complete as per architectural drawings and the directions of Engineer-in-charge. (The Rate are inclusive with all				

	required hardware / Fitting & Fixture all complete, only DGU will be paid for separately). Note: Structural design proof checked from a Government Engineering Institute, to be provided by the manufacturer for basic wind speed > 45 m/sec as per IS 875 – Part 3.				
13.1.1	Two track two panels sliding window with channel for roller track, wool pile, nylon rollers with SS 316 body as per approved drawing.				
13.1.1.1	For fixed portion	641.00	Kg	618.10	3,96,202
13.1.1.2	For shutters of doors, windows & ventilators	961.00	Kg	747.90	7,18,732
13.2	Providing and fixing 12mm thick frameless toughened glass door shutter of approved brand and manufacture, including providing and fixing top & bottom pivot & double acting hydraulic floor spring type fixing arrangement and making necessary holes etc. for fixing required door fittings, all complete as per direction of Engineer in charge (Door handle, lock and stopper etc. to be paid separately)	6.00	Sqm	5855.77	35,135
13.3	Providing and fixing floor spring with adjustable spring strength Size EN 1 - 4, closing speed with standard spindle and cover plate featuring hydraulically fully controlled closing cycle and backcheck, including upto box and adjustable closing speed from 175°, Hold open at 90°, Conforming to EN 1154 and CE marked. Durability: 500,000 Cycles, Finish: Satin stainless steel etc. complete as per the direction of Engineer-in-charge.	3.00	Each	10029.10	30,087
13.4	Providing and fixing mortice lock ( Glasklar lock package 98412302 of approved make) for glass doors shutters including necessary cutting and making good etc. all complete as per the direction of Engineer-in-charge.	3.00	Each	7911.10	23,733

13.5	Providing and fixing Semi black out Roller Blinds for windows, polyester blends along with sturdy hanging system to ensure their long-lasting perfection, along with user-friendly plastic pull-down chain for easy usability, with necessary installation brackets and mounting hardware etc. all complete as per direction of Engineer-in-charge. (Make, design and shade of roller blinds shall be approved by the Engineer-in-Charge.)	250.00	Each	2034.35	5,08,588
13.6	Providing and fixing S.S. grills (316 grade) of required pattern for windows etc. with flats, square or round bars etc., fixed to window openings with necessary arrangements like screws etc., all complete as per design and pattern approved by Engineer-in-charge.	2004.00	Kg.	1223.30	24,51,493
	<b>TOTAL ALUMINIUM WORKS :</b>			<b>Rs.</b>	<b>41,63,970</b>
<b>14.0</b>	<b>MISCELLANEOUS ITEMS</b>				
14.1	Providing and wet drilling accurate and clean holes of specified diameter in RCC walls, slabs, beam or any other RCC member without vibration by core cutting (diamond drilling) machine of approved make for laying service lines including scaffolding, safety majors, disposing the debris, cleaning, making good, providing epoxy mortar/ micro concrete/ ready mix polymer modified patch repair mortar/ Non shrink grout for concrete for grouting the gaps around the pipes for all levels/ all height, after approval of engineer in charge etc compete. Measurement shall be taken for the depth of holes in running meter for specified diameter. Holes shall made by authorized approved agency. Scanning of reinforcement shall be carried out before core cutting if required and as suggested by Engineer in charge. Location of core cutting shall be approved by Engineer in charge.				
14.1.1	Upto 75mm dia	2.00	Metre	1910.20	3,820
14.1.2	75mm to 100mm dia	3.00	Metre	2140.90	6,423
14.1.3	100mm to 150mm dia	3.00	Metre	2648.45	7,945
14.1.4	150mm to 200mm dia	2.00	Metre	3755.90	7,512

14.2	<p>Providing and fixing multi walled transparent/opaque 10 mm thick polycarbonate sheet of required colour blue, brown or green etc. UV co-extruded and having UV coating on one side multi walled sheet of weight not less than 1.60 to 2.05 kg/sqm as approved by Engineer-in-charge. The light transmission from transparent or translucent or opaque polycarbonate sheet varies from 30 to 80% and shall be decided by engineer-in charge as per requirement. The panel shall satisfy the Dart drop impact test for value above 15 and upto 60 Joules and confirm either flame retardancy of class UL-94HB/94V-0 category as per IS 14434:2023 or category V0 &amp; HB as per ASTM D635-18 or BS1D0 classification as per EN13501 for fire safety. The yellowness index tested as per ASTM E313 (D1925) shall be less than or equal to 2 it shall be 1 unit as per ASTM D 2244 at the time of installation an shall be less than or equal to 10 as per ASTM E313 (D 1925) or 6 units as per ASTM D 2244 on a sample after 5000 hours of exposure of UV/sunlight. The multi walled poly carbonate sheet shall be fixed on tubular steel structure with aluminium Alcox section of size 60x18x2 mm (anodized 25 microns thick) and weight not less than 0.462 kg/m. Weather proof Neoprene/EPDM rubber gasket shall be fixed on both side of joints to make the whole structure water tight as per approved design/drawings.</p> <p>The aluminium section shall be fixed on Joints at both sides (top &amp; bottom) of polycarbonate sheet to hold the sheets rigidly together. The weather proof neoprene gasket and aluminum profile shall be fixed and sealed with silicon sealant to make the joints fully water proof. The open overhead ends of polycarbonate sheet to be sealed with anodized aluminum U Profile/channel of size 10x10x1.5 mm thick of weight not less than 0.2 kg/m. The polycarbonate sheet and aluminum profile shall be fixed to MS framed structure with self-taping and self-</p>				
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	drilling 55 mm long steel screws to be fixed @ 300 mm centre to centre. The rate shall be inclusive of cost of all material involved such as polycarbonate sheet, aluminium profile and aluminum channel, EPDM gasket, self-taping screws, nuts bolts, silicon sealant or any other material required for fixing the sheet but excluding the cost of steel structure which shall be paid separately including hoisting the sheet and fixing in position in required scaffolding shape. The rate shall also include the cost of all T&P scaffolding and safety precautions required during execution of the work. The entire work shall be executed as per required design/drawings and direction of Engineer-in-charge, all complete.				
14.2.1	10 mm thick and U- value not more than 2.50 W/m <sup>2</sup> k	14.00	Sqm	1075.30	15,054
14.3	Providing & fixing false ceiling at all height including providing & fixing of framework made of special section, power pressed from M.S. sheets and galvanised with zinc coating of 120 gms/ sqm (both side inclusive) as per IS : 277 and consisting of angle cleat of size 25mm wide x 1.6mm thick with flanges of 27mm and 37mm, at 1200mm c/c, one flange fixed to the ceiling with dash fastener 12.5mm dia x 50mm long with 6mm dia bolts, other flange of cleat fixed to the angle hangers of 25 x10 x0.50mm of required length with nuts & bolts of required size and other end of angle hanger fixed with intermediate G.I channels 45 x15 x 0.90mm running at the spacing of 1200 mm c/c, to which the ceiling section 0.5mm thick bottom wedge of 80mm with tapered flanges of 26 mm each having lips of 10.5mm, at 450mm c/c, shall be fixed in a direction perpendicular to G.I intermediate channel with connecting clip made out of 2.64mm dia x 230mm long G.I wire at every junction, including fixing perimeter channels 0.50mm thick 27mm high having flanges of 20mm and 30mm long, the perimeter of ceiling fixed to wall/ partitions with the help of Rawl plugs at 450mm centre, with 25 mm				

	long dry wall screws @ 230mm interval, including fixing of commercial ply (8/9 mm thick) to ceiling section and perimeter channels with the help of dry wall screws of size 3.5 x25mm at 230mm c/c, all as per manufacture's specification and also including the cost of making opening for light fittings, grills, diffusers, cut outs 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 with:				
14.3.1	8/9mm thick commercial ply conforming to IS : 1328 BWR type	288.00	Sqm	1980.15	5,70,283
14.4	Providing and fixing 4mm thick veneers with necessary screws/nuts & bolts/ nails/silicone adhesive on Aluminium frame work including making groove pattern, complete as per direction of Engineer-in- charge (Frame work shall be paid for separately).	278.00	Sqm	3323.60	9,23,961
14.5	Providing and fixing frame work for partitions/ wall lining etc. made of hollow Alumunium section, placed along the walls, ceiling and floor in a grid pattern with spacing @ 60 cm centre to centre both ways (vertically & horizontally) or at required spacing near opening, fixing the frame to wall/ ceiling/ floors with necessary Stainless Steel screw, Alumunium angle cleat etc. as required at junctions, including making provision for opening for doors, windows, electrical conduits, switch boards etc. complete, as per direction of Engineer-in-charge.				
14.5.1	Anodised aluminium, anodised transparent or dyed to required shade according to IS: 1868, Minimum anodic coating of grade AC 15	2332.00	kg	462.10	10,77,617
14.6	Providing and fixing thermal insulation with Resin Bonded rock wool conforming to IS: 8183, having density 48 kg/cum 50 mm thick, wrapped in 200 G Virgin Polythene Bags fixed to wall with screw, rawel plug & washers and held and in position by criss crossing GI wire etc. complete as per directions of Engineer-in-Charge.	288.00	Sqm	339.86	97,880



14.7	Providing and fixing plain lining with necessary screws/nuts & bolts/ nails and fixed on wooden /steel frame work/Alumunium frame work complete as per direction of Engineer-in- charge (Frame work shall be paid for separately).				
14.7.1	20mm thick wood wool Board of approved make and quality	111.00	Sqm	1210.65	1,34,382
14.8	Providing and fixing plain lining with necessary screws/nuts & bolts/ nails, including a coat of approved primer on one face, and fixed on wooden /steel frame work, complete as per direction of Engineer-in- charge (Frame work shall be paid for separately).				
14.8.1	12mm thick commercial ply conforming to IS : 1328 BWR type	278.00	Sqm	1320.55	3,67,113
14.9	Providing & Fixing acoustically absorptive fabric paneling, over 20 mm thick wood wool board lining, to be neatly fixed on the base structure, finished with 350 gsm, Fire Retardent, stretch fabric of approved shade over gripper system (UK) UPVC Grippers, standard, Cove, mono, edge. Installation of fabric with gripper will be as per drawing/ design approved as per manufacturer specifications and entire satisfaction of engineer in charge. (Cost of wood wool board lining to be paid seperately)	111.00	Sqm	538.40	59,762
14.10	Providing and fixing Automatic Sliding door operator, Make: DORMAKABA ES 200 (EASY) 6250 or equivalent, compliant with future European standards and produced according to the guidelines for power-operated windows, doors and gates, BGR 232, the UVV and the VDE regulations. TÜV design tested for Durability of 1,000,000 Cycles, Manufactured according ISO 9001, tested according to the low voltage guidelines, CE Compliant, fulfils DIN 18650 standards for Padestrian Safety, for framed glass door application with DORMA ST-Flex Profiles Systems, modular design including internal cover and with 12.52 mm Laminated glass for 1 Nos sliding door panels and 1 Nos fixed panels, both sliding & fixed	12.00	Sqm	153600.75	18,43,209

	panels with DORMAKABA ST-Flex framed profile system with Interlocking Seals.Operator & Frame Finish should be Silver Anodised, with operator dimensions (H x D) : 100 x 180 mm and of length as required to suit the opening sizes as given below. DORMAKABA ES200 Operators are of very sturdy design with Self balancing Panel suspension system and with Anti-Jump fitting.The track profile should be separate from the main profile for enabling reduction in vibration insulation. Microprocessor-controlled control unit, Self-learning, with adjustable parameters for opening and closing speed, hold-open time and opening and closing force, reversing when obstruction is encountered, Class of protection IP 20 with SMPS for Power regulation. Activators-DORMAKABA Nemo Motion + Nemo Dual ( Safety & Motion ) Pack, EM Lock - Fail Safe with CableProgram Switch with Key. Max Panel Weight Carrying Capacity of 1 X 200 Kgs. The system shall have constant power supply 230V $\pm$ 5%, 50Hz, AC . The requirement in total is as mentioned below:				
	SINGLE GLAZED TOUGHENED GLASS PARTITIONS - WITH ALTERRA SYSTEM-50 FRAME PROFILES				-
14.11	Supply and installation of dormakaba ALTERRA or equivalent Access and Cabin System for minimal frame, room dividing solutions.Single glazed mullion free demountable glass partition using Toughened/ Laminated glass in proprietary natural anodised/Black aluminium sections ALT 50 of size 50mm x 30mm with Concealed sealing (No visible Gaskets/Seals) with acoustic rating of Minimum 32 db with third party test certificate. The profile will have Carpert Groove at the Bottom on both sides for accomodating max. 8mm carpets. THE Glass to be fixed with help of Proprietary Stability GRIPPER Clamp to have a stable system. It should consists of intermediate slim junction profiles for	16.00	Sqm	24640.10	3,94,242

	<p>Glass to Glass vertical joints, 90 Degree L Junction and T Junction profiles suitably to be used as per room configuration designs.No VISIBLE Clip Lines to provide clutter free view at both side of section. The Glass to be Offset mounted towards outer edge leading to minimum aluminium frame on one side. Optional Profile Bottom Seal pair for additional accoustic if required.</p> <p>Glass thickness - 10mm All Profiles are min 1.5mm thickness excluding 20 microns of Anodizing, Standards applicable</p> <ul style="list-style-type: none"> <li>• Structural stability test accordance to BS 5234: Part2:1992 &amp; EN 1991-1-1:2002</li> <li>• Acoustic test for sound insulation in accordance to DIN EN ISO 10140-2 ASTM-E 90</li> <li>• ALT profile sections are manufactured and tested in accordance to EN573-3, EN755-2, DIN EN 12020 T2 , non- dimensions manufacturing tolerance deviation DIN ISO 2768-1 class C = coarse</li> <li>• Toughened glass complies accordance to BS 6262 (glass supplier specification from market)</li> <li>• Environmental product declaration (EPD) rating accordance to ISO 14025 &amp; EN 15804</li> <li>• HPDs - Ref HPD Unique Identifier; 22451 &amp; 22452 - Classification : 09 84 00 Acoustic Room Components</li> </ul>				
14.12	<p>Providing and fixing aluminium louvers including framing as per the elevation. The aluminium louver sections shall be extruded with approved make with chemical composition and mechanical properties as per IS:733:1983 and IS 1285:2002. Aluminum extruded louver using Aluminum extruded section, the outer frame of size 63x38x1.5 mm Box , the louver Z section of size 103 x58 x 1.5mm and aluminium plate 50x2mm thick, fabricating and assembling the frame as per the sizes, designs and as per the approved drawing and fixing it to the opening with necessary screws and nylon plugs, etc. – all complete. All</p>	278.00	Sqm	6899.25	19,17,992

	profiles shall be pure polyester Powder Coated 50 microns thick in approved shade / colour. The periphery of the aluminium framework shall be sealed both from inside and outside with silicon weather sealant etc. as per the direction of Engineer-in-Charge.				
14.13	Supplying and laying elevation brick tile of size 230x75x9mm of approved colour with adhesive and grouting with matching pigments using 6mm spacer in external elevation of the building in superstructure above plinth and upto floor five level. The tiles are non-rectified, supplied as fired, without mechanical edge rectification. The variation in shade, surface texture, dimension ( $\pm 3\%$ ) and edge geometry are inherent characteristics of fired clay.				
14.13.1	Brick Tile	1165.00	Sqm	2791.20	32,51,748
14.14	Providing and fixing 50 mm thick extruded polystyrene rigid insulation board of required size underdeck on ceiling surface, complying with ISO 4898:2008 & ASTM C 578-08b - type VI, having thermal conductivity of 0.0289 W/m K as per ASTM C 578 (measured as per IS 3346), compressive strength of > 350 kPa listed as per ASTM D 1621, density of 34-36 kg/cum as per ASTM D 1622, water absorptions < 1% by volume as per ASTM D 2842, oxygen index of 24.1 to 28.1 listed as per ASTM D 2863, cell size 0.4 mm of dia (max) as per ASTM D 3576. Fire retardent property as per DIN 4102, Part 1 of class B2 and as per ASTM E84 class A, fixed with suitable water based adhesive and fastener, complete in all respect as per the direction of Engineer-in-Charge.	841.00	Sqm	1200.26	10,09,419
	<b>TOTAL MISCELLANEOUS WORKS :</b>			<b>Rs.</b>	<b>1,16,88,362</b>
<b>15.0</b>	<b>SANITARY FIXTURE &amp; FITTINGS</b>				
15.1	Providing and fixing white vitreous china extended wall mounting water closet of size 780x370x690 mm of approved shape including providing & fixing white vitreous china cistern with dual flush fitting, of flushing	35.00	Each	16491.42	5,77,200

	capacity 3 litre/ 6 litre (adjustable to 4 litre/ 8 litres), including seat cover, and cistern fittings, nuts, bolts and gasket etc complete.				
15.2	Providing and fixing Under counter Wash basin of size 605x410x200 mm of rectangular shape with a single C.P. Brass long neck Pillar cock with brackets, 32 mm C.P. brass waste of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever required as per approved make list and direction of Engineer-in Charge.	29.00	Each	4,487.60	1,30,140
15.3	Providing and fixing Over Counter Wash basin with 32mm CP brass waste coupling 32 mm bottle trap including painting of fittings and brackets, cutting and making good the walls wherever required as per approved make list and direction of Engineer-in Charge	6.00	Each	6,361.10	38,167
15.4	Providing & fixing chrome plated brass battery based infrared sensor operated pillar cock, having foam flow technology - 15mm nominal bore as per approved make list and direction of Engineer-in Charge.	11.00	Each	1,752.60	19,279
15.5	Providing & fixing chrome plated Pressmatic tap - 15mm nominal bore as per approved make list and direction of Engineer-in Charge.	24.00	Each	1,648.50	39,564
15.6	Providing and fixing 15mm C.P brass Sink Mixer for kitchen sink with swinging spout complete. Including cutting and making good the walls wherever required etc. all complete as per approved make list and direction of Engineer-in Charge.	6.00	Each	4,009.95	24,060
15.7	Providing and fixing white vitreous china battery based infrared sensor operated urinal of having pre & post flushing with water (250 ml & 500 ml consumption), having water inlet from back side, including fixing to wall with suitable brackets all as per approved make list and direction of Engineer-in-charge.	13.00	Each	10,337.30	1,34,385
15.8	Providing and fixing toilet paper holder:				
15.8.1	CP Brass	39.00	Each	883.66	34,463
15.9	Providing and fixing health faucet with 1 m long flexible tube and wall hook including all fittings as per approved make list and direction of	39.00	Each	1,235.65	48,190

	Engineer-in-charge.				
15.10	Providing and fixing C.P. brass Two way bib cock of 15 mm nominal bore as per approved make list and direction of Engineer-in-charge.	39.00	Each	1,781.90	69,494
15.11	Providing and fixing C.P. brass bib cock of approved quality conforming to IS:8931 :				
15.11.1	15 mm nominal bore	5.00	Each	557.22	2,786
15.12	Providing and fixing C.P. brass long nose bib cock of approved quality conforming to IS standards and weighing not less than 810 gms.				
15.12.1	15 mm nominal bore	7.00	Each	902.35	6,316
15.13	Providing and fixing Stainless Steel A ISI 304 (18/8) kitchen sink as per IS:13983 with C.I. brackets and stainless steel plug 40 mm, including painting of fittings and brackets, cutting and making good the walls wherever required.				
15.13.1	Kitchen sink with drain board				
15.13.1.1	510x1040 mm bowl depth 200 mm.	2.00	Each	7871.25	15,743
15.14	Providing and fixing white vitreous china laboratory sink with C.I. brackets, C.P. brass chain with rubber plug, 40 mm C.P brass waste and 40mm C.P. brass trap with necessary C.P. brass unions complete, including painting of fittings and brackets, cutting and making good the wall wherever required :				
15.14.1	Size 600x450x200 mm	5.00	Each	7241.02	36,205
15.15	Providing and fixing 15mm C.P brass Sink Mixer for kitchen sink with swinging spout complete. Including cutting and making good the walls wherever required etc. all complete as per approved make list and direction of Engineer-in Charge.	7.00	Each	4,308.50	30,160
15.16	Providing and fixing C.P. brass angle valve for basin mixer and geyser points of approved quality conforming to IS:8931.				
15.16.1	15 mm nominal bore	96.00	Each	631.44	60,618
15.17	Providing and fixing 15mm SS 304 braided hose 450-500mm long with C.P. brass nuts, washers complete in all respects as per approved make list and direction of Engineer-in Charge.	96.00	Each	185.15	17,774
15.18	Providing and fixing C.P. cast brass coat hook fixed to PVC rawl plug	33.00	Each	598.15	19,739

	with SS screws all complete as per approved make list and direction of Engineer-in Charge.				
15.19	Providing and fixing CP Brass liquid soap dispenser & wall flange as per approved make list and direction of Engineer-in Charge.	40.00	Each	1,243.65	49,746
15.20	Providing and fixing of C.P. brass Soap Dish fixed with C.P. brass screws complete in all respects as per approved make list and direction of Engineer-in Charge.	6.00	Each	715.70	4,294
15.21	Providing and Fixing of Hand Dryer, SS 316 grade, total power 1000W, Hot & cold switch with a air speed of 110m/s, noise level upto 75 DB, Energy efficient all complete as per approved make list and direction of Engineer-in Charge.	20.00	Each	8,670.75	1,73,415
15.22	Providing and fixing fragrance dispenser including all fittings complete in all respect as per approved make list and direction of Engineer-in Charge.	26.00	Each	2,163.60	56,254
15.23	Providing and fixing CP Brass Towel Rail (600 mm) all complete as per approved make list and direction of Engineer-in Charge.	34.00	Each	1,571.90	53,445
15.24	Providing and Fixing of C.P. Brass Shower set comprising of : one No. CP brass Single Lever Concealed Diverter, one No. CP brass OH shower head with arm all complete, one No. CP brass Bath Spout, Including cutting and making good the walls wherever required etc. all complete as per approved make list and direction of Engineer-in Charge.	6.00	Each	4,518.25	27,110
15.25	Providing and Fixing of Grease Separator for kitchen as per approved make list and direction of Engineer-in Charge.	2.00	Each	66,743.60	1,33,487
15.26	Providing and fixing of Emergency Shower comprising of 150mm dia brass CP overhead shower with pull chain complete with all accessories as per approved make list and direction of Engineer-in Charge.	1.00	Each	9,040.25	9,040
15.27	Providing and fixing of CP Eye Wash fountain self-closing foot operated with SS Bowl having inlet of 15mm dia, bottle trap and waste coupling with all accessories complete as per approved make list and direction of Engineer-in Charge.	3.00	Each	17,932.25	53,797



15.28	Providing and fixing of Toilet unit for physically challenged persons by providing 1No. along with flushing cistern with necessary fittings, washbasin with fittings of size 460mmX360mm with one pair mounting brackets, One looking mirror of size600x450mm, 1 No. Wall Mounted Hinged hand rail (750X100 mm) covered by Nylon surface with contour finish (for better grip) with two bracket complete, 4 nos. Wall Mounted Grab Bars, covered by Nylon surface with contour finish (for better grip) with Anti-bacterial surface, at appropriate location wherever required inclusive of connection pipes, necessary screws etc, complete as per manufacture's specification of approved make list and as per the directions of Engineer-in-charge. Note: The PH Toilet shall be completed with all required accessories as per CPWD specifications and nothing extra shall be paid.	5.00	Each	45,194.25	2,25,971
15.29	Providing and fixing Urinal Partitions, 10mm thick Toughened Frosted Glass of required size, shape, including all necessary fittings, all completeas per approved make list and direction of Engineer-in Charge.	9.00	Each	2,279.60	20,516
15.30	Providing and fixing water closet squatting pan (Indian type W.C. pan) with 110 mm unplasticised PVC - SWR P or S trap, C P Brass Flush Valve Dual Flow 32mm Size (Concealed Body) With Exposed Shut Off Provision & 100mm Square Plate etc. , with all fittings and fixtures complete, including cutting and making good the walls and floors wherever required: - White Vitreous China Orissa pattern W.C. pan of size 580x440 mm with integral type foot rests.				
15.30.1	Orissa pattern W.C Pan of size 580x440 mm	1.00	Each	4924.34	4,924
	<b>TOTAL SANITARY FIXTURES &amp; FITTINGS</b>				<b>21,16,282</b>
<b>16.0</b>	<b>SOIL, WASTE, VENT &amp; RAIN WATER PIPES</b>				

16.1	Providing, fixing, jointing, testing and commissioning UPVC (Class III - 6 Kg.) Rain water pipe conforming to IS:4985 cut to required lengths including all necessary fittings and specials. UPVC fittings IS : 7834 (Part I to Part-7) 1987 (moulded as well as fabricated) like bends, tees, Y-tees, crosses, boss connections, access pieces, cleanout plug, adaptors for connections to other materials, plugs, reducers, cowls, offsets and other specials. Fixing at wall/ceiling level supported by galvanized steel clamps & hangers etc. Making proper connection with cement solvent joint as per BIS / manufacturer. Cutting, chases / holes in floors / walls / slab.				
16.1.1	160 mm OD	90.00	Metre	1,005.00	90,450
16.1.2	63 mm OD	117.00	Metre	302.00	35,334
16.1.3	50 mm OD	25.00	Metre	251.00	6,275
16.1.4	40 mm OD	50.00	Metre	221.00	11,050
16.2	Providing and fixing unplasticized Rigid UPVC Push Fit single socketed pipes conforming to IS 13592 Type B (pressure of 6 kg/sqcm) including jointing with seal ring conforming to IS : 5382 leaving 10mm gap for thermal expansion as per the direction of the Engineer-in-charge for soil, waste and vent pipes including necessary fittings and accessories complete. (Note : 1. All the joints shall be leak proof. 2. The centre line length of pipes shall be measured for the purpose of payment. 3. Floor trap and terminal guard only shall be measured separately for payment).				
16.2.1	110 mm nominal outside dia.	281.00	Metre	528.00	1,48,368
16.2.2	75 mm nominal outside dia.	366.00	Metre	336.00	1,22,976
16.3	Providing and fixing 110 mm dia uPVC inlet fitting/ Extension Piece with 2 or 3 inlets of 32 to 63 mm dia, fixed to uPVC trap and set in cement concrete as per drawing complete.	78.00	Each	293.45	22,889
16.4	Providing and fixing UPVC Push Fit Joint P or S trap of self cleansing design with screwed down or hinged grating with or without vent arm complete, including cost of cutting and making good the walls and floors : 110 mm	43.00	Each	347.05	14,923

16.5	Providing and fixing GI U-clamps of required size and shape embedded in cement concrete blocks 10x10x10cm of 1:2:4 mix (1 Portland Pozzolana Cement : 2 coarse sand : 4 graded stone aggregate 20mm nominal size) for UPVC Pipes including cost of cutting holes and making good the walls etc. :				
16.5.1	110 mm	65.00	Each	386.65	25,132
16.5.2	75 mm	65.00	Each	383.55	24,931
16.6	Providing and fixing UPVC fittings and specials conforming to IS 13592 Type-B as per the direction of the Engineer-in-charge for soil, waste and vent pipes. - Terminal guard:				
16.6.1	110 mm	5.00	Each	76.85	384
16.6.2	75 mm	5.00	Each	58.70	294
16.7	Providing and fixing unplasticized Rigid PVC Multi floor trap of self cleansing design with screwed down or hinged grating with or without vent arm complete, including cost of cutting and making good the walls and floors : 100 mm inlet and 75 mm outlet	35.00	Each	181.85	6,365
16.8	Providing and fixing Heavy Class SS grating of approved design including setting in floor with cement motor to match with floor finish as per architect requirement suitable for FT, UT & FD. (Chilly/Camry or equivalent) - Size 125 mm X 125 mm or 125mm dia	56.00	Each	565.80	31,685
16.9	Providing and fixing SS Cockroach trap of approved design including setting in floor with cement motor to match with floor finish as per architect requirement. (Chilly model no. CCT-RG-127/Camry CCR-RG-127 or equivalent)	35.00	Each	748.55	26,199
16.10	Providing and fixing on wall face unplasticised Rigid PVC rain water pipes conforming to IS :13592 Type A, including jointing with seal ring conforming to IS : 5382, leaving 10 mm gap for thermal expansion, (i) Single socketed pipes.				
16.10.1	110 mm diameter	160.00	Metre	414.95	66,392
16.11	Providing and fixing on wall face unplasticised - PVC moulded fittings/ accessories for unplasticised Rigid PVC rain water pipes conforming to IS : 13592 Type A, including jointing				

	with seal ring conforming to IS : 5382, leaving 10 mm gap for thermal expansion.				
16.11.1	Single Push fit coupler				
16.11.1.1	110 mm dia	44.00	Each	140.29	6,173
16.11.2	Bend 87.5°				
16.11.2.1	110 mm bend	44.00	Each	165.31	7,274
16.11.3	Shoe (Plain)				
16.11.3.1	110 mm dia	12.00	Each	144.97	1,740
16.12	Providing and fixing unplasticised - PVC pipe clips of approved design to unplasticised - PVC rain water pipes by means of 50x50x50 mm hard wood plugs, screwed with M.S. screws of required length, including cutting brick work and fixing in cement mortar 1:4 (1 cement : 4 coarse sand) and making good the wall etc. complete.				
16.12.1	110 mm	132.00	Each	408.24	53,888
16.13	Making khurras 45x45 cm with average minimum thickness of 5 cm cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate of 20 mm nominal size) over P.V.C. sheet 1 m x 1 m x 400 micron, finished with 12 mm cement plaster 1:3 (1 cement : 3 coarse sand) and a coat of neat cement, rounding the edges and making and finishing the outlet complete.	13.00	Each	327.92	4,263
	<b>TOTAL SOIL, WASTE, VENT &amp; RAIN WATER PIPES</b>				<b>7,06,985</b>
<b>17.0</b>	<b>INTERNAL WATER SUPPLY</b>				
17.1	Providing and fixing G.I. pipes complete with G.I. fittings and clamps, i/c cutting and making good the walls etc. : Internal work – Exposed on wall.				
17.1.1	15 mm dia. nominal bore	20.00	Metre	402.85	8,057
17.1.2	20 mm dia. nominal bore	20.00	Metre	480.81	9,616
17.1.3	25 mm dia. nominal bore	158.00	Metre	606.59	95,841
17.1.4	32 mm dia. nominal bore	17.00	Metre	733.36	12,467
17.1.5	40 mm dia. nominal bore	44.00	Metre	892.68	39,278
17.1.6	50 mm dia. nominal bore	84.00	Metre	1152.65	96,823
17.2	Providing and fixing G.I. Pipes complete with G.I. fittings and clamps, i/c making good the walls etc. concealed pipe, including painting with anticorrosive bitumastic paint, cutting chases and making good the				

	wall:				
17.2.1	15 mm dia. nominal bore	18.00	Metre	638.20	11,488
17.2.2	20 mm dia. nominal bore	430.00	Metre	698.40	3,00,312
17.3	Providing and fixing Stainless Steel pipe and fitting of grade 316L as per IS 6911:2017 and conforming to EN-10312 standards complete with press type fitting (fitting shall be paid for separately) i/c fixing of the pipe with clamps at 1.00 m spacing including cutting and making good the walls including testing of joints complete as per direction of Engineer-in-charge. (The pipe length inserted in the fitting shall not be measured for payment)				
	Internal work - Exposed on wall				
17.3.1	15.00 mm outer dia pipe	24.00	Metre	774.10	18,578
17.3.2	22.00 mm outer dia Pipe	20.00	Metre	1127.25	22,545
17.4	Providing and fixing Stainless Steel pipe and fitting of grade 316L as per IS 6911:2017 and conforming to EN-10312 standards complete with press type fitting (fitting shall be paid for separately) i/c fixing of the pipe with clamps at 1.00m spacing and also including cutting of chases and making good the walls including testing of joints complete as per direction of Engineer -in-charge. (The pipe length inserted in the fitting shall not be measured for payment)				
	Internal work - Concealed Pipe				
17.4.1	15.00 mm outer dia pipe	15.00	Metre	996.25	14,944
17.4.2	22.00 mm outer dia Pipe	10.00	Metre	1349.35	13,494
17.5	Providing and fixing required Stainless Steel Fitting of press fit design of grade 316L as per IS 6911:2017 and conforming to EN-10312 standards with V-profile and with O-ring sealing gasket of EPDM material of required dia as per direction of Engineer-in-charge				
	Reducer				
17.5.1	For 22 mm x 15 mm outer dia pipe	6.00	Each	445.79	2,675
17.6	Providing and fixing required Stainless Steel Fitting of press fit design of grade 316L as per IS : 6911:2017 and conforming to EN-10312 standards with V-profile and with O-ring sealing gasket of EPDM material of required dia as per direction of Engineer-in-				

	charge				
	Elbow90°				
17.6.1	For 15 mm outer dia pipe	6.00	Each	531.82	3,191
17.6.2	For 22 mm outer dia Pipe	6.00	Each	750.79	4,505
17.7	Providing and fixing required Stainless Steel Fitting of press fit design of grade 316L as per IS 6911:2017 and conforming to EN-10312 standards with V-profile and with O-ring sealing gasket of EPDM material of required dia as per direction of Engineer-in-charge.				
	Equal Tee				
17.7.1	For 15 mm outer dia pipe	6.00	Each	875.96	5,256
17.7.2	For 22 mm outer dia Pipe	6.00	Each	1024.56	6,147
17.8	Providing and fixing required Stainless Steel Fitting of press fit design of grade 316L as per IS 6911:2017 and conforming to EN-10312 standards with V-profile and with O-ring sealing gasket of EPDM material of required dia as per direction of Engineer-in-charge.				
	Reducing Tee				
17.8.1	For 22mm x 15 mm outer dia pipe	6.00	Each	1001.09	6,007
17.9	Providing and fixing forged brass ball valve of brass body with hard chrome plated steel ball inside PTFE (Teflon) seat & ring with chrome plated centre handle with female BSP threads complete in all respects.				
17.9.1	15mm nominal bore	7.00	Each	461.65	3,232
17.9.2	20mm nominal bore	33.00	Each	626.10	20,661
17.9.3	25mm nominal bore	29.00	Each	973.25	28,224
17.9.4	32mm nominal bore	2.00	Each	1,604.50	3,209
17.9.5	40mm nominal bore	2.00	Each	2,322.10	4,644
17.9.6	50mm nominal bore	5.00	Each	3,319.60	16,598
17.10	Providing & fixing Pressure Reducing Valve suitable for pressure not less than 15 Kg/Sq.cm.(65 mm dia)	2.00	Each	13,770.85	27,542
17.11	Providing and fixing forged brass single acting air release valve with screwed inlet 25 mm dia.	10.00	Each	792.65	7,927
17.12	Providing and fixing motorized valve including control wiring upto panel & ON/OFF arrangement and all other accessories required to make the system complete including control unit to be made of good quality PVC box, as per IP 65 with cable gland				

	also as per IP 65 and suitable for outdoor installation complete with suitable wiring. This unit should be suitable to operate solenoid valve, float switch and consisting of contactors, control transformer, MCB, Potential free contacts for BMS, indicating lamp for automatic operation of filling OH tank with level to be mentioned between 70% (low) to 100% (full)				
17.12.1	40mm nominal bore	1.00	Each	31,051.50	31,052
17.12.2	50mm nominal bore	1.00	Each	31,431.45	31,431
17.13	Providing and fixing Thermoflex or Kaiflex thermal insulation tubing a elastomeric flexible material having hermetic blister closed cell structure of expanded synthetic rubber over pipes of following nominal bores and thickness including all required accessories complete as per specification.				
17.13.1	For 15 mm dia Pipe 6 mm thick (Concealed Pipes)	40.00	Metre	63.05	2,522
	<b>TOTAL INTERNAL WATER SUPPLY</b>				<b>8,48,266</b>
<b>18.0</b>	<b>SEWERAGE &amp; STORM WATER DRAINAGE</b>				
18.1	Providing, laying and jointing HDPE Double Wall Coil (DWC) SN-8 Grade pipes confirming to IS: 16098 including all fittings wherever required e.g., tees, bends of any degree, couplings, adapters, plugs, unions etc. and jointing as manufacturer recommendation etc. including testing of joints etc. complete.				
18.1.1	150 mm diameter	100.00	Metre	499.00	49,900
18.1.2	200 mm diameter	30.00	Metre	668.00	20,040
18.1.3	250 mm diameter	20.00	Metre	1,070.00	21,400
18.2	Providing and laying non-pressure NP2 class (light duty) R.C.C. pipes with collars jointed with stiff mixture of cement mortar in the proportion of 1:2 (1 Portland Pozzolana cement : 2 fine sand) including testing of joints etc. complete :				
18.2.1	150 mm dia. R.C.C. pipe	53.00	Metre	611.81	32,426
18.2.2	250 mm dia. R.C.C. pipe	32.00	Metre	989.32	31,658



18.3	Constructing brick masonry manhole in cement mortar 1:4 (1 cement : 4 coarse sand ) with R.C.C. top slab with 1:1.5:3 mix (1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size), foundation concrete 1:4:8 mix (1 cement : 4 coarse sand : 8 graded stone aggregate 40 mm nominal size), inside plastering 12 mm thick with cement mortar 1:3 (1 cement : 3 coarse sand) finished with floating coat of neat cement and making channels in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) finished with a floating coat of neat cement complete as per standard design :				
18.3.1	Inside size 90x80 cm and 45 cm deep including C.I. cover with frame (light duty) 455x610 mm internal dimensions, total weight of cover and frame to be not less than 38 kg (weight of cover 23 kg and weight of frame 15 kg):				
18.3.1.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	1.00	Each	14041.09	14,041
18.3.2	Inside size 120x90 cm and 90 cm deep including C.I. cover with frame (medium duty) 500 mm internal diameter, total weight of cover and frame to be not less than 116 kg (weight of cover 58 kg and weight of frame 58 kg) :				
18.3.2.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	1.00	Each	29032.58	29,033
18.4	Extra for depth for manholes :				
18.4.1	Size 90x80 cm				
18.4.1.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	1.00	Metre	9703.44	9,703
18.4.2	Size 120x90 cm				
18.4.2.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	1.00	Metre	11638.65	11,639
18.5	Constructing brick masonry road gully chamber 50x45x60 cm with bricks in cement mortar 1:4 (1 cement : 4 coarse sand) including 500x450 mm pre-cast R.C.C. horizontal grating with frame complete as per standard design :				

18.5.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	16.00	Each	6550.65	1,04,810
18.6	Constructing brick masonry circular type manhole 0.91 m internal dia at bottom and 0.56m dia at top in cement mortar 1:4 (1 cement : 4 coarse sand), in side cement plaster 12 mm thick with cement mortar 1:3 (1 cement : 3 coarse sand) finished with a floating coat of neat cement, foundation concrete 1:3:6 mix (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size), and making necessary channel in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) finished with a floating coat of neat cement, all complete as per standard design :				
18.6.1	0.91 m deep with SFRC Cover and frame (heavy duty , HD- 20 grade designation) 560 mm internal dia conforming of to IS 12592 total weight of cover and frame to be not less than 182.Kg, fixed in cement concrete 1:2:4 (1 cement :2 coarse sand : 4 graded stone agggregate 20 mm nominal size ) including centering shuterling all complete. (Excavation,foot rest and 12 mm thick cement plaster at the external surface shall be paid for separately)				
18.6.1.1	with common burnt clay F.P.S.(non modular) brick of class designation 7.5	1.00	Each	13991.01	13,991
18.7	Extra depth for circular type manhole 0.91m internal dia (at bottom) beyond 0.91 m to 1.67 m.				
18.7.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	1.00	Metre	8347.11	8,347
18.8	Constructing brick masonry circular manhole 1.22 m internal dia at bottom and 0.56 m dia at top in cement mortar 1:4 (1 cement :4 coarse sand) inside cement plaster 12 mm thick with cement mortar 1:3 (1 cement : 3 coarse sand) finished with a floating coat of neat cement foundation concrete 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size) and making necessary channel in cement concrete				

	1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) finished with a floating coat of neat cement, all complete as per standard design :				
18.8.1	1.68 m deep with SFRC Cover and frame (heavy duty HD- 20 grade designation) 560 mm internal diameter conforming to I.S. 12592, total weight of cover and frame to be not less than 182 kg. fixed in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) including centering, shuttering all complete. (Excavation, foot rests and 12 mm thick cement plaster at the external surface shall be paid for separately) :				
18.8.1.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	1.00	Each	27160.43	27,160
18.9	Extra depth for circular type manhole 1.22 m internal dia (at bottom) beyond 1.68 m to 2.29 m :				
18.9.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	1.00	Metre	10842.57	10,843
18.10	Constructing brick masonry circular manhole 1.52 m internal dia at bottom and 0.56 m dia at top in cement mortar 1:4 (1 cement : 4 coarse sand) inside cement plaster 12 mm thick with cement mortar 1:3 (1 cement : 3 coarse sand) finished with a floating coat of neat cement, foundation concrete 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size) and making necessary channel in cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) finished with a floating coat of neat cement, all complete as per standard design :				
18.10.1	2.30 m deep with SFRC Cover and frame (heavy duty HD-20 grade designation) 560 mm internal diameter conforming to I.S. 12592, total weight of cover and frame to be not less than 182 kg. fixed in cement concrete 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate 20 mm nominal size) including centering, shuttering all complete.				

	(Excavation, foot rests and 12 mm thick cement plaster at the external surface shall be paid for separately):				
18.10.1. 1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	2.00	Each	58239.00	1,16,478
18.11	Providing orange colour safety foot rest of minimum 6 mm thick plastic encapsulated as per IS : 10910, on 12 mm dia steel bar conforming to IS: 1786, having minimum cross section as 23 mmx25 mm and over all minimum length 263 mm and width as 165 mm with minimum 112 mm space between protruded legs having 2 mm tread on top surface by ribbing or chequering besides necessary and adequate anchoring projections on tail length on 138 mm as per standard drawing and suitable to with stand the bend test and chemical resistance test as per specifications and having manufacture's permanent identification mark to be visible even after fixing, including fixing in manholes with 30x20x15 cm cement concrete block 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size) complete as per design.	45.00	Each	608.79	27,396
	<b>TOTAL SEWERAGE &amp; STORM WATER DRAINAGE</b>				<b>5,28,865</b>
<b>19.0</b>	<b>EXTERNAL WATER SUPPLY</b>				
19.1	Providing and fixing G.I. pipes complete with G.I. fittings including trenching and refilling etc. : External work				
19.1.1	50 mm dia. nominal bore	150.00	Metre	837.98	1,25,697
19.1.2	65 mm dia. nominal bore	90.00	Metre	985.80	88,722
19.1.3	80 mm dia. nominal bore	35.00	Metre	1145.34	40,087
19.2	Painting G.I. pipes and fittings with two coats of anti-corrosive bitumastic paint of approved quality :				
19.2.1	50 mm diameter pipe	150.00	Metre	33.53	5,030
19.2.2	65 mm diameter pipe	90.00	Metre	41.62	3,746
19.2.3	80 mm diameter pipe	35.00	Metre	48.38	1,693
19.3	Providing and filling sand of grading zone V or coarser grade all- round the G.I. pipes in external work.				
19.3.1	50 mm diameter pipe	150.00	Metre	190.49	28,574

19.3.2	65 mm diameter pipe	90.00	Metre	300.66	27,059
19.3.3	80 mm diameter pipe	35.00	Metre	309.84	10,844
19.4	Providing & laying HDPE pipes confirming to IS: 4984 type PE-80 (10 kg/cm <sup>2</sup> ) including fittings wherever required e.g., tees, bends of any degree, couplings, adapters, plugs, unions etc. and jointing as manufacturer recommendation etc. complete including necessary earth excavation for trenching & refilling. (For Irrigation System.)				
19.4.1	25 mm dia.	20.00	Metre	238.55	4,771
19.4.2	32 mm dia.	30.00	Metre	267.70	8,031
19.4.3	40 mm dia.	100.00	Metre	327.00	32,700
19.5	Providing, fixing, joints and testing in position 25 mm dia lawn hydrants consisting of 25 mm dia Ball valve, GI nipple and threaded hose receiver complete as required.	5.00	Each	2,619.95	13,100
19.6	Constructing masonry Chamber 30x30x50 cm inside, in brick work in cement mortar 1:4 (1 cement :4 coarse sand) for stop cock, with C. I. surface box 100x100 x75 mm (inside) with hinged cover fixed in reinforced cement concrete slab 1:1.5:3 mix (1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size), i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5 fine sand : 10 graded stone aggregate 40mm nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12mm thick, finished with a floating coat of neat cement complete as per standard design :				
19.6.1	With common burnt clay F.P.S (non modular) bricks of class designation 7.5	2.00	Each	2190.84	4,382
19.7	Constructing masonry Chamber 60x60x75 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for sluice valve, with C.I. surface box 100mm top diameter, 160 mm bottom diameter and 180 mm deep ( inside) with chained lid and RCC top slab 1:1.5:3 mix (1 cement : 1.5 coarse sand : 3 graded stone aggregate 20mm nominal size ) , i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5 fine sand : 10 graded stone aggregate 40				

	mm nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design :				
19.7.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	2.00	Each	11943.10	23,886
19.8	Constructing masonry Chamber 90x90x100 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for sluice valve, with C.I. surface box 100 mm top diameter, 160 mm bottom diameter and 180 mm deep (inside) with chained lid and RCC top slab 1:1.5:3 mix (1 cement : 1.5 coarse sand : 3 graded stone aggregate 20 mm nominal size ), i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5 fine sand : 10 graded stone aggregate 40 mm nominal size ) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with a floating coat of neat cement complete as per standard design :				
19.8.1	With common burnt clay F.P.S.(non modular) bricks of class designation 7.5	1.00	Each	20776.73	20,777
	<b>TOTAL EXTERNAL WATER SUPPLY</b>				<b>4,39,099</b>
<b>20.0</b>	<b>ROAD WORK</b>				
20.1	Preparation and consolidation of sub grade with power road roller of 8 to 12 tonne capacity after excavating earth to an average of 22.5 cm depth, dressing to camber and consolidating with road roller including making good the undulations etc. and re-rolling the sub grade and disposal of surplus earthwith lead upto 50 metres.	983.00	Sqm	240.68	2,36,588
20.2	Providing and laying design mix cement concrete of M-30 grade, in roads/ taxi tracks/ runways, using cement content as per design mix, using coarse sand and graded stone aggregate of 40 mm nominal size in appropriate proportions as per approved & specified design criteria, providing dowel bars with sleeve/ tie bars wherever required, laying at site, spreading compacting mechanically				

	by using needle and surface vibrator, levelling to required slope/ camber, finishing with required texture, including steel form work with sturdy M.S. channel sections, curing, making provision for contraction/ expansion, construction & longitudinal joints (10 mm wide x 50 mm deep) by groove cutting machine, providing and filling joints with approved joint filler and sealants, complete all as per direction of Engineer-in-charge (Item of joint fillers, sealants, dowel bars with sleeve/ tie bars to be paid separately). Note:- Cement content considered in M-30 is @ 340 kg/cum. Excess/ less cement used as per design mix is payable/ recoverable separately.				
20.2.1	Cement concrete prepared with batch mixing machine. <b>Note:-</b> If the agency wants to procure the concrete from the RMC plant, they can procure with prior approval of the design mix and RMC plant from the Engineer in charge. No additional claims will be admissible in this regards.	402.00	Cum	11576.92	46,53,922
20.3	Providing and filling in position rubberized bitumen hot sealing compound for sealing of expansion joints in roads / pavements all complete as per direction of the Engineer-in-Charge.				
20.3.1	Providing and filling in position rubberized bitumen hot sealing compound for sealing of expansion joints in roads / pavements all complete as per direction of the Engineer-in-Charge.	22588.00	per cm depth per cm width per metre length	9.51	2,14,812
20.4	Providing and laying at or near ground level factory made kerb stone of M-25 grade cement concrete in position to the required line, level and curvature, jointed with cement mortar 1:3 (1 cement: 3 coarse sand), including making joints with or without grooves (thickness of joints except at sharp curve shall not to more than 5mm), including making drainage opening wherever required complete etc. as per direction of Engineer-in-charge (length of finished kerb edging shall be measured to calculate volume for payment). (Precast C.C. kerb stone shall be	19.00	Cum	11124.20	2,11,360



	approved by Engineer-in-charge).				
20.5	Providing, laying, spreading and compacting graded stone aggregate (size range 53 mm to 0.075 mm ) to wet mix macadam (WMM) specification including premixing the material with water at OMC in for all leads & lifts, laying in uniform layers with mechanical paver finisher in sub-base / base course on well prepared surface and compacting with vibratory roller of 8 to 10 tonne capacity to achieve the desired density, complete as per specifications and directions of Engineer-in-Charge.	147.00	Cum	3204.24	4,71,023
20.6	Providing and laying factory made chamfered edge Cement Concrete paver blocks in footpath, parks, lawns, drive ways or light traffic parking etc, of required strength, thickness & size/ shape, made by table vibratory method using PU mould, laid in required colour & pattern over 50mm thick compacted bed of sand, compacting and proper embedding/laying of inter locking paver blocks into the sand bedding layer through vibratory compaction by using plate vibrator, filling the joints with sand and cutting of paver blocks as per required size and pattern, finishing and sweeping extra sand. complete all as per direction of Engineer-in-Charge.				
20.6.1	60 mm thick cement concrete paver block of M-35 grade with approved colour, design & pattern.	187.00	Sqm	1149.68	2,14,990
20.7	Providing and laying tactile tile (for vision impaired persons as per standards) of size 300x300x9.8mm having with water absorption less than 0.5% and conforming to IS:15622 of approved make in all colours and shades in for outdoor floors such as footpath, court yard, multi modals location etc., laid on 20mm thick base of cement mortar 1:4 (1 Portland Pozzolana Cement : 4 coarse sand) in all shapes & patterns	74.00	Sqm	2218.33	1,64,156

	including grouting the joints with white cement mixed with matching pigments etc. complete as per direction of Engineer-in-Charge.				
20.8	Providing and laying cement concrete (M-30 grade) tactile tile such as directional, warning or hazardous (for vision impaired persons as per standards) of size 300x300x80 mm {80mm base +(5mm $\pm$ 0.5mm) thick raised portion) of approved make in all colours (preferably yellow) and shades for footpath laid in required colour & pattern over 50mm thick compacted bed of coarse sand, compacting and proper embedding/laying of inter locking paver blocks into the sand bedding layer through vibratory compaction by using plate vibrator, filling the joints with river sand and cutting of paver blocks as per required size and pattern, finishing and sweeping extra sand in footpath, parks , lawns, drive ways or light traffic parking etc. complete as per manufacturer's specifications & direction of engineer-in-charge (the thickness of wearing layer should not be less than 8mm) and as per harmonized guidelines and space standards for barrier free built environment for persons with disability and elderly person.	77.00	Sqm	1201.70	92,531
20.9	Providing and laying 125-micron thick Polyethylene sheet (separation membrane) below the Cement Concrete and CC Pavements etc. all complete as per the direction of Engineer in charge. The overlaps of sheet at sheet joint shall not be less than 100mm.	983.00	Sqm	28.95	28,458
20.10	Construction of granular sub-base by providing close graded Material conforming to specifications, mixing in a mechanical mix plant at OMC, carriage of mixed material by tippers to work site, for all leads & lifts, spreading in uniform layers of specified thickness with motor grader on prepared surface and compacting with vibratory power roller to achieve the desired density, complete as per specifications and directions of				

	Engineer-in-Charge.				
20.10.1	With material conforming to Grade-I (size range 75 mm to 0.075 mm) having CBR Value-30	147.00	Cum	3060.98	4,49,964
20.11	Providing and applying 2.5 mm thick road marking strips (retro- reflective) of specified shade/ colour using hot thermoplastic material by fully/ semi automatic thermoplastic paint applicator machine fitted with profile shoe, glass beads dispenser, propane tank heater and profile shoe heater, driven by experienced operator on road surface including cost of material, labour, T&P, cleaning the road surface of all dirt, seals, oil, grease and foreign material etc. complete as per direction of Engineer-in-charge and accordance with applicable specifications.	85.00	Sqm	822.20	69,887
20.12	Manufacturing, supplying and fixing retro reflective sign boards made up of 2 mm thick aluminium sheet, face to be fully covered with high intensity encapsulated type heat activated retro reflective sheeting conforming to type - IV of ASTM-D 4956-01 in blue and silver white or other colour combination including subject matter, message (bi-lingual), symbols and borders etc. as per IRC ; 67:2001, pasted on substrate by an adhesive backing which shall be activated by applying heat and pressure conforming to class -2 of ASTM-D-4956-01 and fixing the same with suitable sized aluminium alloy rivets @ 20 cm c/c to back support frame of M.S. angle iron of size 25x25x3 mm along with theft resistant measures, mounted and fixed with 2 Nos. M.S. angles of size 35x35x5 mm to a vertical post made up to M.S. Tee section ISMT 50x50x6 mm welded with base plate of size 100x100x5 mm at the bottom end and including making holes in pipes, angles flats, providing & fixing M.S. message plate of required size, steel work to be painted with two or more coats of synthetic enamel paint of required shade and of approved brand &				

	manufacture over priming coat of zinc chromate yellow primer (vertical MS-Tee support to be painted in black and white colours).Backside of aluminium sheet to be painted with two or more coats of epoxy paint over and including appropriate priming coat including all leads and lifts etc. complete as per drawing , specification and direction of Engineer-in-charge.				
20.12.1	Mandatory/ Regulatory sign boards of size 900 mm dia. with support length of 3750 mm	4.00	Each	7898.02	31,592
	<b>TOTAL ROAD WORK:</b>			<b>Rs.</b>	<b>68,39,283</b>
<b>21.0</b>	<b>HORTICULTURE</b>				
21.1	Supplying and stacking of good earth at site including royalty and carriage upto 5 km lead complete (earth measured in stacks will be reduced by 20% for payment).	45.00	Cum	803.75	36,169
21.2	Supplying and stacking at site dump manure from approved source, including carriage upto 5 km lead complete (manure measured in stacks will be reduced by 8% for payment) :				
21.2.1	Screened through sieve of I.S. designation 20 mm	10.00	Cum	391.35	3,914
21.2.2	Screened through sieve of I.S. designation 16 mm	15.00	Cum	447.05	6,706
21.2.3	Screened through sieve of I.S. designation 4.75 mm	12.00	Cum	491.65	5,900
21.3	Spreading of sludge, dump manure and/or good earth in required thickness as per direction of officer-in-charge (cost of sludge, dump manure and/ or good earth to be paid separately).	8.00	Cum	79.70	638
21.4	Mixing earth and sludge or manure in the required proportion specified or directed by the Officer-in-charge	12.00	Cum	55.70	668
21.5	Digging holes in ordinary soil and refilling the same with the excavated earth mixed with manure or sludge in the ratio of 2:1 by volume (2 parts of stacked volume of earth after reduction by 20% : 1 part of stacked volume of manure after reduction by 8%) flooding with water, dressing including removal of rubbish and surplus earth, if any, with all leads				

	and lifts (cost of manure, sludge or extra good earth if needed to be paid for separately)				
21.5.1	Holes 60 cm dia, and 60 cm deep	25.00	Each	47.85	1,196
21.5.2	Holes 45 cm dia, and 45 cm deep	25.00	Each	20.65	516
21.6	Providing & laying of Selection no. 1 doob grass turf with earth 50mm to 60mm thickness of existing ground prepared with proper level and ramming with required tools wooden and than rolling the surface with light roller make the surface smoothen and light watering the same and maintenance for 30 days or more till the grass establish properly, as per direction of the officer in charge	100.00	Per Sqm	113.70	11,370
21.7	Plantation of Trees, Shrubs, Hedge ground cover and seasonal plants at site i/c watering and removal of unserviceable material's as per direction of officer in charge (excluding cost of plants & water).				
21.7.1	Trees Plant	20.00	Each	9.45	189
21.7.2	Shrubs Plant	121.00	Each	4.70	569
21.7.3	Hedge Plant	121.00	Each	3.15	381
21.8	Providing, stacking and displaying Golden Bottle brush Topiary well developed with fresh & healthy foliage 5 to 6 big ball 115 to 180 cm ht. in 40 cm Cement Pot/plastic pot as per direction of the officer-incharge.	10.00	Each	1048.75	10,488
21.9	Providing and stacking of Bottle palm of ht. 210-240 cm bottom girth 30-35 cm well developed in big HDPE bags as per direction of the officer-in-charge.	5.00	Each	379.15	1,896
21.10	Providing and stacking of Ficus benamina (green) of height 150-165 cm., bushy with healthy branches and lush green foliage in big size HDPE bags as per direction of the officer-incharge.	5.00	Each	195.00	975
21.11	Providing and stacking of Grevillea robusta (Silver Oak) of height 150-165 cm. in poly bags of size 25 cm as per direction of the officer-in-charge.	5.00	Each	54.15	271
21.12	Providing and stacking of Ficus panda of height 30-45 cm. with 3-4 branches and healthy foliage in p.bag of size 20 cm as per direction of the officer-in-charge.	5.00	Each	38.50	193

21.13	Providing and stacking Vernonia elaeagnifolia (curtain creeper) of height 30 cm to 45 cm. in 20 cm size of Earthen pots / Plastic pots as per direction of the officer-in-charge.	25.00	Each	27.70	693
21.14	Providing, stacking and Displaying Foxtail palm well developed with fresh & healthy foliage of ht. plant 210 cm to 240 cm in 40 cm Cement Pot/ Plastic Pot and as per direction of the officer-in-charge.	25.00	each	1295.50	32,388
21.15	Providing and laying Neelgiri/Mexican grass turf with earth 50mm to 60mm thickness of existing ground prepared with proper level and ramming with required tools wooden (Dhurmos) and than rolling the surface with light roller make the surface smoothen and light, watering with sprinkler and maintenance for 30 days or more till the grass establish properly as per direction of officer-in-charge.	150.00	Per Sqm	257.00	38,550
	<b>TOTAL HORTICULTURE WORKS:</b>			<b>Rs.</b>	<b>1,53,670</b>
	<b>TOTAL OF ALL SUBHEADS:</b>			<b>Rs.</b>	<b>18,61,00,188</b>

# **PART-C**

## **ADDITIONAL CONDITIONS, SPECIFICATIONS AND SCHEDULE OF QUANTITIES APPLICABLE TO ELECTRICAL AND MECHANICAL COMPONENT OF THE WORK**



### **ADDITIONAL CONDITIONS**

1. The work shall be carried out strictly in accordance with CPWD specification for electrical works CPWD general specification Part-I (Internal) 2023, Part- II (External) 2023, Part-III (Lift & Escalator) 2003 and amended up to date, Part -IV (Substation) 2013, Part-V (Wet riser & Sprinkler System) 2020, Part-VI Fire detection and alarm System-2018, General Specification for Electrical works Part-VII (DG set) 2013, Part VIII Gas Based Fire Extinguisher System, General Specification for Heating Ventilation & Air Conditioning (HVAC) 2024, and in accordance with Indian Electricity Rules, 1956, India Electricity Act, 2003, ECSBC 2024 as amended up to date and NBC 2016 as amended up to date and as per instructions of the Engineer-in-Charge and nothing extra will be paid.
2. The scope of works & specification is given in general but they are not exhaustive i.e. does not mention all the incidental works required to be carried out for complete execution of the item of work. The work shall be carried out, all in accordance with true intent and meaning of the specifications and the drawings taken together, regardless of whether the same may or may not be particularly shown on the drawings and/ or described in the specifications, provided that the same can be reasonably inferred there from. There may be several incidental works, which are not mentioned in the contract document/specifications but will be necessary to complete the item in all respect.
3. All these incidental works/ costs which are not mentioned, but are necessary to complete the work shall be deemed to have been included in the overall amount quoted by the contractor for various components of work. No adjustment of rates shall be made for any variation in quantum of incidental works due to variation/change in actual working drawings.
4. Adjustment of rates shall not be made due to any change in incidental works or any other deviation in such element of work (which is incidental to the items of work and are necessary to complete such items in all respects) on account of the directions of Engineer-in-charge. Nothing extra shall be payable on this account.
5. Three final copies of the documents prepared shall be submitted to Engineer-in-charge for record. All the documents created out of the assignment will become the sole property of the Department.
6. Stage Payment for E&M packages: The following percentage of contract rates shall be payable against the stages of work shown herein:

S. No.	Stage of Work	Payment terms in %
1	On initial inspection of materials and delivery at site in good condition on basis	50%
2	On completion of installation	25%
3	On completion of testing and commissioning	20%

4	On Handing Over	5%
	<b>Total</b>	<b>100%</b>

7. **ELIGIBILITY CRITERIA FOR ASSOCIATE AGENCY:** The Composite category contractor is also eligible to carry out electrical and mechanical services works himself/herself without associating any specialized agency provided he fulfils the prescribed eligibility criteria respectively for these work(s) as mentioned below:

a) **Eligibility Criteria for Fire Fighting & Fire safety system:**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending last date of month previous to the one in which tender is invited.

Three similar completed works each costing not less than 40% of the estimated cost put to tender.

OR

Two similar works each costing not less than 60% of the estimated cost put to tender.

OR

One similar works each costing not less than 80% of the estimated cost put to tender.

Similar work shall mean **SITC of Fire Fighting & Fire safety system.**

b) **Eligibility Criteria for Automatic Fire Alarm & PA System:**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending last date of month previous to the one in which tender is invited.

Three similar completed works each costing not less than 40% of the estimated cost put to tender.

OR

Two similar works each costing not less than 60% of the estimated cost put to tender.

OR

One similar works each costing not less than 80% of the estimated cost put to tender.

Similar work shall mean **“SITC of Automatic Fire Alarm & PA System”**.

c) **Eligibility Criteria for Sub-Station Work :-**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending last date of month previous to the one in which tender is invited.

Three similar completed works each costing not less than 40% of the estimated cost put to tender.

OR

Two similar works each costing not less than 60% of the estimated cost put to tender.

OR

One similar works each costing not less than 80% of the estimated cost put to tender.

- Similar work shall mean “**The capacity of individual transformer being 80% of individual capacity (rounded off to next available higher capacity) of the equipment i.e. transformer proposed in NIT**”.

d) **Eligibility Criteria for DG set:**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending last date of month previous to the one in which tender is invited.

Three similar completed works each costing not less than 40% of the estimated cost put to tender.

OR

Two similar works each costing not less than 60% of the estimated cost put to tender.

OR

One similar works each costing not less than 80% of the estimated cost put to tender.

- Similar work shall mean “**The capacity of individual DG Set being 80% of individual capacity (rounded off to next available higher capacity) of the equipment i.e. DG Set proposed in NIT**”.

e) **Eligibility Criteria for UPS: -**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending last date of month previous to the one in which tender is invited.

Three similar completed works each costing not less than 40% of the estimated cost put to tender.

OR

Two similar works each costing not less than 60% of the estimated cost put to tender.

OR

One similar works each costing not less than 80% of the estimated cost put to tender.

- Similar work shall mean “**UPS System**”

f) **Eligibility Criteria for HVAC system:-**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending last date of month previous to the one in which tender is invited.

Three similar completed works each costing not less than 40% of the estimated cost put to tender.

OR

Two similar works each costing not less than 60% of the estimated cost put to tender.

OR

One similar works each costing not less than 80% of the estimated cost put to tender.

- Similar work shall mean “The **capacity of individual Chiller being 80% of individual capacity (rounded off to next available higher capacity) of the equipment i.e. Chiller/ proposed in NIT**”.

g) **Eligibility Criteria for Solar PV System:**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending last date of month previous to the one in which tender is invited.

Three similar completed works each costing not less than 40% of the estimated cost put to tender.

OR

Two similar works each costing not less than 60% of the estimated cost put to tender.

OR

One similar works each costing not less than 80% of the estimated cost put to tender.

- Similar work shall mean “**Solar PV generation plant**”.

h) **Eligibility Criteria for CCTV Work: -**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending last date of month previous to the one in which tender is invited.

Three similar completed works each costing not less than 40% of the estimated cost put to tender.

OR

Two similar works each costing not less than 60% of the estimated cost put to tender.

OR

One similar works each costing not less than 80% of the estimated cost put to tender.

Similar work shall mean “CCTV Work”

i) **Eligibility Criteria for Bike Parking System: -**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending last date of month previous to the one in which tender is invited.

Three similar completed works each costing not less than 40% of the estimated cost put to tender.

OR

Two similar works each costing not less than 60% of the estimated cost put to tender.

OR

One similar works each costing not less than 80% of the estimated cost put to tender.

- Similar work shall mean “Bike Parking System”

j) **Eligibility Criteria for LAN Work:**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending last date of month previous to the one in which tender is invited.

Three similar completed works each costing not less than 40% of the estimated cost put to tender.

OR

Two similar works each costing not less than 60% of the estimated cost put to tender.

OR

One similar works each costing not less than 80% of the estimated cost put to tender.

- Similar work shall mean “LAN Work”

k) **Eligibility Criteria for IPBAX (IP Based) work:**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending last date of month previous to the one in which tender is invited.

Three similar completed works each costing not less than 40% of the estimated cost put to tender.

OR

Two similar works each costing not less than 60% of the estimated cost put to tender.

OR

One similar works each costing not less than 80% of the estimated cost put to tender.

Similar work shall mean “**IPBAX (IP Based) System**”

l) **Eligibility Criteria for STP/ ETP: -**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending last date of month previous to the one in which tender is invited.

Three similar completed works each costing not less than 40% of the estimated cost put to tender.

OR

Two similar works each costing not less than 60% of the estimated cost put to tender.

OR

One similar works each costing not less than 80% of the estimated cost put to tender.

- Similar work shall mean “**Sewage/ Effluent Treatment Plant**”

m) **Eligibility Criteria for Boom Barrier System :-**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending last date of month previous to the one in which tender is invited.

Three similar completed works each costing not less than 40% of the estimated cost put to tender.

OR

Two similar works each costing not less than 60% of the estimated cost put to tender.

OR

One similar works each costing not less than 80% of the estimated cost put to tender.

- Similar work shall mean “**Boom Barrier & Driver Face and Number Plate Recording System**”.

n) **Eligibility Criteria for Lift:**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending last date of month previous to the one in which tender is invited.

Three similar completed works each costing not less than 40% of the estimated cost put to tender.

OR

Two similar works each costing not less than 60% of the estimated cost put to tender.

OR

One similar works each costing not less than 80% of the estimated cost put to tender.

- Similar work shall mean “Lifts System”.

o) **Eligibility Criteria for Audio Video System:**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending last date of month previous to the one in which tender is invited.

Three similar completed works each costing not less than 40% of the estimated cost put to tender.

OR

Two similar works each costing not less than 60% of the estimated cost put to tender.

OR

One similar works each costing not less than 80% of the estimated cost put to tender.

- Similar work shall mean “Audio Video System”.

p) **Eligibility Criteria for Access Control:**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending last date of month previous to the one in which tender is invited.

Three similar completed works each costing not less than 40% of the estimated cost put to tender.

OR

Two similar works each costing not less than 60% of the estimated cost put to tender.

OR

One similar works each costing not less than 80% of the estimated cost put to tender.

- Similar work shall mean “Access Control”.

q) **Eligibility Criteria for WTP:-**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending last date of month previous to the one in which tender is invited.



Three similar completed works each costing not less than 40% of the estimated cost put to tender.

OR

Two similar works each costing not less than 60% of the estimated cost put to tender.

OR

One similar works each costing not less than 80% of the estimated cost put to tender.

- Similar work shall mean “**Water Treatment Plant**”.

r) **Eligibility Criteria for Fire Suppression System: -**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending last date of month previous to the one in which tender is invited.

Three similar completed works each costing not less than 40% of the estimated cost put to tender.

OR

Two similar works each costing not less than 60% of the estimated cost put to tender.

OR

One similar works each costing not less than 80% of the estimated cost put to tender.

- Similar work shall mean “**Fire Suppression System**”.

s) **Eligibility Criteria for Water Supply Pumps: -**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending last date of month previous to the one in which tender is invited.

Three similar completed works each costing not less than 40% of the estimated cost put to tender.

OR

Two similar works each costing not less than 60% of the estimated cost put to tender.

OR

One similar works each costing not less than 80% of the estimated cost put to tender.

- Similar work shall mean “**Water Supply Pumps**”.

The value of executed works shall be brought to current costing level by enhancing the actual value of work at simple rate of 7% per annum, calculated from the date of completion to the last date of submission of bids.

- t) The contractor has to submit MOU with associated contractor (in case electrical contractor is associated), engineers name, credential, email address & mobile no. before start of work. The main agency should possess a valid electrical contractor licence for executing EI works otherwise he has to associates contractor having valid electrical contractor licence.
- u) All the material to be used on this work by the contractor shall be got approved from the Engineer-in-Charge in advance before installation at the site.
- v) All damages done to the building during the execution of electrical work shall be the responsibility of the contractor and the same will be made good immediately at his own cost to the satisfaction of the Engineer-in-Charge. In case, the repair is not satisfactory, the department will get it rectified & any expenditure incurred by the department in this connection shall be recovered from the contractor and decision of the Engineer-in-charge
- w) All the debris of the electrical works should be removed and the site should be cleared by the contractor immediately after the accruing of debris daily. Similarly rejected material if any should be immediately cleared off from the site by the contractor.
- x) The contractor or his engineer is bound to sign the site order book as and when required by the Engineer-in-Charge and to comply with the remarks therein.
- y) The size of conduit and wiring shall be got approved from the Engineer-in-Charge before the execution of work.
- z) The contractor shall make his own arrangement at his own cost for Electrical/ General tools and plants required for the work. In case, proper tools are not available, the department will purchase the tools for bonafide use of work at the risk & cost of the contractor.
- aa) Main board and main distribution board: The work shall be carried out according to the drawing/details as approved by the Engineer-in-Charge. The contractor shall have to get the sample approved before the whole lot is brought to site. The main board, distribution board shall be properly labelled.
- bb) The entire installation shall be at the risk and responsibility of the contractor until these are tested and handed over to the department. The watch & ward is the responsibility of the contractor till handing over.
- cc) The connection inter connection, earthing and inter earthing shall be done by the contractor wherever required and nothing extra shall be paid on this account.
- dd) Nothing extra shall be paid for inter connections with thimbles/Wires/Tapes strips etc. used on the work.

- ee) The contractor has to make his own arrangements for stores and watch and ward and no extra claim for this will be entertained.
- ff) The contractor shall make his own arrangements for electrical power supply for the construction activities. No extra payments for the same will be made.
- gg) The wiring and conduit route shall be marked by the contractor on the drawing first, and shall be got approved from the Engineer-in-charge.
- hh) The rupturing capacity of the MCB's shall be 10KA. The MCB's shall have ISI mark.
- ii) The insulated copper wire to be used on this work shall be FRLS type of multi stranded.
- jj) Make of MCB/MCCB shall be the same as the make of MCB DB.
- kk) The contractor shall on demand by the Engineer-in-charge, furnish the proof to the satisfaction of Engineer-in-charge regarding purchase of Wires, Modular switches & accessories, MCBs MCBDB fan & fixture and accessories and other items, from the manufactures authorized outlets.
- ll) All PVC/MS conduits accessories shall be of the same make as conduits and shall be ISI marked. The conduits shall be terminated as switch boxes/metallic junction boxes with suitable glands/check nuts.
- mm) Cutting of brick walls shall be done with due care. All repairs and patch works shall be neatly carried out to match the original finish and to the entire satisfaction of the Engineer in Charge.
- nn) All the sub main and circuits wiring includes loose wire for connections inside switch boxes and MCB DBs. No payment for these loose wires shall be made. However, wires within the cubicle panel will be measured and paid under relevant item of work.
- oo) To facilitate drawing of wires, 18 SWG GI fish wire shall be provided along with laying of recessed conduit for which no extra payment shall be made. Conduits laid for other services, like TV, Telephone etc., where wiring is not done along with IEI work, fish wire shall be invariably drawn.
- pp) The connection between incoming switch/isolator and bus bar shall be made with suitable size of thimble and cable at no extra cost.
- qq) Copper conductor of insulated cables of size 1.5 Sq.mm and above shall be stranded and terminals provided with crimped lugs.
- rr) All hardware items such as screws, thimbles, GI wire etc. which are essentially required for completing an item as per specification will be deemed to be included in the item even when the same have not been specifically mentioned.
- ss) All hardware items such as nuts/bolts/screws/washers etc. to be used in work shall be of zinc/cadmium plated iron.

- tt) While laying conduit, suitable size junction boxes shall be provided for pulling the wire as per the decision of the Engineer-in-charge.
- uu) Materials to be used in work are to be ISI marked. The make of the materials has been indicated in the list of preferred makes. No other makes will be acceptable. The materials to be used in the work shall be got approved by the Engineer in Charge/his representative before its use at site. The Engineer-in-charge shall reserve the right to instruct the contractor to remove the material which, in his opinion, is not acceptable.
- vv) Where switches / sockets / regulator / telephone / TV / internet outlets are to be provided, the same shall be of only one make. Modular accessories for UPS outlets shall be of distinguishable colour.
- ww) The firm should submit the warranty against manufacturer defect for a period of 5 years from the date of completion of work for LED fittings and products from the manufacturer.
- xx) The contractor shall have to work as per the convenience of the concerned Department.
- yy) Any conduit which is not to be wired by the contractor shall be provided with GI fish wire for wiring for some other agency subsequently. Nothing extra shall be paid for the same.
- zz) The tenderer should either himself meet the eligibility conditions for the respective E&M components or otherwise he will have to associate with agencies, fulfilling the eligibility requirements and hence consent letter from eligible Associate Agency of the respective components of E&M work shall also be submitted as per attached **Proforma in Form “A”**.
- aaa) In case the main contractor is himself eligible (as per eligibility criteria) for executing any specific minor component and intends doing the job himself, he may not be required to associate with another agency for that minor component of work. In such cases the main contractor also has to submit the documents as per eligibility criteria mentioned for associated agency of individual E&M component.
- bbb) In support of the eligibility conditions of the proposed Associated Contractor, copy of their registration documents, Electrical License, GST Documents duly attested by the applicants (Main Contractor) shall be submitted to the **Executive Engineer-in-charge** for deciding the eligibility. Each such Associated Contractor will certify that they are not debarred as on the day of application for tender participation. Proposal for associating agency for minor components of work shall be submitted in **Form ‘B’** of this tender document from each associate independently for all electrical and mechanical components.
- ccc) The main contractor should submit an affidavit of MoU signed with eligible associated contractor. The MoU in the enclosed **Form ‘C’** shall be signed by both the parties, main contractor as 1<sup>st</sup> party and associated contractor as 2<sup>nd</sup> party independently for all electrical and mechanical components.
- ddd) In the event of the concerned E&M agency not performing satisfactorily or failure of associate contractor to complete the E&M work, the main contractor on written directions

of the department, shall remove the Associate contractor deployed on the work and shall submit name of new associate agency who fulfil the conditions mentioned in the NIT to execute the leftover work without any loss of time or variation in cost to the department. **Such associates shall also give an undertaking along with the main tenderer but both of them together will stand guarantee for the equipment's already supplied for which payment has been released by the department in part.** If any equipment supplied for the work, during the currency of the earlier Associate contractor and paid partly by the Department, becomes redundant / not in a position to be installed and commissioned and put to beneficial use due to change in agency for execution of E&M work, the main contractor shall be liable for replacement of the equipment(s) at no cost to Department. No change of Associated Contractor will be allowed without prior approval of the Engineer-in-charge of the work.

- eee) In respect of all works i.e., Electrical installation., the materials shall be procured only from the original equipment manufacturers / authorized dealers of OEM. The contractor shall submit all documentary details in fulfilment of these conditions regarding procurement of materials including relevant test certificates.
- fff) Before completion of defect liability period as per condition laid down in GCC 2023, the main contractor has to submit security deposit of 5% of 80% of the Quoted price of SITC of LED fittings for the warranty period for LED fittings in acceptable form i.e. FDR/ Bank guarantee to Engineer in charge. The Security Deposit deducted from the bills of contractor shall be refunded to the main contractor only after submission of above security deposit for LED fittings by main contractor, failing which this LED security deposit shall be deducted from Security Deposit deducted for total work and balance amount only will be refunded after completion of defect liability period. The LED Security Deposit will be released after completion of warranty period of 5 years to the main contractor.
- ggg) The contractor shall execute the whole work in the most substantial and workman like manner in strict accordance with the specifications, approved design, drawings, particular specifications, special conditions, additional conditions and instructions of the Engineer-in-Charge.
- hhh) The contractor shall at his own expense and risk arrange land for accommodation of labour, setting up of office, storage of materials, erection of temporary workshops, construction of approach roads to the site of work, including land required for carrying out of all jobs connected with the completion of the work. The contractor shall have to abide by the regulations of the authorities concerned and the directions of the Engineer-in-Charge for use of land available at the site of work. If it becomes necessary during construction to remove or shift the stored materials, shed, workshop, access roads, etc, to facilitate execution of the work included in this agreement or any other work by any other agency, the contractor shall remove or shift these facilities as directed by the Engineer-in-Charge and no claim whatsoever shall be entertained on this account.
- iii) The necessary tests shall be conducted in the laboratory approved by the Engineer-in-Charge. The samples for carrying out all or any of the tests shall be collected by the Engineer-in-charge or on his behalf by any other officer of CCU. The contractor or his

authorized representative shall associate himself in collection, preparation, packing and forwarding of such samples for the prescribed tests and analysis. In case the contractor or his authorized representative is not present or does not associate himself in the aforesaid operation the results of such tests and consequences thereon shall be binding on the contractor.

- jjj) Materials used on work without prior inspection and testing (where testing is necessary) and without approval of the Engineer-in-Charge are liable to be considered unauthorized, defective and not acceptable. The Engineer-in-Charge shall have full powers to require the removal of any or all of the materials brought to site by contractor which are not in accordance with the contract specifications or do not conform, in character or quality to the samples approved by the Engineer-in-Charge. In case of default on the part of the contractor in removing rejected materials, the Engineer-in-Charge shall be at liberty to have them removed at the risk and cost of the contractor.
- kkk) The contractor shall make his own arrangement of water required for execution of work and get the water tested at his own cost with regard to its suitability for use in the works and get written approval from the Engineer-in-Charge before he proceeds with the use of same for execution of work.
- lll) The work shall be carried out in such a manner so as not to interfere or adversely affect or disturb other works being executed by other agencies, if any.
- mmm) Any damage done by the contractor to any existing works or work being executed by other agencies shall be made good by him at his own cost.
- nnn) The work shall be carried out in the manner complying in all respects with the requirement of relevant rules and regulations of the local bodies under the jurisdiction of which the work is to be executed and nothing extra shall be paid on this account.
- ooo) For completing the work in time, the contractor may have to work in two or more shifts and no claims whatsoever shall be entertained on this account, notwithstanding the fact that the contractor will have to pay to the labourers and other staff engaged directly or indirectly on the work according to the provisions of the labour regulations and the agreement entered upon and/or extra amount for any other reasons.
- ppp) The contractor shall take all precautions to avoid all accidents by exhibiting necessary caution boards and by providing red flags, red lights and barriers. The contractor shall be responsible for any accident at the site of work and consequences thereof.
- qqq) **Quality Assurance Manual (Quality Assurance Plan & Checklist for E & M Service).**
- (a) Main contractor/Associate agency shall submit the required quantity of materials as sample for Testing from Govt. / approved private Laboratory.
- (b) The decision on testing shall be as per E&M quality checklist of CPWD vide OM No. 51(4)/CE(E)/CSQ/2016/293 (H) dated 31.03.2016 as applicable and/or as per

direction of Engineer in charge and shall be binding on contractor. Contractor shall submit the required size and quantity of samples for the testing.

- (c) Department shall send the samples to the testing laboratory & the test results shall be reported directly to department.
- rrr) All the equipment shall be delivered with (i) Manufacturer's test certificate, (ii) Manufacturer's technical catalogues and Installation / Instruction (O&M) manuals. For LED luminaries, the contractor shall also submit the LM-79 test report of LED luminaries from NABL accredited laboratory.
- sss) Scaffoldings & any other T & P required for execution, testing and commissioning of work shall be arranged by the contractor and is included in the cost of work tendered by the contractor.
- ttt) **Inspection before Dispatch:** All routine tests shall be conducted before dispatch of equipment. No equipment shall be dispatched out from the manufacturer's premises before such tests are conducted and test result recorded. These test certificates shall be given along the supply of equipment. The Engineer- In-charge shall, if he so desires inspect and witness the pre-delivery tests. For this purpose, the agency shall give 15 days advance notice. Agency shall arrange for inspection of the department. Department shall bear expenses of its officials for inspection as far as travelling, boarding and / lodging is concerned. However, the inspection shall be done at the discretion of the department without any cost implication but **ROUTINE TEST & TYPE TEST Certificates** shall have to be submitted for all the equipment.
- uuu) Prior to dispatch, all equipment shall be adequately protected & insured for the whole period of transit, storage and erection against corrosion and incidental damages etc. from the effect of vermin, sunlight, rain, heat, humid climate and accidents etc.
- vvv) **APPROVAL OF MATERIALS, SHOP FLOOR DRAWINGS AND COMMENCEMENT OF WORK:** The contractor shall submit list of makes & Model numbers of all items of equipment and accessories for each Sub Head of work. Catalogues of the equipment to be supplied. Shop floor drawings of each packages/ Sub work shall be submitted separately for approval. It is the responsibility of the tenderer to get the makes, models and shop floor drawings approved by the department before placing of order.
- www) **Insurance:** The agency shall include storage cum erection insurance including third party insurance right from the storage to commissioning and handing over of various equipment. In insurance, the beneficiary shall be Engineer-In-charge at the cost of the agency. All insurance which the agency is required to enter into under the contract shall be affected any authorized general insurance company and the agency shall produce the policies of insurance. In case of any delay in handing over, the insurance cover will be suitably extended by the contractor at his own cost.
- xxx) **Remedy of failure to insure:** If the agency fails to effect and keep in force the insurance referred to in the preceding sub-clause and in case of unforeseen eventuality of



theft/damage etc. to any material, the contractor only shall be held responsible and necessary rectification/replacement has to be done by contractor himself.

yyy) **Quality of material and workmanship:** All parts of the equipment shall be of such design, size and material so as to function satisfactorily under all rated conditions of operation. All components of the equipment shall have adequate factor of safety. The work of fabrication and assembly shall conform to sound engineering practice and on the basis of “Fail Safe Design”. The mechanical parts subject to wear and tear shall be easily replaceable type. The construction of the equipment shall be such as to facilitate easy operation, inspection, maintenance and repairs. All connections and contacts shall be designed to minimize risk of accidental short circuits caused by animals, birds and vermin etc. All identical items and their component parts should be completely interchangeable including spare parts.

zzz) All electrical & mechanical fittings / fixture / appliances, to be provided for the work, where BEE certification is available should have **5-star rating (of BEE)**.

aaaa) **QUALITY ASSURANCE:** The Contractor shall make available, on request from the Department, for record, copies of challans, cash memos, receipts and other certificates, if any, vouchers towards the quantity and quality of various materials procured and the same shall be kept in record. These shall also provide information on the name of the manufacturer, manufacturer's product identification, manufacturer's instructions, warning, date of manufacturing and test certificates from manufacturers for the product for each consignment delivered at site, shelf life, if any, for the department to ensure that the material have been procured from the approved source and of the approved quality, as directed by the Engineer-in-Charge.

bbbb) Storage and safe custody of all materials shall be the sole responsibility of the Contractor. Nothing extra shall be payable on this account. This shall include cost of painting of the entire installation. The major equipment's shall be factory final finish painted. The agency shall be required to do only touch up to the damages caused to the painting during transportation, handling & installation at site, if there is no major damage to the painting. However, hangers, supports etc. of bus trunking & cable tray etc. shall be painted with required shade including painting with two coats of anticorrosive primer paint or pressurized paint for touch up of powder coated equipment at site.

cccc) The scope of works includes the on job technical training of two persons of department at site. Nothing extra shall be payable on this account.

**CONSENT LETTER FROM ELIGIBLE ASSOCIATE AGENCY OF MINOR  
COMPONENT OF WORK**

**Name of work:** .

I / We hereby give my consent to associate with M/s.....,  
for Executing the minor component of work of  
.....  
(Mention category).

I / We will execute the work as per specifications and conditions of the agreement and as per directions of the Engineer –in-Charge for the corresponding minor work till the completion of the work.

I / We will be responsible for necessary action to handover the installations and for rectification of defects and repair during the maintenance / warranty period.

Also, I / We will employ full time technically qualified Engineer / supervisor for the minor component of the work as required for the work. I / We will attend inspection of officers of the department as and when required.

Date:

Signature with date of Major component  
Contractor  
Address

Signature with date of Associate/Minor Component  
Contractor  
Address

Witness with address  
(From major component contractor side)

Witness with address  
(From minor component contractor side)

**PROPOSAL FOR ELIGIBLE ASSOCIATING AGENCIES FOR MINOR  
COMPONENTS OF WORK**

I/we hereby propose the following agencies as mentioned against each for executing corresponding minor components of work. Their consent letters are also attached.

<b>Sl. No</b>	<b>Name of Associated Contractor</b>	<b>Category and class of registration</b>	<b>Enlistment copy / Completion Certificates attached</b>	<b>Monetary Limit of work</b>	<b>Validity of registration</b>	<b>Consent Letter Attached (Yes/No)</b>
1)						

**Note:** Self-Attested photocopies of enlistment order, valid electrical contractor license, work experience certificates of each agency for each component of E&M work shall be submitted.

Signature of contractor

**AFFIDAVIT OF MEMORANDUM OF UNDERSTANDING (MOU)**

(to be submitted for each and every E&M component)

M/s. (Name of the firm with full address) .....Enlistment Status (Valid Upto)  
.....(Henceforth called the main Contractor)

M/s. (Name of the firm with full address)..... Enlistment Status (Valid  
Upto).....(Henceforth called Associated Contractor)

For the execution of E &M component Works

**Name of work:** .....

We state that M.O.U between us will be treated as an agreement and has legality as per Indian Contract Act (amended up to date) and the department (CCU) can enforce all the terms and conditions of the agreement for execution of the above work. Both of us shall be responsible for the execution of work as per the agreement to the extent this MOU allows. Both the parties shall be paid consequent to the execution as per agreement to the extent this MOU permits. In case of any dispute, either of us will go for mediation by the Engineer In charge. Any of us may appeal against the mediation to the Chief Engineer, ..... His decision shall be final and binding on both of us.

We have agreed as under:

The Associated Contractor will execute all E & M works in the wholesome manner as per terms and conditions of the agreement.

The Associated Contractor shall be liable for disciplinary action if he fails to discharge the action(s) and other legal action as per agreement.

All the machinery and equipments, tools and tackles required for execution of the E & M works, as per agreement, shall be the responsibility of the Associated Contractor.

The site staff required for the E & M work shall be arranged by the Associated Contractor as per terms and conditions of the agreement.

SIGNATURE OF MAIN CONTRACTOR

Date:

Place:

SIGNATURE OF ASSOCIATED CONTRACTOR

Date :

Place:

Witness with address  
(From major component contractor side)

Witness with address  
(From minor component contractor side)

**UNDERTAKING LETTER FROM MANUFACTIRERES OF LED FITTINGS  
(ON THEIR LETTER HEAD)**

We hereby agree that:

1. All the LED fittings supplied by us are guaranteed for five years including drivers from the date of handing over.
2. In case of discontinuation of model and non-availability of spares, we will replace the fittings with equivalent/ high end model in case of manufacturing defect during the warranty period of 5 years.

For M/S .....,

.....

(Authorized signatory of manufacturer of LED luminaries)

Counter Signature,

Major contractor

## **LIST OF PREFERRED MAKES OF MATERIALS FOR ELECTRICAL WORKS**

SL. NO.	ITEMS	MAKES
	<b>ELECTRICAL INSTALLATIONS &amp; GENERAL</b>	
1	WIRES AND CABLES a) PVC INSULATED FRLS COPPER CONDUCTOR SINGLE CORE CABLE b) 1.1 KV GRADE XLPE POWER CABLE AND CONTROL CABLE c) FIRE SURVIVAL CABLE d) 11 KV GRADE XLPE POWER CABLE e) COMMUNICATION CABLE	POLYCAB/ KEI/ HAVELLS/ FINOLEX
2	a) MS CONDUIT/ PVC CONDUIT AND ITS ACCESSORIES b) GI PERFORATED CABLE TRAY c) GI RACEWAY	AKG / BEC / NIC
3	MODULAR SWITCH & SOCKET	MK -ORNA / HAVELLS (CRABTREE MURANO) / SCHNEIDER LIVIA OR MILUZ LARA
4	ANCHOR FASTENER	HILTI/ 3M/ FISCHER
5	CABLE LUGS AND BRASS GLAND	GRIPWEL / DOWELL/ COMET
6	CAT-6 UTP CAT-6A, UTP UTP PATCH CORD FIBRE OPTICS CABLE	PANDUIT/ BELDEN / 3C3 / DERWISER
8	UPVC / HDPE PIPE/DWC	DURALINE/ REX/ TIRUPATI
9	RACK FOR ALL (EPABX / AUDIO VIDEO / CCTV etc.)	PANDUIT/ APC INDIA / 3C3 / IMPULSE / NEXXUX / BELDEN
10	PAINT, PRIMER	ASIAN PAINT/ NEROLAC / BERGER/ ICICI
11	MS PIPE, GI PIPE	SAIL/ TATA/ JINDAL (HISSAR)/JINDAL STAR
12	SERVER / DESKTOP	DELL / HP/ IBM / LENOVO / PANASONIC
13	WI- FI SYSTEM & NETWORK SWITCHES	CISCO/ JUNIPER/ NEXXUUS / IMPLUSE / BELDEN
14	STRUCTURAL STEEL	TATA/ SAIL/ JINDAL HISSAR / APL-APOLLO
15	WATER SUPPLY, STP, DRAINAGE, SUBMERSIBLE PUMPS	KIRLOSKAR /KSB/ GRUNDFOSS/ WILO/ XYLEM/ ARMSTRONG
	<b><u>DG SET</u></b>	
1	DIESEL ENGINE	CUMMINS / CATERPILLER/ PERKINS/ KIRLOSKAR OIL ENGINE LTD.
2	ALTERNATOR	STAMFORD/ KIRLOSKAR ELECTRIC/ CROMPTON
3	PROTECTION RELAYS & CT'S	L&T/ SIEMENS/ SCHNEIDER ELECTRIC
4	BATTERY	EXIDE / AMARON/ AMARAJA/LUMINOUS
5	DG SET - ACOUSTIC ENCLOSURE & ASSEMBLER	KIRLOSKAR (JACKSON) / SUDHIR / CUMMINS INDIA
6	AMF CONTROLLER	AS PER OEM
7	POWER/ AUXILLARY CONTACTOR/ CAPACITOR DUTY CONTACTOR / METERS INCLUDING DIGITAL METERS / INDICATING LAMP (LED TYPE) / PUSH BUTTON / STARTERS /OVERLOAD RELAY / TIMER	L&T/ SIEMENS/ SCHNIEDER ELECTRIC/ ABB
	<b><u>SUB-STATION</u></b>	
1	11 KV VCB PANEL	ABB / SCHNEIDER ELECTRIC/ SIEMENS/ TRICOLITE
2	a) DRY TYPE (11KV/433 VOLT)	KIRLOSKAR/ VOLTAMP/ ABB/ CROMPTON
	b) OIL TYPE TRANSFORMER (11KV/433	GREEVES



	VOLT)	
3	COMPACT SUB STATION	SCHNEIDER ELECTRIC/ ABB/ SIEMENS/ THEIR AUTHORIZED LICENSE PARTNER
4	ACB	SCHNEIDER ELECTRIC – MASTERPACT NW (6.0A)/ L&T - U POWER OMEGA (MTX3.5)/ SIEMENS 3WL (ETU 45B)/ ABB EMAX (PR122)
5	MCCB	SCHNEIDER – COMPACT NSX/ L&T DU/ ABB TMAX
6	MCB/ RCCB/ ISOLATOR	SCHNEIDER - ACTI9/ HAGER-H3/ SIEMENS BETA GUARD 10KA/ ABB SB200M
7	MCB DB	HAGER (H3) / SIEMENS (BETAGARD) /SCHNEIDER (ACTI-9)/ABB (ITUS)
8	MAIN LT PANEL/ SUB LT PANELS/ CAPACITOR PANEL/ SYNCHRONIZING PANEL WITH ACCESSORIES/ STARTER PANEL	NEPTUNE/ ADVANCE PANELS & SWITCHGEAR (P) LTD / ADLEC /ASPL/ APPLICATION CONTROL PVT. LTD
9	BUS DUCT, AIR INSULATED COMPACT RISING MAINS, END FEED UNIT, TAP-OFF BOX (PLUG-IN TYPE)	SCHNEIDER ELECTRIC/ LEGRAND / L&T/RR
10	OUTDOOR BUS TRUNKING	SCHNEIDER ELECTRIC/ RR/ NAXSO BBT
11	HT, LT JOINTING KIT & TERMINATION KIT	REYCHEM / 3M / ABB
12	SOFT STARTERS	SIEMENS/ SCHNEIDER/ ABB / L&T
13	CT, PT	ADVANCE / KAPPA / AE
	<b>UPS</b>	
1	UPS	SCHNEIDER (APC)/ EATON/ EMERSON (VERTIV)/ PEGASUS/ ABB / NUMERIC
	<b>LIGHTING, FIXTURES &amp; FANS</b>	
1	CEILING FAN / EXHAUST FAN / KITCHEN FRESH AIR/ WALL FAN	HAVELLS/ CROMPTON/ USHA /BAJAJ/ ORIENT
2	LED EXIT SIGNAGE	MR. LITE/ PROLITE/ WIPRO/ AGNI
3	A) LED INDOOR LUMINAIRES B) LED DECORATIVE LIGHT LUMINAIRES C) LED STREET LIGHT D) BOLLARDS & OUTDOOR FITTINGS	PHILIPS/ REGENT/ LIGHTING TECHNOLOGY
4	MS DECORATIVE POLE	PHILIPS/ BAJAJ/ HI-LITE/ HAVELLS/ LUSTER/ UTKARSH/ ILEN
5	POLYCARBONATE JUNCTION BOX WITH CONNECTOR	HENSEL / RITTAL/ SCHNIEDER
6	SENSORS & TIMER FOR LIGHT CONTROL	PHILIPS / HONEYWELL / SCHNEIDER ELECTRIC / HAVELLS
	<b>EPABX</b>	
1	IP-PBX SYSTEM / IP PHONE	CISCO / CORAL / TADIRAN
	<b>FIRE ALARM SYSTEM</b>	
1	a) ADDRESSABLE FIRE ALARM CONTROL PANEL b) ADDRESSABLE DETECTORS c) GRAPHIC USER INTERFACE SOFTWARE d) MONITOR & CONTROL MODULE e) RESPONSE INDICATORS f) MANUAL CALL BOXES & HOOTERS g) INPUT /OUTPUT DEVICES	NOTIFIER (HONEYWELL)/ BOSCH/ SCHNEIDER/ EATON/ NOHMI
	<b>PUBLIC ADDRESS SYSTEM</b>	
1	a) PUBLIC ADDRESS SYSTEM CONSOLE AND ALL ACCESSORIES b) P.A. SPEAKERS c) AMPLIFIERS	BOSCH/ BIAMP/ HONEYWELL
	<b>FIRE FIGHTING SYSTEM</b>	
	a) 2-WAY/4-WAY FIRE BRIGADE CONNECTION b) AIR RELEASE VALVE	SAFEX/ NEWAGE/ LIFE GUARD/ EXFLAME

1	c) LANDING VALVE d) BRANCH PIPE e) FIRST AID HOSE REEL AND DRUM f) RRL HOSE PIPE g) FIRE MAN AXE	
2	DIESEL ENGINE (FIRE-FIGHTING)	CUMMINS/ KIRLOSKAR / CATER PILLER
3	FIRE EXTINGUISHERS	CEASEFIRE/ MINIMAX/ NEWAGE / SAFEX / KANEX / EXFLAME
4	FLEXIBLE DROP & FLEXIBLE COUPLINGS	LIFE GUARDS / VICTAULIC/ TYCO
5	a) INSTALLATION CONTROL VALVE b) DELUGE VALVE c) SPRINKLER HEADS	TYCO / VICTAULIC / HD / HONEYWELL
6	SPRINKLER PANEL, CURTAIN SYSTEM PANEL PRESSURE RELEASE VALVE ZONE CONTROL VALVE (ZCV)	TYCO / HONEYWELL / HD
7	ALL FIRE FIGHTING PUMPS	GRUNDFOSS / WILO / MATHER PLATT / KIRLOSKAR
8	ELECTRICAL MOTOR	ABB/ KIRLOSKAR ELECTRIC CO./ SIEMENS INDIA LTD
9	THERMAL INSULATION FOR EXHAUST PIPE	UPTWIGA/ LLOYD INSULATION/ OWENS CORNING/ KIMMCO
10	M.S. FITTINGS	VS / DRP / VICTAULIC / UNIK
11	WELDING RODS	ADORE / ESAB/ MARGLAM
12	BUTTERFLY (MANUAL, GEAR OPERATED) VALVES, NON-RETURN VALVES, SLUICE VALVES Y-TYPE STRAINER FOOT VALVE WITH STRAINER AIR RELEASE VALVE BALL VALVES	AUDCO / ZOLOTO / SANT / HONEYWELL
13	TAMPER SWITCH FOR BUTTERFLY VALVE	HONEYWELL/ POTTER/ RAPID CONTROL/ SYSTEM SENSOR/ PACIFIC FIRE
14	PRESSURE SWITCH FLOW TEST METER	DANFOSS/ INDFOS/ VIKING/ DELTA CONTROL
15	PRESSURE GAUGE LIQUID FILLED	FEIBIG/ H. GURU/ EMERALD/ WAAREE
	<b>HVAC</b>	
1	SPLIT TYPE AC	HITACHI/ MITUSBISHI/ O-GENERAL
2	REFRIGERANT PIPING	MANDEV / MEXFLOW / RR SHRAMIK
3	CLOSED CELL NITRILE RUBBER INSULATION/ EPDM INSULATION	ARMAFLEX /AEROCCELL / ALP
4	INLINE FANS	SYSTEMAIR/ KRUGER/ GREENHECK/ HUMIDIN/ NICOTRAAIR
5	CHILLER	TRAIN/ TROX/ YORK/DAIKEN
6	CHILLER PUMP	ARMSTRONG/ GROUND FOSS/XYLEM
7	AIR HANDLING UNITS/ TREATED FRESH AIR UNITS	SYSTEMAIR/ EDGETECH/ TRANE/ BALANCE/ ZECO / WAVES
8	AIR WASHER	SYSTEMAIR/ EDGETECH / TRANE/ BALANCE/ ZECOW/ WAVES
9	AIR SEPARATOR	XYLEM/ EMERALD/ ANERGY/ KD AGENCIES
10	COOLING TOWERS (CTI/ CERTIFIED)	ADVANCE/ MARLEY/ PAHARPUR/ BELL
11	GI SHEETS DUCTING ETC	SAIL/ TATA/ JINDAL
12	CO2 SENSOR	SCHNEIDER/ HONEYWELL/ SIEMENS
13	PPR PIPE	JINDAL HISSAR / ASTRAL / FUSION
14	CENTRIFUGAL & AXIAL FANS VANE AXIAL IN-LINE FANS AND THEIR MOTORS	KRUGER/ GREENHECK/ NICOTRA/ BALANCE/ TRISTAR WITH MOTOR FROM THEIR APPROVED OEM
15	VIBRATION ISOLATOR RUBBED PAD DUCT SUPPORT ARRANGEMENT	DUNLOP/ RESISTOFLEX/ GERB

16	GRILL DIFFUSER FIRE DAMPERS LOUVERS VOLUME CONTROL DAMPER	SYSTEM AIR/ CARRYAIRE/ COSMOS/ TRISTER / GREENHECK/ BALANCE
17	FLEXIBLE GROOVED FITTINGS COUPLINGS	VICTAULIC/ TYCOGRINNEL/ VIKING
18	PRE-FABRICATED DUCT DUCT FLANGE (WITH GI SHEETS OF MAKES)	ZECO/ ROLLASTAR/ DUCTOFAB/ WAVES
19	VARIABLE FREQUENCY DRIVE	DANFOSS/ ABB / HONEYWELL/ SIEMENS / SCHNEIDER
20	ALUMINUM TAPE	JOHNSON/ BIRLA-3M/ NIPPON INDUSTRIES
	<b>LIFT</b>	
1	LIFT	KONE ELEVATORS INDIA PVT. LTD./ MITSUBISHI / SCHINDLER/ OTIS ELEVATOR/ JHONSON
	<b>SOLAR POWER</b>	
1	POWER CONDITIONING UNIT (PCU)/ SOLAR INVERTERS	ABB FIMER/ SOLAREEDGE/ FRONIUS
2	SOLAR PV PANEL	TATA SOLAR/ WAAREE ENERGY/ADANI SOLAR
	<b>STP/ETP/WTP</b>	
1	PLANT MANUFACTURER	GRANNUS WATER AND ENVIRONMENTAL SOLUTIONS PVT. LTD./ CIMERA ENGINEERS/ SPECTRUM ENGINEERING TECH PVT. LTD. / ION EXCHANGE / ZETA4/ ROHANTA INFRA SOLUTION
2	AIR BLOWER	EVEREST / BETA / ROBUSCHI
3	AIR DIFFUSERS	REHAU / SSI AERATION / MM AQUA
4	RAW SEWERAGE TRANSFER PUMP / SLUDGE RECYCLE PUMP / FILTER FEED PUMP / NON CLOG HORIZONTAL CENTRIFUGAL PUMP/ DE WATERING PUMP / DOSING PUMP/ SBR FEED PUMP/ FILTER FEED PUMP/ SLUDGE PUMP/ CHLORINE DOSING PUMP	ARMSTRONG / XYLEM / GRUNDFOS/ / WILO
5	FILTER PRESS	SACHINFILTECH / PHARMATECH / HITECH
6	TUBE SETTLER MEDIA /MBBR MEDIA	WELBRICK / PHARMATECH / MM AQUA
7	M.S. FILTER	WELBRICK / ION EXCHANGE / ASTHA / THERMAX / ZETA4
8	OZONATOR	CREATIVE/ OZONICS/ ORAPL / CHEMTRONICS / FARADAY
9	NON CLOGG HORIZONTAL SCREW TYPE FILTER PRESS PUMP	ROTO/ POSITIVE/ ROTAMAC/ TUSHACO
10	CENTRIFUGE	APOLLO/ WELBRICK/ GWSPL/ PHARMATECH / GEA
11	PRESSURE GAUGE	H GURU / FEIBIG / GLUCK / BAUMER
12	BUTTERFLY / DUAL PLATE CHECK VALVES	AUDCO / ZOLOTO / ADVANCE / CASTLE / SANT
13	PLC	DELTA/ SIEMENS/ SCHNEIDER
	<b>AUDIO-VIDEO</b>	
1	LED VIDEO WALL / LED DISPLAY	SAMSUNG/LG/ PANASONIC / SONY
2	PROJECTOR	CHRISTIE / BARCO / NEC / PANASONIC
3	WIRELESS AND WIRED MICROPHONE BOUNDARY MICROPHONE GOOSNECK MICEOPHONE WIRELESS CHARGER FOR WIRELESS GOOSNECK MICEOPHONE ANTENNA & SPLITTER/ COMBINER	SHURE / SENNHEISER / AUDIO TECHNICA
4	DIGITAL PODIUM	AHA/ UNI/ MAXHUB/ TECCOM
5	NETWORK VIDEO ENDPOINT	QSC/KRAMER/EXTRON/ LIGHTWARE/ CRESTRON/ LUMENS
	FULL RANGE CEILING SPEAKERS 2 WAY	QSC/ BOSE / TW AUDIO

6	SPEAKER – TYPE 1 & 2 SUBWOOFER SURROUND SPEAKER PASSIVE COLUMN ARRAY LOUDSPEAKER – TYPE 1 & 2	
7	AMPLIFIER	QSC/ LAB GRUPPEN / POWER SOFT
8	DIGITAL SIGNAL PROCESSOR	QSC/ BOSE / SYMETRIX
9	DIGITAL IP BASED CHAIRMAN UNIT DIGITAL IP BASED DELEGATE UNIT WIRELESS DELEGATE UNIT WIRELESS CHAIRMAN UNIT WIRELESS CONFERENCE CONTROLLER	SENNHEISER/ SHURE / TELVIC
10	MATRIX SWITCHER DISTRIBUTION AMPLIFIER, TRANSMITTER & RECEIVER	LIGHTWARE/ EXTRON/ CRESTRON
11	TABLE MOUNT ENCLOSURE	KRAMER/CRESTRON/ LOGIC
12	PTZ CAMERAS	SONY/ LUMENS/ QSC/ PANASONIC
13	RECORDER & STREAMING SYSTEM	LUMENS/ MEDIA POINTE/ PANASONIC/ SONY
14	CONTROL TOUCH PANEL AND CONTROL SYSTEM	CRESTRON/QSC/EXTRON
15	SPEAKER & MICROPHONE CABLE	KRAMER / BELDONE / KRYSTAL
	CONTROL CABLE	
16	HDMI CABLE ACTIVE USB CABLE	CRESTRON/ EXTRON/ LIGHTWARE
17	VIDEO CONFERENCE SYSTEM	CISCO/ POLYCOM/ CRESTRON
	<b>CCTV</b>	
1	PTZ, BULLET, DOOM CCTV CAMERA NVR	AXIS / HONEYWELL ENTERPRISES/ MOBOTIX IMPULS
	<b>BOOM BARRIER</b>	
1	BOOM BARRIER	DESIGNA / NEPTUNE / GODREJ
	<b>FIRE SUPPRESSION SYSTEM</b>	
1	FIRE SUPPRESSION SYSTEM	SVS BUILDWELL/ SAFEX / LIFEGUARD
	<b>EV Charging</b>	
1	EV charging	ABB/SCHNEIDER/NEPTUNE
	<b>ACCESS CONTROL SYSTEM</b>	
1	ACCESS CONTROL SYSTEM	SIEMENS/ SCHNEIDER/ GODREJ/HONEYWELL/ BOSCH
	<b>BIKE PARKING</b>	
1	BIKE PARKING SYSTEM	iPARK/ TAR PARKING/
	<b>BUILDING MANAGEMENT SYSTEM(BMS)</b>	
1	CENTRAL CONTROL BMS SERVER	IBM/ HP/ DELL/ SIEMENS / DELTA/ HONEYWELL EBI/ SCHNEIDER / CARRIER ALC
2	PRINTER	HP/ CANON/ EPSON
3	BUILDING MANAGEMENT SYSTEM	SIEMENS/ CARRIER ALC/ HONEYWELL EBI/ DELTA/ SCHNEIDER
4	BUILDING MANAGEMENT WEB BASED SERVER SOFTWARE	SIEMENS/ CARRIER ALC/ HONEYWELL EBI/ DELTA/ SCHNEIDER
5	PROGRAMMABLE & APPLICATION SPECIFIER CONTROLLER (DDC)	SIEMENS/ CARRIER ALC/ HONEYWELL COMFORT POINT/ DELTA/ SCHNEIDER
6	SYSTEM INTERGRATION UNITS FOR 3RD PARTY SOFTWARE INTEGRATION	SIEMENS/ CARRIER ALC/ HONEYWELL COMFORT POINT/ DELTA/ SCHNEIDER
7	ENCLOSURE FOR DDC CONTROLLER	RITTAL/ SIEMENS/ BCH/ DELTA
	<b>SENSOR &amp; FIELD DEVICES</b>	
8	IMMERSSION TYPE TEMPERATURE SENSORS	SIEMENS/ HONEYWELL COMFORT POINT/ALC/ DELTA
9	ULTRASONIC BTU METER/FLOW METER	SIEMENS/ HONEYWELL/ BELIMO/ DELTA
10	OUTSIDE T+RH SENSOR	SIEMENS/ HONEYWELL COMFORT POINT/ALC/ DELTA

11	DIFFERENTIAL PRESSURE SWITCH AIR	SIEMENS/ HONEYWELL COMFORT POINT/ ALC/ DELTA
12	DIFFERENTIAL PRESSURE SWITCH WATER	SIEMENS/ HONEYWELL/ DWYER/ DELTA
13	DIFFERENTIAL PRESSURE SENSOR- AIR/WATER	SIEMENS/ HONEYWELL COMFORT POINT/ ALC/ DELTA
14	ROOM/DUCT TYPE TEMP SENSOR	SIEMENS/ HONEYWELL COMFORT POINT/ ALC/ DELTA
15	ROOM/DUCT TYPE TEMP + RH SENSOR	SIEMENS/HONEYWELL COMFORT POINT/ ALC/ DELTA
16	PRESSURE SENSOR WATER	SIEMENS/HONEYWELL COMFORT POINT/ ALC/ DELTA
17	CO2 SENSOR/VOC SENSOR/ PM2. 5&10	SIEMENS/HONEYWELL COMFORT POINT/ ALC/ DELTA
18	WATER LEVEL SWITCHES	VEKSLER/ FLIPRO/ OMICRON/ DWYER
19	FLAME PROOF LEVEL TRANSMITTER	VEKSLER/ FLIPRO/ OMICRON/ DWYER
20	DC VOLTAGE / CURRENT/ POWER FACTOR TRANSDUCER	L&T/ABB/ DWYER/ MECO
21	CURRENT RELAY	L&T/ABB/ DWYER/ MECO
22	VFD DRIVES	SCHNEIDER/ SIEMENS/ ALLEN BRADLEY
	<b>WIRING &amp;CONDUCTING</b>	
23	SIGNAL CABLE, PVC INSULATED, TINNED COPPER	POLYCAB/ SKYTON/ FINOLEX/ BONTON/ LAPP
24	LAN CABLE	BELDEN/ MOLEX/ PANDUIT
25	NETWORKING PASSIVE	PANDUIT/ AVAYA/ LEGRAND/ HP
26	NETWORKING ACTIVE	CISCO/ HP/ JUNIPER/ EXTREME/ AVAYA/
27	LAN PASSIVE (CABLE /IO'S/ PATCH CORDS/ FACE PLATE/ JACK PANEL) & OFC COMPONENTS	LEVITON/ SYSTIMAX/ PANDUIT/ POLYCOM / LEGRAND
28	CONTROL SOFTWARE, CONTROLLERS	HONEYWELL / SCHNEIDER ELECTRIC /SIEMENS / ALC/ SAUTER/ JOHNSON CONTROL
29	TEMP GAUGE, PRGAUGE, FLOW SWITCH, PR SWITCH, ACTUATORS, ROOM THERMOSTAT, HUMIDSTAT, WATER FLOW METER, HARDNESS ANALYSER, PH, CHLORINE, TDS,CO,CO2 SENSORS ETC.	HONEYWELL/ SCHNEIDER ELECTRIC /SIEMENS / JOHNSON CONTROL/ KELE/ VEKSLER/ L&T/ DANFOSS/GE/ TRANE/ AZBIL

**Note:** The articles/materials which are not mentioned in the above said list shall be approved by the NIT approving authority before execution of work.

# **SCHEDULE OF QUANTITY FOR ELECTRICAL WORK**

## SCHEDULE OF QUANTITY (E&M WORK)

**Name of Work : Construction of Integrated Regional Office at Chennai.**

Sl. No.	Item Description	Qty.	Unit	Rate	Amount
	<b>Sub-Head:-I (Internal Electrical Works)</b>				
	<b>A- WIRING</b>				
1	Wiring for light point/ fan point/ exhaust fan point/ call bell point with 1.5 sq.mm FRLS/HFFR PVC insulated copper conductor single core cable in surface/ recessed steel conduit, with modular switch, modular plate, suitable GI box and earthing the point with 1.5 sq.mm. FRLS/HFFR PVC insulated copper conductor single core cable etc as required.				
a	Group C	404	Point	2101	848804
2	Wiring for group controlled (looped) light point/fan point/exhaust fan point/ call bell point (without independent switch etc.) with 1.5 sq. mm FRLS/HFFR PVC insulated copper conductor single core cable in surface/ recessed steel conduit, and earthing the point with 1.5 sq. mm FRLS/HFFR PVC insulated copper conductor single core cable etc. as required.				
a	Group C	234	Point	1246	291564
3	Wiring for light/ power plug with 2X4 sq. mm FRLS/HFFR PVC insulated copper conductor single core cable in surface/ recessed steel conduit along with 1 No 4 sq. mm FRLS/HFFR PVC insulated copper conductor single core cable for loop earthing as required.	1 056	Metre	480	506880
4	Wiring for light/ power plug with 4X4 sq. mm FRLS/HFFR PVC insulated copper conductor single core cable in surface/ recessed steel conduit along with 2 Nos 4 sq. mm FRLS/HFFR PVC insulated copper conductor single core cable for loop earthing as required.	150	Metre	724	108600
5	Wiring for circuit/ submain wiring along with earth wire with the following sizes of FRLS/HFFR PVC insulated copper conductor, single core cable in surface/ recessed steel conduit as required				
a	2 x 1.5 sq.mm. + 1 x 1.5 sq.mm. earth wire.	300	Metre	370	111000
b	2 X 2.5 sq. mm + 1 X 2.5 sq. mm earth wire	3 100	Metre	414	1283400
c	2x10 sq. mm + 1 x 6 sq. mm earth wire	100	Metre	778	77800
d	4 X 6 sq. mm + 2 X 6 sq. mm earth wire	100	Metre	1001	100100
e	4 X 10 sq. mm + 2 X 6 sq. mm earth wire	100	Metre	1253	125300



f	4 X 16 sq. mm + 2 X 6 sq. mm earth wire	100	Metre	1760	176000
6	Supplying and fixing of following sizes of steel conduit along with accessories in surface/recess including painting in case of surface conduit, or cutting the wall and making good the same in case of recessed conduit as required.				
a	20 mm	2 000	Metre	254	508000
b	25 mm	1 650	Metre	289	476850
c	32 mm	300	Metre	360	108000
7	Supplying and fixing following size/modules, GI box alongwith modular base & cover plate for modular switches in recess etc. as required.				
a	1 or 2 Module (75 mm x 75 mm) (For Telephone, Data, TV Outlets)	264	Each	354	93456
8	Supplying and fixing suitable size GI box with modular plate and cover in front on surface or in recess, including providing and fixing 3 pin 5/6 A modular socket outlet and 5/6 A modular switch, connections etc. as required.(Raw power)	197	Each	545	107365
9	Supplying and fixing suitable size GI box with modular plate and cover in front on surface or in recess, including providing and fixing 2 Nos. 3 pin 5/6 A modular socket outlet and 2 Nos. 5/6 A modular switch, connections etc. as required. (For light plugs to be used in non residential buildings). (UPS workstations)	129	Each	757	97653
10	Supplying and fixing suitable size GI box with modular plate and cover in front on surface or in recess, including providing and fixing 6 pin 5/6 A & 15/16 A modular socket outlet and 15/16 A modular switch, connections etc. as required.	132	Nos.	659	86988
11	Supplying and fixing following modular switch/ socket on the existing modular plate & switch box including connections but excluding modular plate etc. as required.				
a	TV antena Socket Outlet	6	Each	168	1008
12	Supplying and drawing co-axial TV cable RG-6 grade, 0.7 mm solid copper conductor PE insulated, shielded with fine tinned copper braid and protected with PVC sheath in the existing surface/ recessed steel/ PVC conduit as required.	150	Meter	54	8100
13	Supplying and fixing modular blanking plate on the existing modular plate & switch box excluding modular plate as required.	50	Each	47	2350

14	Supplying and fixing 20 A, 415 V, TPN Industrial type socket outlet, with 4 pole and earth, metal enclosed plug top alongwith 20 A "C" curve, TPMCB, in sheet steel enclosure, on surface or in recess, with chained metal cover for the socket out let and complete with connections, testing and commissioning etc. as required.	5	Each	2773	13865
	<b>B- LIGHT AND FANS</b>				
15	LED Batten light (System lumen efficacy $\geq 105 < 120$ lm/Watt) Supplying, installation, Testing & Commissioning of LED surface mounted Batten light of following body material and construction as per IS : 10322 with driver (Replaceable) as per the requirement with Driver efficiency $> 85\%$ ,Operating voltage AC 140-270 Volt, freq 50/60 Hz, Operating temp range -5 deg to 40 deg centigrade, internal surge protection of 2.5 KV with Short & Open circuit protection ,THD $< 10\%$ , P. F. $\geq 0.95$ , IP20, CRI $> 80$ , Flicker free, (flicker should be below 5 %), life time (LED,Driver & electrical circuitary), of minimum 50000 Burning Hours with , 70% of initial Lumen maintained till life ends, CCT 3000°K / 4000°K / 5700°K /6500°K (As per ANSI Bin), SDCM(Standard Deviation Color Matching) $< 3$ , Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard and trade mark certificate (T.C.). Manufactures Word Mark/ Name Engraved/ Embossing/ Screen printing on housing. complete in all respect i/c external connections with 1.5 sq mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty. System lumen efficacy $\geq 105 < 120$ lm/Watt output . LM79 & LM80 Test report and all testing required for LED fixtures as per BIS shall be submitted. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above 90°C). Powder coated die cast /Extruded aluminium Body (Thickness $> 1.20$ mm)				
a	18- 22 Watt	98	Nos.	681	66738
16	LED Down lighter (COB Type) (System lumen efficacy $\geq 120$ lm/Watt) Supplying, installation, Testing & Commissioning of LED Recessed/surface Down lighter				

	(Round / square/ Rectangular) COB Type of following body material and construction as per IS : 10322 with driver as per the requirement with Driver efficiency >85%, Operating voltage AC 140-270 Volt, freq 50/60 hz, Operating temp range -5 deg to 40 deg centigrade, internal surge protection of 2.5 KV with Short & Open circuit protection ,THD < 10% , P. F.≥0.95, IP20, CRI >80 , UGR (Unified Glare Rating) < 19, Flicker free (flicker should be below 5 %), life time (LED,Driver & electrical circuitary), life time of minimum 50000 Burning Hours with , 70% of initial Lumen maintained till life ends , CCT 3000°K / 4000°K / 5700°K /6500°K (As per ANSI Bin), SDCM(Standard Deviation Color Matching) <3, Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard and trade mark certificate ( T.C.). Manufactures Word Mark/ Name Engraved/ Embossing/ Screen printing on housing. OEM must have its own in house NABL lab setup for all testing facilities for LED fixtures. "complete in all respect i/c external connections with 1.5 sq mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty. System lumen efficacy ≥120 <135 lm/Watt output . LM79 & LM80 Test report and all testing required for LED fixtures as per BIS shall be submitted Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above 90°C). Powder coated die cast /Extruded aluminium Body including trim with Aluminium Reflector				
a	12 -15 watt	69	Nos.	1187	81903
b	18 Watt	201	Nos.	1470	295470
17	LED Panel light 2x2 ft., (System lumen efficacy ≥135 lm/Watt) Supplying, installation, Testing & Commissioning of Panel light 2x2 ft., of following body material and construction as per IS : 10322 with driver as per the requirement with Driver efficiency >85%, Operating voltage AC 140-270 Volt, freq 50/60 Hz, Operating temp range -5 deg to 40 deg centigrade, internal surge protection of 2.5 KV with Short & Open circuit protection,THD < 10% , P. F.≥0.95, IP20, CRI ≥80, UGR				

	(Unified Glare Rating) < 19, Flicker free, (flicker should be below 5 %), life time (LED, Driver & electrical circuitary), of minimum 50000 Burning Hours with , 70% of initial Lumen maintained till life ends ,CCT 3000°K / 4000°K / 5700°K /6500°K (As per ANSI Bin), SDCM(Standard Deviation Color Matching) <3, Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard and trade mark certificate (T.C.). Manufactures Word Mark/ Name Engraved/ Embossing/ Screen printing on housing. complete in all respect i/c external connections with 1.5 sq mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty. System lumen efficacy $\geq 135$ lm/Watt output. LM79 & LM80 Test report and all testing required for LED fixtures as per BIS shall be submitted. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above 90°C). Powder coated die cast /Extruded aluminium Body (Thickness > 1.20 mm)				
a	36 watt	139	Nos.	3997	555583
18	Supply, Installation, Testing and Commissioning of extruded aluminium housing LED 9W to 10 W mirror light suitable for surface and wall maunting application. with Efficacy not less than 100 lm/watt, PF>0.90 , CRI $\geq$ 80, 4000/6500K CCT and Min. including connections with 1.5 Sqm FRLS PVC insulated copper conductor single core cable, earthing etc. as required, with 5 years on site warranty.	27	Nos.	660	17820
19	Supplying, Installation, Testing and Commissioning of 250mm sweep Fresh Air Fan with PVC Body suitable for operation at single phase 230 V 50Hz supply complete etc. as required at site.	28	Nos.	2218	62104
20	Supplying, Installation, Testing and Commissioning of 400 mm dia Wall Mount fan having 1350 RPM, Min. Air delivery 70 cubic per minute with PVC Body suitable for operation at single phase 230 V 50Hz supply complete etc. as required at site.	76	Nos.	3247	246772
	<b>C- Distribution Boards</b>				

19	Supplying and fixing following way, single pole and neutral, sheet steel, MCB distribution board, 240 V, on surface/ recess, complete with tinned copper bus bar, neutral bus bar, earth bar, din bar, interconnections, powder painted including earthing etc. as required. (But without MCB/RCCB/Isolator)				
a	12 way , Double door	5	Nos.	2871	14355
b	18 way , Double door	1	Nos.	3056	3056
20	Supplying and fixing following way, horizontal type three pole and neutral, sheet steel, MCB distribution board, 415 V, on surface/ recess, complete with tinned copper bus bar, neutral bus bar, earth bar, din bar, interconnections, powder painted including earthing etc. as required. (But without MCB/RCCB/Isolator)				
a	6 Way (4+18), Double Door	17	Nos.	5299	90083
b	4 way (4 + 12), Double door	2	Nos.	4377	8754
21.0	Supplying and fixing of following ways surface/ recess mounting, vertical type, 415 V, TPN MCB distribution board of sheet steel, dust protected, duly powder painted, inclusive of 200 A tinned copper bus bar, common neutral link, earth bar, din bar for mounting MCBs (but without MCBs and incomer ) as required . (Note : Vertical type MCB TPDB is normally used where 3 phase outlets are required.)				
a	8 Way (4+24), Double Door	6	Nos.	10724	64344
22.0	Supplying and fixing Cable End Box (Loose Wire Box) suitable for following single pole and neutral, sheet steel, MCB distribution board, 240 Volts, on surface/ recess, complete with testing and commissioning etc. as required.				
a	For 10 Way, Double Door SPN MCB DB	5	Nos.	895	4475
23.0	Supplying and fixing Cable End Box (Loose Wire Box) suitable for following triple pole and neutral, sheet steel, MCB distribution board, 415 Volts, on surface/ recess, complete with testing and commissioning etc.as required.				
a	For 6 Way, Double Door TPN MCB DB	19	Nos.	1223	23237
b	For 8 Way, Double Door TPN MCB DB	6	Nos.	1448	8688
24	Supplying and fixing 5 A to 32 A rating, 240/415 V, 10 kA, "C" curve, miniature circuit breaker suitable for inductive load of following poles in the existing MCB DB complete with connections, testing and commissioning etc. as required.				
a	Single pole	370	Nos.	285	105450

b	Double pole	13	Nos.	696	9048
c	Triple pole Neutral	7	Nos.	1301	9107
d	Triple pole	45	Nos.	1070	48150
25	Supplying and fixing following rating, double pole, 240 V, isolator in the existing MCB DB complete with connections, testing and commissioning etc. as required.				
a	40 Amp	21	Nos.	472	9912
b	63 Amps	1	Nos.	569	569
26	Supplying and fixing of following rating, 240/415 volts, "C" curve, four pole miniature circuit breaker suitable for inductive load of following poles in the existing MCB DB complete with connections, testing and commissioning etc. as required.				
a	40A to 63A FP MCB	18	Nos.	1839	33102
27	Supplying and fixing following rating, double pole, (single phase and neutral), 240 V, residual current circuit breaker (RCCB), having a sensitivity current 30 mA in the existing MCB DB complete with connections, testing and commissioning etc. as required.				
a	40 Amp	18	Each	2512	45216
b	25 Amps	18	Each	2141	38538
28	Supplying and fixing single pole blanking plate in the existing MCB DB complete etc. as required.	50	Nos.	14	700
	<b>Lighting Automation</b>				
29	Supplying, Installation, Testing and commissioning of Passive Infrared (PIR) technology based occupancy sensor having high performance, non regulating programmable type, suitable for connected load upto 10Amp , for mounting height up to 3 meter and for 5 m diameter coverage area along with necessary fixing arrangements i/c programming at site etc. complete as required.	60	Nos.	4896	293760
30	Supplying, Installation, Testing and commissioning of Passive Infrared (PIR) technology based occupancy sensor with day light dimming(lightning level shall be regulated as per availability of natural day light in an area along with occupancy detection.) having high performance, regulating programmable type, suitable for connected load upto 10Amp , for mounting height up to 3 mtr and for 5 m diameter coverage area along with necessary fixing arrangements i/c programming at site etc. complete as required.	20	Nos.	9670	193400

	<b>Total Sub Head:- I</b>				<b>7463417</b>
	<b>Sub-Head:- II (Earthing &amp; Lighting Conductor)</b>				
1	Earthing with copper earth plate 600 mm X 600 mm X 3 mm thick including accessories, and providing masonry enclosure with cover plate having locking arrangement and watering pipe of 2.7 metre long etc. with charcoal/ coke and salt as required.	8	Nos	15004	120032
2	Earthing with G.I. earth plate 600 mm X 600 mm X 6 mm thick including accessories, and providing masonry enclosure with cover plate having locking arrangement and watering pipe of 2.7 metre long etc. with charcoal/ coke and salt as required.	24	Nos	8351	200424
3	Providing and fixing 25 mm X 5 mm copper strip in 40 mm dia G.I. pipe from earth electrode including connection with brass nut, bolt, spring, washer excavation and re-filling etc. as required.	250	Metre	1638	409500
4	Providing and fixing 25 mm X 5 mm G.I. strip in 40 mm dia G.I. pipe from earth electrode including connection with G.I. nut, bolt, spring, washer excavation and re-filling etc. as required.	150	Metre	755	113250
5	Providing and fixing 25 mm X 5 mm copper strip on surface or in recess for connections etc. as required.	50	Metre	1246	62300
6	Providing and fixing 25 mm X 5 mm G.I. strip on surface or in recess for connections etc. as required.	300	Metre	287	86100
7	Providing and fixing 6 SWG dia G.I. wire on surface or in recess for loop earthing as required.	100	Metre	84	8400
8	Providing and fixing 6 SWG dia G.I. wire on surface or in recess for loop earthing along with existing surface/ recessed conduit/ submain wiring/ cable as required.	100	Metre	50	5000
9	Providing and fixing of lightning conductor finial, made of 25 mm dia 300 mm long, G.I. tube, having single prong at top, with 85 mm dia 6 mm thick G.I. base plate including holes etc. complete as required.	6	Each	609	3654
10	Jointing copper / G.I. tape (with another copper/ G I tape, base of the finial or any other metallic object) by riveting / nut bolting/ sweating and soldering etc as required.	100	Each	139	13900
11	Providing and fixing G.I. tape 20 mm X 3 mm thick on parapet or surface of wall for lightning conductor complete as required.(For horizontal run)	250	Metre	148	37000



12	Providing and fixing G.I. tape 20 mm X 3 mm thick on parapet or surface of wall for lightning conductor complete as required.(For vertical run)	150	Metre	238	35700
13	Providing and fixing testing joint, made of 20 mm X 3 mm thick G.I. strip, 125 mm long, with 4 nos. of G.I. bolts, nuts, chuck nuts and spring washers etc. complete as required.	6	Each	140	840
14	Providing and laying G.I. tape 32 mm X 6 mm from earth electrode directly in ground as required.	100	Metre	221	22100
	<b>Total Sub Head:- II</b>				<b>1118200</b>
	<b>Sub Head:- III (Sub station equipment)</b>				
	<b><u>High Side</u></b>				
<b>1</b>	<b>11 KV HT PANEL</b>				
	Supplying, installation, testing & commissioning of indoor type floor mounted metal clad, 11 KV VCB panel totally enclosed & fully interlocked, horizontal drawout, horizontal/ vertical isolation type breaker as per IS 13118, as amended up to date and additional specifications, having capacities as mentioned below, single break, trip free mechanism, motorised/manually charged and auto/manually closing breaker suitable for use on 11 KV, 3 phase, 50Hz AC supply with short circuit fault level of 350 MVA, complete with self contained, fully interlocked, rack in and rack out mechanism, air insulated but encapsulated copper bus bars of 630 Amps capacity, breaker featured with mechanical ON/OFF indicator with hand trip device, spring release coil, shunt trip coil, auxiliary relay (for tripping through RTT of Transformer) and auxiliary switch of 4 NO + 4 NC, suitable capacity power pack and equipped with following switchgears and accessories i/c connections suitable up to 3 x 240 sq.mm XLPE 11KV cable (cable entry from bottom), etc. as required. (Note-Cost of end termination not included in this item) .				
	<b>a) Incoming- 1 No.630 A VCB</b>				
	b) 1No. -11KV/110Volts PT Class 0.5 accuracy and 100 VA burden with 1 No. Voltmeter (0-15KV), digital type, selector switch for voltmeter and protection fuses/MCB for HT metering upto 12 KV on incomer.				

	c) 1 No. (0-100A) dual scale Ammeter, digital type, selector switches for ammeters.				
	d) 1 No. Microprocessor based numerical relay with O/L, E/F and S/C protection.				
	e) 1 No. set of dual core dual ratio 3 CTs 100/50/5/5A of 15VA burden and accuracy Class-1.0 for metering and class 5P10 for protection.				
	<b>a) Outgoing - 2 Nos. 630A VCB.</b>				
	b) 2 Nos. - (0-75A) Ammeters, dual scale digital type & selector switches for Ammeters.				
	c) 2 Nos.. – Microprocessor based numerical relays with O/L, E/F & S/C protections.				
	d) 2 Nos. - set of dual core dual ratio 3 CTs 60/30/5/5A of 15VA burden and accuracy Class-1.0 for metering and class 5P10 for protection.				
	e) 1set of 24 V DC power system for control including 2x65 AH SMF Batteries.	1	Set	2177961	2177961
2	<b>Dry type transformer</b>				
	Supply, installation, testing and commissioning of following capacity (continuous loading) 11/0.433 KV Delta/Star, step down, 3 Phase, 50 Hz, Dyn 11 vector group, Cast Resin / VPI (vacuum pressure impregnated) Dry Type, copper wound transformer(Electrolytic grade 99.9% pure copper, Core made of first grade Cold Rolled Grain Oriented (CRGO) Core grade MOH or better) AN (air natural) cooled transformer suitable for indoor applications with Offload Tap Changer/ On Load Tap Changer (OLTC) ( upto 500 KVA offload and above 500 KVA On Load Tap Changer) on HV side having AVR relay and Remote Tap Changer Control (RTCC) for automatic sensing of incoming voltage, automatic operation of OLTC and facility for remote and manual operation of				
	OLTC HV side in range of +5% to -15% in steps of 2.5%, insulation class F (minimum), suitable for environment conditions class E4, suitable for fire behaviour class F1, climate class-C1, having cable endboxes on HV side suitable for 3x300 sqmm XLPE cable of 11 KV grade with necessary hardware, clamps, lugs etc. for termination on HV/MV etc. for				

	all transformers, bus trunking arrangement on LV side complete with all accessories and safety provisions as per relevant IS Code ,The transformer shall be provided with standard fittings/accessories as per relevant IS and mentioned below, protection alarm/trip protection, 3 nos. of Polymeric Zinc Oxide surge Arrestors on HV Side. Winding Temperature scanner				
	(Digital) with alarm/Trip contacts with RTD Sensors per LV winding and space for mounting differential protection CT's in LV chamber with neutral brought out separately including supplying and laying of copper conductor multicore control cable from transformer to HT breaker/HT Panel for safety tripping, complete as confirming to IS-2026 Part-11, i/c supplying and grouting of suitable M.S. Channel with all accessories ,complete in all respects as required at site as per CPWD specifications. Design ambient condition : a) air temperature 50 0C, b) Relative Humidity 90 % Max, c) Seismic Zone as per location of site, d) Altitude as per location/site. The transformer should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location, rating plate as per relevant IS Code etc. All testing shall as per relevant IS Code. Noise level Shall not exceed limits as per NEMA TR-1 with all accessories running measured as per IEC551/ NEMA Standard. Fitting and				
	Relative Humidity 90 % Max, c) Seismic Zone as per location of site, d) Altitude as per location/site. The transformer should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location, rating plate as per relevant IS Code etc. All testing shall as per relevant IS Code. Noise level Shall not exceed limits as per NEMA TR-1 with all accessories running measured as per IEC 551/ NEMA Standard.				

	Fitting and Accessories : The following fittings shall be provided:- a) Two earthing terminals with the earthing symbol b) Rating and terminal marking plates; c) Thermometer pocket with cap; d) Lifting lugs for the complete transformer as well as for core and winding assembly; e) Bi-directional flat rollers (for transformers above 200 kVA); f) HV side neutral grounding strip (where one of the HV bushing terminal is connected to earth); g) Arcing horns or suitable rating lightning arrestors for HT side – 3 Nos. for transformers up to 200 kVA; h) Bird guard; i) Jacking pads (for transformer above 1 600 kVA); j) Name Rating & Diagram Plate. k) Monogram Plate.i) 177				
	Additional neutral separately brought out on bushing for earthing. Level 3				
	<b>500 KVA (losses at 50% loading &lt; 1600watt, losses at 100% loading &lt; 4750watt)</b>	2	2	1162515	2325030
	<b>HT CABLE</b>				
3	Supplying of one number Earthed armoured Aluminium conductor XLPE power cable of 11 KV grade confirming to IS:7098 (Part-II)1985 as amended up to date.				
a	3 core 240 sq. mm Al arm (E)	150	Mtr.	2418	362700
4	Supplying and laying of following size DWC HDPE pipe ISI marked along with all accessories like socket, bend, couplers etc. conforming to IS 14930, Part II complete with fitting and cutting, jointing etc. direct in ground (75 cm below ground level) including excavation and refilling the trench but excluding sand cushioning and protective covering etc., complete as required.				
a	120 mm dia (OD-120 mm & ID-103 mm nominal)	100	Mtr.	417	41700
5	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 11 KV grade of following size in the existing RCC/ HUME/ METAL pipe as required.				
a	Above 120 sq. mm and upto 400 sq. mm	100	Mtr.	170	17000

6	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 11 KV grade of following size in the existing masonry open duct as required.				
a	Above 120 sq. mm and upto 400 sq. mm	50	Mtr.	146	7300
7	supplying and making indoor cable end termination with heat shrinkable jointing kit complete with all accessories including lugs suitable for following size of 3 core, XLPE aluminium conductor cable of 11 KV grade as required				
a	240 sq. mm	8	Set	17414	139312
8	Supplying and fixing cable route marker with 10 cm X 10 cm X 5 mm thick G.I. plate with inscription there on, bolted /welded to 35 mm X 35 mm X 6 mm angle iron, 60 cm long and fixing the same in ground as required.	10	Nos.	598	5980
9	<b>(MAIN L.T PANEL)</b>				
	<b><u>Main LT panel in substation - IEC: 61439 compliant type tested panels</u></b>				
	Supply, Installation, testing and commissioning of Cubical type Main Distribution Board made out of 2mm thick Sheet Steel, totally enclosed, IP 54 protection, free standing, floor mounted, dust & vermin proof, indoor type, compartmentalised, powder coated of approved shade after antirust treatment with Nine tanks process suitable for operation on 3 Phase and neutral, 415V, 50 Hz AC supply system with copper busbar, interconnection with suitable size of copper lead/ solid Copper Strips, control circuits, rotary operating handle for MCCBs & suitable spreader terminals for cable connection according to size, bottom base channel of MS section not less than 100 x 50 x 5 mm (Thick), Fabrication shall be done in transportable sections, entire panel shall have a common earth bus bar at rear with 2 nos earth stud, cable alleys, cable gland plates in two half complete as required, as per Single Line Diagram and specification enclosed with the following switchgears. (The panel shall be TTA)				
	<b>Incomer from 500KVA Transformer</b>				

	2 Nos. X 800A 4Pole EDO ACB, 50KA with microprocessor based release for over current with different time settings, short circuit with time delay & earth fault release with time delay, instantaneous setting and with communication module (MODBUS) . Suitable links to terminate 4 nos of AL. Arm. XLPE cables. ON/OFF/TRIP indication shall be wired through potential free contact up to terminal strip of breaker for hooking to BMS. Each incomer shall have following.				
	<b>Each Transformer incomer shall be provided the followings:</b>				
	1 No. Digital Voltmeter with selector switch.				
	1 No. Digital Ammeter with selector switch.				
	1 No. digital multi function meter to display F, PF, kW, kVA, kVAR, kWh, kVAh, kVARh, THD, Phase angles, Power demand parameters.				
	3 No. phase indicating lamps to show the incoming power with control 2A HRC fuse/back up MCBs				
	3 Nos. indicating lamps for ACB on/ off/ trip position.				
	1 No. reverse power relay with matching cast resin CTs				
	1 no. 3 phase voltage monitoring relay cum phase sequence meter				
	1 No. Low- set standby earth fault relay connected to neutral CT of transformer				
	1 No. Restricted earth fault relay (REF) /differential protection relay connected to neutral CT & mains CT of transformer with facility of primary trip with necessary ancillary relays like master trip element etc.				
	Necessary Current transformers of suitable burden and for metering and protections as above				
	<b>Incomer from 250KVA DG SET</b>				
	1 Nos. X 630A 4Pole EDO ACB, 50KA with microprocessor based release for over current with different time settings, short circuit with time delay & earth fault release with time delay, instantaneous setting and with communication module (MODBUS) . Suitable links to terminate 4 nos of AL. Arm. XLPE cables. ON/OFF/TRIP indication shall be wired through potential free contact up to terminal strip of breaker for hooking to BMS. Each incomer shall have following.				
	<b>Each DG incomer shall be provided the</b>				

	<b>followings:</b>				
	1 No. Digital Voltmeter with selector switch.				
	1 No. Digital Ammeter with selector switch.				
	1 No.digital multi function meter to display F, PF, kW, kVA, kVAR, kWh, kVAh, kVARh, THD, Phase angles, Power demand parameters.				
	3 No. phase indicating lamps to show the incoming power with control 2A HRC fuse/back up MCBs				
	3 Nos. indicating lamps for ACB on/ off/ trip position.				
	1 No. reverse power relay with matching cast resin CTs				
	1 no. 3 phase voltage monitoring relay cum phase sequence meter				
	1 No. Low- set standby earth fault relay connected to neutral CT of transformer				
	1 No. Restricted earth fault relay (REF) /differential protection relay connected to neutral CT & mains CT of transformer with facility of primary trip with necessary ancillary relays like master trip element etc.				
	Necessary Current transformers of suitable burden and for metering and protections as above				
	<b>Incomer from solar Panel</b>				
	<b>INCOMER</b>				
	1 No. 400A FP MCCB, 36 kA breaking capacity. microprocessor release with O/L, S/C & inbuilt E/F protection and adjustable setting and with rotary handle				
	<b>METERING &amp; INDICATION</b>				
	1 set of R,Y,B phase indicating lamps				
	1 Sets - Multi function meter with 3 suitable ratio CTs with Class - 0.5 accuracy and HRC fuse protection for measuring Volt, Amps, P.F, KVA, KW, KVAR etc				
	1 No. 3 phase and neutral, neutral to earth (minimum 4 mode) surge suppressor for 50KA along with necessary fuses.				
	<b>Interlocking for incomer EB &amp; DG ACBs &amp; bus coupler.</b>				
	The 800 Amps ACB from transformer and 630A ACB from DG and 800A bus couplers shall be electrically interlocked through advance contacts. These circuit breakers shall have 'ready to close feature' suitable for automatic change over of Mains/ DG supply as per signal from line voltage monitoring relays )				



	<b>Bus Couplers</b>				
	1 number of 800A 4 pole EDO ACB, 50KA as bus coupler. Necessary contacts shall be wired upto terminal strip for breaker ON/OFF/TRIP, providing potential free contact ON/OFF/TRIP for status monitoring in BMS.				
	<b>Bus Bar Section</b>				
	A set of TPN Aluminium bus bar rated for 1000A, 50kA (after considering all necessary deratings) 3 phase 4wire, 50Hz. The bus bar size and earth bus size shall be as per CPWD Specification.				
	(Under no case temperature of main LT panel shall be more at any point of the panel. To avoid heating necessary exhaust fans shall have to be provided along with top louvers, space heater etc.).				
	<b>Outgoings</b>				
	5 Nos. 630A microprocessor based 4P MCCB , 50KA, Set of three phase R,Y,B indicating lamps along with 2A SP MCB backup protection. and Digital flush type class-1.0 accuracy multifunction meter showing V, A, PF, KVAR , KWH etc. along with current transformers of 600/5A ratio, 15 VA Class 1.0 metering.				
	3 Nos. 400A microprocessor based 4P MCCB , 50KA, Set of three phase R,Y,B indicating lamps along with 2A SP MCB backup protection. and Digital flush type class-1.0 accuracy multifunction meter showing V, A, PF, KVAR , KWH etc. along with current transformers of 250/5A ratio, 15 VA Class 1.0 metering.				
	1 Nos. 200A microprocessor based 4P MCCB , 50KA, Set of three phase R,Y,B indicating lamps along with 2A SP MCB backup protection. and Digital flush type class-1.0 accuracy multifunction meter showing V, A, PF, KVAR , KWH etc. along with current transformers of 200/5A ratio, 15 VA Class 1.0 metering.				
	<b>Other items such as</b>				
	Necessary electrical Interlocking through advance contacts / contactors in ACB should be provided to ensure that only one supply is available at a time on each section of bus and to eliminate any possibility of accidentally approaching two supplies at one bus section as per single line diagram enclosed & as required.				

	PLC based panel controller shall be suitable for Switching ON/ OFF supplies from 2 Transformer & 1 D.G. sets supply operation as indicated in the Chart marked on the Single Line Diagram. the Panel shall be complete with suitable in built UPS. It should also have suitable nos. of IOS to close/ open LT Breakers.				
	Cylinder based Clean Agent based Fire Suppression systems, suitable for extinguishing, electrical enclosed panel, fire by automatically triggering the thermo-activated micro capsules of UL approved HFC 227ea, activated within 120-160 Degree C temperature, in each compartment of the panel . The system has to be EN approved and Maintenance free and without any pressurized cylinder, tube, pressure gauge and flexible in nature with Warranty of 5 years as required.				
	1 Lot of control wiring.				
	1 Set of designation plates				
	<b>MAIN L.T PANEL as describe above</b>	1	Set.	2013324	2013324
	<b>APFC panels- IEC: 61439 compliant type tested panels</b>				
10	<b>APFC Panel</b>				
	Automatic Power Factor Correction (APFC) System				
	Supply, Installation, testing and commissioning of Automatic Power Factor Correction (APFC) panel, indoor type floor mounted free standing totally enclosed, extendable, IP 52, of following capacity for 3 phase, 415 V + 10 %, 50 Hz AC System for Ambient temperature -5°C to +40°C, fabricated in compartmentalised designed made of CRCA sheet steel of 2.0mm thick for framework & covers, 3 mm thick for gland plate i/c cleaning & finishing complete with 9 tank process for powder coated of approved shade ( RAL 7032- Siemens gray or as approved by Engineer-in-Charge), having front section (switch gear and control accessories) and rear section capacitor and reactor, front and rear access, having suitable current carrying capacity, extensible TPN Aluminium alloy bus bar of high conductivity, DMC/SMC bus bar supports, bottom base channel of MS Section, fabrication shall be done in transportable section, entire panel shall have common copper earth bar of minimum size of 25mm x 5mm with 2 nos. earth studs, the earth terminals provided on the body of capacitor bank shall also be bonded to the				

	<p>main capacitor panel earth bus with 2 nos. 25X3mm GI earth flat/ equivalent size of copper conductor cable, forced ventilation for maintaining temperature rise not more than 5°C from ambient, interconnections, connections with 7% detuned reactor and heavy duty 525 V ISI marked Impregnated MPP(Metalized Polypropylene) Capacitor (IS 13340 Part -1 &amp; 2) APFC Panel shall be in compliance with IS :16636 &amp; CPWD Specifications etc. as per below details</p> <p>(A) Incomers Suitable capacity MCCB Microprocessor base with O/C, S/C, E/L release of TPN 35KA breaking capacity (Ics=Icu), ON, OFF, Trip, R, Y, B - LED Indicating Lamp set alongwith required Instruments and accessories with extended rotary handel and door interlocking arrangment. Current rating of the Incomer in ampere shall be APFC Panel rating in KVAR x 1.4 x 1.5 or Nearest higher standards rating.</p> <p>(B) Instruments &amp; Indications</p> <p>i) 3-Phase current sensing APFC microprocessor relay/controller , advance 8/12 stages (8 stages for capacity below 100 KVAR and 12 stages 100 KVAR &amp; above) with Communication Ethernet/RS485/SNMP port open protocol for BMS integration as per approved by Engineering in charge and having display of Phase wise V, A, PF, Cos-Phi, Kw, KVA, KVAR, THD-V , THD-I, harmonics up to 31 level. 3 nos of dual core CT's accuracy class 1, 15VA at incomer of PCC Panel for APFC relay.</p> <p>ii) Auto Manual Selector switch, auxiliary contactors with timer for delay in manual mode.</p> <p>iii) Digital Multi function meter with LED Display for V, A, PF, KW, KVA, KVAR, THD-V &amp; I, Frequency.</p> <p>iv) Suitable rating control transformer shall be provided for control and indication circuit.</p> <p>v) All components like control transformer, meter, relay and indicating lamp shall be protected by using suitable rating individual MCB's.</p> <p>vi) Wiring of the control circuit shall be done by using 2.5 sq mm, FRLS/HFFR 1100 V grade, PVC insulated multi stranded copper control wire.</p> <p>(C) Bus Bars 1.3 Amp per Sq.mm,TPN, Electrolytic grade Aluminium bus bar of capacity 1.25 times of incomer rating as per</p>				
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	<p>CPWD specification.</p> <p>(D) Outgoings (APFC Section) Selection of the capacitors combinations shall be for continuous rating and each capacitor bank shall have suitable capacity Heavy Duty ISI Marked Capacitor, capacitor duty contactor, the capacitor shall be mounted on channel with base of perforated M S Powder coated sheet, connections inter connections etc. and other features as per CPWD Specifications and relevant IS Code having following:</p> <p>(i) Capacitor bank ratings &amp; stages shall be as per the technical specifications sheet of NIT.</p> <p>(ii) Capacitor will be MPP self healing type with discharge resistor, pressure release mechanism.</p> <p>(iii) Since Capacitor Voltage is 525 Volts, thus higher KVAR has to be considered to get rated output at 415 Volts.</p> <p>(iv) 7% Detuned Reactor of class H insulation &amp; 150% linearity in series with Capacitor.</p> <p>(Note: Technical specifications sheet for selection of the capacitors combinations shall be provided by the NIT Approving Authority with due consideration of number of capacitors i.e. 1 KVAR, 2 KVAR, 3 KVAR, 5 KVAR, 10 KVAR.....for smooth correction).</p>				
a	200 KVAR	2	Set	428583	857166
	<b>(RISING MAIN &amp; BUS TRUNKING)</b>				
11	<p>Supplying, installing on wall, testing and commissioning of following capacity Air Insulated Compact Type Rising Mains for use on 3 phase 4 wire 415 volts, 50Hz A.C. supply with enclosure having IP-54 rating after fixing the tap off boxes and all accessories, made of 1.6mm thick steel sheet duly powder coated in convenient sections complete with 4 Nos aluminium bus bars having current density of 130 A/ sq cm at nominal current rating, necessary joints &amp; expansion joints, fire barrier at each floor, provision of tapping at every metre, continuous earthing with 2 Nos aluminium strip of suitable size (one on each side) including, G.I. clamping brackets, angle iron bracket, steel fasteners, connecting to earthing system etc. as required.</p>				
a	630 A, Isc = 50kA for 1 second	30	Mtr.	13584	407520

12	Supplying, installation, testing & commissioning of following capacity Plug In/ tap off box on the existing Air Insulated Compact Type bus trunking/ rising mains for use on 3 phase 4 wire 415 volts, 50Hz A.C. supply made with 1.6mm thick sheet steel enclosure (IP54) duly powder coated with provision of MCCB/ACB (but without MCCB/ACB) complete etc. as required				
a	200 A, Isc= 25kA for 1 sec	4	Nos.	9104	36416
b	400 A, Isc= 30kA for 1 sec	1	Nos.	11171	11171
13	Supplying, installation, testing & commissioning of following capacity End Feed Unit for the existing Air Insulated Compact Type bus trunking/ rising mains for use on 3 phase 4 wire 415 volts, 50Hz A.C. supply made with 1.6mm thick steel sheet enclosure (IP54) duly powder coated with provision of MCCB/ACB (but without MCCB/ACB) complete with necessary joints including clamping brackets, angle iron bracket, steel fasteners, connecting to earthing system etc. as required				
a	630 A, Isc = 50kA for 1 second	2	Nos.	14120	28240
	<b><u>Low Side</u></b>				
	<b>SUB DISTRIBUTION BOARD ESDB, MAIN DISTRIBUTION BOARD (MDB), RISING MAINS, METER BOARDS &amp; DISTRIBUTION BOARDS</b>				
14	Supply, Installation, testing and commissioning of Cubical type Main Distribution Board made out of 2mm thick Sheet Steel, totally enclosed, IP 54 protection, free standing, floor mounted, dust & vermin proof, indoor type, compartmentalised, powder coated of approved shade after antirust treatment with <b>Nine tanks</b> process suitable for operation on 3 Phase and neutral, 415V, 50 Hz AC supply system with copper busbar, interconnection with suitable size of copper lead/ solid Copper Strips, control circuits, rotary operating handle for MCCBs & suitable spreader terminals for cable connection according to size, bottom base channel of MS section not less than 100 x 50 x 5 mm (Thick), Fabrication shall be done in transportable sections, entire panel shall have a common earth bus bar at rear with 2 nos earth stud, cable alleys, cable gland plates in two half complete as required, as per Single Line Diagram and specification enclosed with the following switchgears.				

a	<b><u>ESSENTIAL PANEL</u></b>				
	<b><u>EB Incomer</u></b>		-		
	1 Nos. Incomers 630Amps 4 Pole Motorised drawout MCCB, 35KA with O/C, S/C protection, 3 Nos. phase indicating lamps to show the incoming power with control 2A TP MCB and Digital flush type class-1.0 accuracy multifunction meter for V, A, PF, KW, KWH etc. with RS - 485 module (MODBUS) along with matching cast resin CTs.				
	<b>DG INCOMER</b>				
	1 Nos. Incomers 630Amps 4 Pole Motorised drawout MCCB, 35KA with O/C, S/C protection, 3 Nos. phase indicating lamps to show the incoming power with control 2A TP MCB and Digital flush type class-1.0 accuracy multifunction meter for V, A, PF, KW, KWH etc. with RS - 485 module (MODBUS) along with matching cast resin CTs.				
	<b>INTERLOCK</b>				
	Auto change over scheme between EB and DG incomer will be provided with necessary PLC logic scheme wirings				
	<b><u>Bus Bars</u></b>				
	800 Amps TPN Al. bus bars with heat shrinkable insulation sleeve. - 1 Set				
	<b><u>Outgoing</u></b>				
	200A TPN MCCB - 2 Sets				
	100A TPN MCCB - 3 Sets				
	63A TPN MCCB - 8 Sets	1	Set	1127804	1127804
b	<b><u>LT ISOLATION PANEL (ICOG)</u></b>				
	1 Nos. 800Amps,50 kA, 4 Pole Microprocessor based Electrical drawout ACB with O/C, S/C and Earth Fault protection, 3 Nos. phase indicating lamps to show the incoming power with control MCB with suitable size powder coated sheet steel enclosure i/c connection etc as required.	2	Set	204992	409984
c	<b>FIRST,SECOND,THIRD AND FOURTH FLOOR PANEL</b>				
	<b>Incomer</b>		-		
	1 No 200A, TPN,25KA,MCCB				
	<b>METER</b>				
	Digital Multifunction meter - 1 set				
	<b>INDICATION</b>				

	RYB 22 mm dia LED Lamp & On/Off/Trip Indications.				
	<b>BUSBAR</b>				
	1 set of 250A,25kA,TPN Aluminium Bus Bar				
	<b>Outgoings</b>				
	5 nos.63 Amps TPN MCCB				
	1 nos.32 Amps TPN MCCB	4	Set	139490	557960
d	<b>VRF OUTDOOR PANEL</b>				
	<b>Incomer</b>				
	1 No 400 Amps 4P,ATS				
	1 No 400 Amps 4P, MCCB				
	<b>METER</b>				
	Digital dual source Multifunction meter - 1 set				
	<b>INDICATION</b>				
	RYB 22 mm dia LED Lamp & On/Off/Trip Indication for two incomers				
	<b>BUSBAR</b>				
	1 set of 500A, 25kA, TPN Aluminium Bus Bar				
	<b>Outgoings</b>				
	6 nos.125 Amps TPN MCCB	1	Set	327145	327145
e	<b>UPS OUTGOING PANEL</b>				
	<b>Incomer-1&amp;2</b>				
	1 No 63A, 4P, MCCB				
	<b>METER</b>				
	Digital dual source Multifunction meter - 2 set				
	<b>INDICATION</b>				
	RYB 22 mm dia LED Lamp & On/Off/Trip Indication for two incomers				
	<b>BUSBAR</b>				
	1 set of 100A, 25kA, TPN Aluminium Bus Bar				
	<b>Outgoings</b>				
	9 nos.63 Amps TPN MCCB	1	Set	179630	179630
15	Providing and fixing following rating and breaking capacity and pole MCCB in existing cubicle panel board including drilling holes in cubicle panel, making connections, etc. as required.				
a	200A, 36KA, 4P MCCB	4	Nos	15956	63824
b	63A, 25KA, 4P MCCB	10	Nos	7494	74940



16	Supplying and fixing following rating, 240/415 volts, "C" curve, miniature circuit breaker suitable for inductive load of following poles in the existing MCB DB complete with connections, testing and commissioning etc. as required.				
a	63A, 10KA, DP MCB	2	Nos	875	1750
b	16A, 10KA, FP MCB	4	Nos	1661	6644
	<b>General Notes: Applicable for all Panels:</b>				
1	The BOQ shall be read in conjunction with general notes, specification, single line diagram & boq. Incase of any discrepancy between General notes, SLD, specification & BOQ, the same shall be brought to the notice of Client/Consultant before quoting the rates, otherwise stringent condition shall be deemed to have been considered.				
2	All ACBs shall have Ics=Icu=Icw=50kA for 1S, fully rated at 50 degree Centigrade ambient temperature.				
3	All ACBs shall have inbuilt releases for Over Current, Short Circuit and Earth Fault Protection.				
4	All ACBs shall be provided with minimum 4 NO + 4 NC spare auxiliary contacts (other than used in the control circuit) awired upto terminal block.				
5	All incoming ACB shall have LED display for event history and measurement of parameters.				
6	All MCCB shall have Ics=100% Icu.				
7	All MCCB shall have adjustable Overload and Short Circuit trip settings as per the load requirement.				
8	All MCCB shall be provided with door interlocked rotary handle and ON, OFF, TRIP Indicating lamp protected with 2A, SP MCBs. <b>The MCCB upto 250A shall be with thermal magnetic releases &amp; 25kA and above 250A shall be with micro processor based releases &amp; 35kA with MFM.</b>				
9	All Microprocessors based MCCBs shall be provided with inbuilt O/C, S/C and E/F releases & thermal magnetic based shall be with inbuilt O/C & S/C releaseswith earth fault module				
10	All feeder doors shall have pad locking arrangement.				
11	All TP feeders shall have solid isolable neutral link.				
12	Bus Coupler shall be provided without releases but with on & off indicating lamps.				

13	Spare contacts of ACB/Relays/Contactor etc. shall be wired upto terminal block.				
14	All Energy meters are digital type & MCCB shall be with RS-485 port for communication.				
15	Internal wiring of panel shall be with size 2.5sqmm Flexible Copper Conductor for CT circuit and control wiring with 1.5 sqmm.				
16	In soft starter Vender should supply power contactor with aux. Contactor & All necessary accessories required etc. (As per BOQ & specification)				
17	All indicating light shall be LED type.				
18	Each vertical section of floor mounted panel shall have independent base frame (75mm x 40mm) size made out of 3 mm sheet steel (LT Panel & DG Panel).				
19	All the makes shall be as per approved make list only.				
20	Wherever only voltmeter & ammeter are required, the same may be provided in combined meter suitable for both parameter.				
21	Space heater shall be provided in each cable alley.				
22	All links/drops for ACB/MCCB shall be designed for full rated current of ACB/MCCB rating at same current density of Main Bus Bar.				
23	All CTs and PTs shall be cast resin type.				
24	The current density of the bus bar shall be as per CPWD specification.				
					0
	<b>CABLE SUPPLY, LAYING &amp; TERMINATION</b>				
17	Supplying of one number XLPE insulated and PVC sheathed (FRLS type) Armoured power cable of 650/ 1100 V grade as per IS 7098(Part I) 1988 as amended up to date of following size etc as required				
a	3.5C X 240 Sqmm XLPE Al.Ar. Cable	590	Metre	2537	1496830
b	3.5C X 70 Sqmm XLPE Al.Ar. Cable	180	Metre	857	154260
c	3.5C X 25 Sqmm XLPE Al.Ar. Cable	30	Metre	386	11580
d	4C X 16 Sqmm XLPE Al.Ar. Cable	520	Metre	316	164320
e	4C X 10 Sqmm XLPE Al.Ar. Cable	80	Metre	295	23600
f	4C X 6 Sqmm PVC Al.Ar. Cable	240	Metre	215	51600
g	4C x 70 Sqmm XLPE Cu.Flexible cable	60	Metre	4742	284520
h	4C x 50 Sqmm XLPE Cu.Flexible cable	60	Metre	3415	204900
i	4C x 16 Sqmm XLPE Cu.Flexible cable	60	Metre	1040	62400
j	4C x 10 Sqmm XLPE Cu.Flexible cable	30	Metre	662	19860
k	3C x 6 Sqmm XLPE Cu.Flexible cable	15	Metre	288	4320

l	3C x 4 Sqmm XLPE Cu.Flexible cable	150	Metre	195	29250
m	4C x 2.5 Sqmm PVC Cu. Ar. cable	80	Metre	171	13680
n	12 Core 2.5 sqmm Copper Ar. Cable	40	Metre	540	21600
o	19 Core 2.5 sqmm Copper Ar. Cable (Tr - RTCC)	60	Metre	831	49860
18	Supplying and making end termination with brass compression gland and aluminium lugs for following size of PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 KV grade as required.				
a	3.5C X 240 Sqmm	38	Each	1160	44080
b	3.5C X 70 Sqmm	12	Each	542	6504
c	3.5C X 25 Sqmm	2	Each	372	744
d	4C X 16 Sqmm	52	Each	366	19032
e	4C X 10 Sqmm	14	Each	325	4550
f	4C X 6 Sqmm	50	Each	325	16250
g	3.5C x 50 Sqmm	8	Each	484	3872
h	3C x 10 Sqmm	10	Each	312	3120
19	Laying and fixing of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size on cable tray as required.				
a	Upto 35 sq. mm (clamped with 1mm thick saddle)	1,000	Metre	53	53000
b	Above 35 sq. mm and upto 95 sq. mm (clamped with 25x3mm MS flat clamp)	200	Metre	109	21800
c	Above 185 sq. mm and upto 400 sq. mm (clamped with 40x3mm MS flat clamp)	400	Metre	226	90400
20	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size in the existing masonry open duct as required.				
a	Upto 35 sq. mm	305	Metre	36	10980
b	Above 35 sq. mm and upto 95 sq. mm	100	Metre	58	5800
c	Above 185 sq. mm and upto 400 sq. mm	190	Metre	146	27740
	<b>Cable Trays</b>				
21	Supplying and installing following size of perforated Hot Dipped Galvanised Iron cable tray (Galvanisation thickness not less than 50 microns) with perforation not more than 17.5%, in convenient sections, joined with connectors, suspended from the ceiling with two numbers GI Suspenders i/c base of suitable size GI angle, GI bolts & nuts, fastner etc as required.				
a	100 mm width X 50 mm depth X 1.6 mm thickness	150	Metre	754	113100
b	150 mm width X 50 mm depth X 1.6 mm thickness	200	Metre	803	160600

c	300 mm width X 50 mm depth X 1.6 mm thickness	300	Metre	1062	318600
d	450 mm width X 62.5 mm depth X 2.0 mm thickness	150	Metre	1439	215850
e	600 mm width X 75 mm depth X 2.0 mm thickness	200	Metre	2111	422200
f	750 mm width X 75 mm depth X 2.0 mm thickness	150	Metre	2441	366150
	<b>Safety Equipments</b>				
22	Supplying & fixing safety instruction chart in word duly framed with 5 mm thick glass as required. (approx. front area 1.20 sq.mt.)	4	Each	726	2904
23	FIRE BUCKET STAND WITH 4 NOS. OF FIRE BUCKET Including canopy support structure made out of 50x50x6 angle verticals and horizontal member. The top canopy shall be made out of 1 mm thick corrugated aluminum sheet. The overall height of the canopy shall be 2 meters from FGL and the buckets shall be hung at support provided at 1 meter from FGL. The Aluminum shade shall be fixed to the MS structure with SDST screws of Hilti or equivalent make .All the MS Strucutre shall be applied with two coats of primer and two coats of synthetic Enamel paint as approved by Client.	2	Set	4859	9718
24	Supply & fixing shock treatment chart duly mounted on a wooden frame with 5 mm thick glass as required. (approximate front area 1.20 sq.mtr.)	2	Each	726	1452
25	Providing of rubber mat 2mm thick in position, Class A, withstand upto 3.3 KV, 1 mtr wide and as per IS 15652-(2006) as required.	20	Mtr	540	10800
26	Providing of rubber mat 3mm thick in position, Class C, withstand upto 33 KV, 1 mtr wide and as per IS 15652-(2006) as required.	10	Mtr	813	8130
27	Providing and fixing M.V. danger notice plate of 200 mm X 150 mm, made of mild steel, at least 2 mm thick, and vitreous enameled white on both sides, and with inscription in single red colour on front side as required.	3	Each	315	945
28	Providing and fixing H.T. danger notice plate of 250 mm X 200 mm, made of mild steel, at least 2 mm thick, and vitreous enameled white on both sides, and with inscription in single red colour on front side as required.	6	Each	340	2040

29	Supplying and erection of First aid box as approved by St. John Ambulance Brigade/ Indian Red Cross society conforming to IS : 2217 -1963.	2	Each	2163	4326
	<b>Total Sub Head:-III</b>				<b>15717768</b>
	<b>Sub Head:- IV (External Lighting)</b>				
1	Supplying, Installation, Testing and Commissioning of 7 mtr long hot dip Galvanized octagonal Pole top of the pole Approx. 70 mm dia (A/F) and bottom of the pole Approx. 130 mm dia (A/F) made out of 3mm sheet with 1.5mm Single ARM GI Bracket, MS base plate of size (As per OEM Standard), opening inside the pole with flush door with locking facility preferably with LN key having proper arrangement with Accommodating of 1 Nos. 6 Amp,10 KA SPMCB & neutral link 4 way connector suitable for 25 sqmm cable complete ii/c providing 4 Nos steel foundation bolts & nuts as per OEM Standard etc.as required i/c erection of steel tubular or rail pole strut in cement concrete 1:3:6 (1 cement : 3 Coarse sand : 6 graded stone aggregate 40 mm nominal) foundation including excavation and refilling and secured with holding claimps, bolts, nuts, etc. as required.	10	Each	21800	218000
2	Supplying, Installation, Testing and Commissioning of 4.5/ 5 mtr long hot dip Galvanized octagonal Pole top of the pole Approx. 70 mm dia (A/F) and bottom of the pole Approx. 130 mm dia (A/F) made out of 3mm sheet with 1.5mm Single ARM GI Bracket, MS base plate of size (As per OEM Standard), opening inside the pole with flush door with locking facility preferably with LN key having proper arrangement with Accommodating of 1 Nos. 6 Amp,10 KA SPMCB & neutral link 4 way connector suitable for 25 sqmm cable complete ii/c providing 4 Nos steel foundation bolts & nuts as per OEM Standard etc.as required i/c erection of steel tubular or rail pole strut in cement concrete 1:3:6 (1 cement : 3 Coarse sand : 6 graded stone aggregate 40 mm nominal) foundation including excavation and refilling and secured with holding claimps, bolts, nuts, etc. as required.	16	Each	19258	308128

3	<p>Supplying, installation, Testing &amp; Commissioning of the integrated type solar PV lighting system on the existing pole structure, comprising of 35 watt, 6V Mono Passivated Emitter and Rear Contact (PERC) Solar Panel (minimum efficiency 21%),, Pulse with modulation (PWM)/Maximum Power point tracking (MPPT) Charge Controller in the box with a sleek appearance and a sturdy structure, is weather-proof, and is simple to install, with Lithium-Iron Phosphate Battery (LiFePO4) 3.2Volt (Cell) 35 AH battery, charging time 8-10 hours, Battery backup time 12 hours (minimum), LED fixture watt 35 watt, Input voltage: 12V DC , Operating temp range -5 deg to 50 deg centigrade, internal surge protection of 5 KV L,N,E as per IEC 61000-4-5, Driver efficiency &gt;85%, P. F.≥0.95, IP-66,IK-08, CRI &gt;70 , under voltage and over voltage protection, Electro Magnetic Interference (EMI) Electro Magnetic Compatibility (EMC) As per CISPR 15 , lenses for beam angle as per Illuminating Engineering Society of North America (IESNA) type I/II/III as per the width of the road and the project requirement, Correlated Colour Temperature (CCT) 5700°K (As per American National Standard Institute (ANSI Bin)), life time (LED,Driver &amp; electrical circuitary) of 50K hours lamp burning hours till the 70 % of initial Lumen maintained as per LM80 extrapolation IES TM-21-11 report, automatic switch on/off, Alluminium or Acrylonitrile Butadiene Styrene (ABS body), can be installed on a pole or wall. System lumen efficacy &gt;120 lm/Watt output. LM79 &amp; LM80 Test report and all testing required for LED fixtures as per BIS shall be submitted.. All as per pre approved by Engineer in-charge complete in all respect i/c external connections with 1.5 sq mm FRLS, PVC insulated copper conductor single core cable and earthing etc. as required.(Part 1), for fixtures up to 60 watt. LED light Complete with mounting structure for the battery and accessories and wind storm withstand capacity as per the zone. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise aboven90°C) 35 Watt (System lumen efficacy &gt;120 lm/Watt)</p>	10	Each	29329	293290
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4	<p><b>LED Smart Street light fixture, powder coated pressure die cast aluminium (System. System lumen efficacy <math>\geq 120</math> and <math>&lt; 135</math> lm/Watt)</b></p> <p>Supplying, installation, Testing &amp; Commissioning of Smart Street light LED fixture, powder coated pressure die cast aluminium body with built in or separate driver as per the requirement ( <math>&lt; 700\text{ma}</math>), Input voltage: 140-270 Volt AC, freq 50/60 hz, Operating temp range -5 deg to 50 deg centigrade, internal surge protection of 5 KV L,N,E as per IEC 61000-4-5, Driver efficiency <math>&gt;85\%</math>, THD <math>&lt; 10\%</math> as per IEC 61000-3-2, P. F. <math>\geq 0.95</math>, IP-66, IK-08, CRI <math>&gt;70</math>, under voltage and over voltage protection, EMI- EMC as per CISPR- 15, lenses for beam angle as per IESNA type I/II/III as per the width of the road and the project requirement., suitable to fit in up to 65mm dia pipe, life time of minimum 50000 Burning Hours with 70% of initial Lumen maintained till life ends as per LM80 extrapolation IES TM-21-11 report , CCT 3000°K / 4000°K / 5700°K /6500°K (As per ANSI Bin) , Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard complete in all respect i/c external connections with 1.5 sq mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty. System lumen efficacy <math>\geq 120</math> and <math>&lt; 135</math> lm/Watt output . LM79 &amp; LM80 Test report and all testing required for LED fixtures as per BIS shall be submitted.. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above 90°C). Smart inbuilt controller shall have following features.</p>				
a.	45 Watt	16	Each	5563	89008
b.	50 Watt	10	Each	5804	58040
	<b>LT CABLES</b>				
5	Supplying of following sizes of 1.1 KV grade XLPE / PVC insulated, PVC sheathed armoured stranded Power Cable conforming to IS 7098 Part-I/ 1554 Part -1 complete as required.(Cable tags with name plate details for every 20 mtr)				
a.	3.5 core, 25 Sq.mm. AL Armoured cable( Feeder Pillar incoming cable)	200	Meter	405	81000



b.	2 core, 16 Sq.mm. Al. Armoured cable	250	Meter	249	62250
6	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size in the existing RCC/ HUME/ METAL pipe as required.				
a	Upto 35 sq. mm	450	Meter	47	21150
7	Supplying and making end termination with brass compression gland and aluminium lugs for following size of PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 KV grade as required.				
a	3½ X 25 sq. mm (28mm)	4	Each	371	1484
b.	2x16 Sq.mm. ( 22mm)	80	Each	311	24880
8	Earthing with G.I. earth pipe 4.5 metre long, 40 mm dia including accessories, and providing masonry enclosure with cover plate having locking arrangement and watering pipe etc. with charcoal/ coke and salt as required.	3	Each	7658	22974
9	Providing and laying earth connection from earth electrode with 6 SWG dia G.I. Wire in 15 mm dia G.I. pipe from earth electrode including connection with G.I. thimble excavation and re-filling as required.	60	Meter	313	18780
10	Providing and fixing 6 SWG dia G.I. wire on surface or in recess for loop earthing as required.	30	Meter	84	2520
11	Providing and fixing 6 SWG dia G.I. wire on surface or in recess for loop earthing along with existing surface/ recessed conduit/ submain wiring/ cable as required.	100	Meter	50	5000
12	Supplying and laying of following size DWC HDPE pipe ISI marked along with all accessories like socket, bend, couplers etc. conforming to IS 14930, Part II complete with fitting and cutting, jointing etc.direct in ground (75 cm below ground level) including excavation and refilling the trench but excluding sand cushioning and protective covering etc., complete as required.				
a	63 mm dia (OD-63 mm & ID-51 mm nominal)	20	Meter	289	5780
	<b>Feeder Pillars:</b>				

13	SITC of floor mounting, totally enclosed, compartmentalized, cubical, dust, vermin proof and <b>double door outdoor type (IP - 65)</b> fabricated out of 2mm thick MS sheet, sheet steel, intermnally strengthened with angle iron frame work with following incoming and outgoing feeders (fabricated out of 2mm CRCA sheet steel) including supplying and fixing following switchgears including making connectins / interconnections with 2.5 sq.mm copper wire lugs / glands crimping tools, etc. as required.				
	<b>Incommer</b>				
	63A 4P MCCB 25 KA - 1 No.				
	40A, 3P power Contactor - 4 Nos.				
	Astronomical Time Switch suitable for operation on 415/230V 50Hz AC supply - 4 Nos.				
	Auto Manual Selector Switch - 4 No.				
	Bus Bars				
	4P Aluminium bus bar of 100A rating (minimum)				
	<b>Outgoings</b>				
	32 A DP MCB 10 KA - 8 Nos.				
	Indication lamps (LED Type) R Y B - 3 Nos.				
	<b>External Lighting Feeder Pillars Described as above.</b>	1	Set	80938	80938
	<b>Total Sub Head: - IV</b>				<b>1293222</b>
	<b>Sub Head: - V (DG Sets)</b>				
1	Supply, installation, Testing & Commissioning of 'Silent Type Diesel Generating set as per CPCB IV + or better norms along with having Prime Power Rating of KVA as below, 415 volts at 1500 RPM, 0.8 lagging power factor at 415 V suitable for 50 Hz, 3 phase system & for 0.85 Load Factor, including testing at factory and site with fuel, load for test and other necessary arrangements Complete as per CPWD specifications, should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location, rating plate as per relevant IS Code etc. and consisting of the followings:				

	<p>(A) Diesel Engine: Turbocharged Diesel engine 4 stroke water cooled, multi cylinder, dynamically balanced fly wheel, electric start of suitable BHP at 1500 RPM suitable for above output of alternator at 40 Degree C, 50% RH &amp; at 1000 Meter MSL , capable of taking 10% over loading for one hour after 12 hours of continuous operation. The engine will be with Electronic governor, Dry type Air filter with service indicator, first filling of engine fuel (after commissioning) lubricating Oil, Coolant and other consumables complete with all the required accessories, the Electronic governor shall be as per ISO 8528. The engine shall comply to the latest CPCB norms (CPCB IV + or better) and Conforming to BS 5514, BS 649, IS 10000, IS 10002, IS 13018 and as per CPWD specifications.</p>				
	<p>(B) Engine mounted Instrument Panel fitted with and having digital display for following:</p> <ul style="list-style-type: none"> <li>(i) Start-stop switch with key</li> <li>(ii) Water temperature indication</li> <li>(iii) Lubrication oil pressure indication</li> <li>(iv) Lubrication oil temperature indication</li> <li>(v) Battery charging indication and Voltage indication</li> <li>(vi) RPM indication</li> <li>(vii) Over speed indication</li> <li>(viii) Low lubrication Oil trip indication</li> <li>(ix) Engine Running Hours indication</li> <li>(x) Fuel Level</li> </ul>				
	<p>(C) Alternator: Synchronous alternator rated of appropriate KVA, 415 volts at 1500 RPM, 3 phase 50 Hz, AC supply with 0.8 lagging power factor at 40 Degree C, 50% RH &amp; at 1000 Meter MSL. The alternator shall be having Screen Protected Drip Proof (SPDP) enclosure IP23, brushless, continuous duty, dynamically balanced rotor, capable of taking 10% over loading for one hour after 12 hours of continuous operation, self cooled, self-excited and self-regulated through AVR conforming to IS13364(Part 2)/IS: 4722/BS 2613 suitable for tropical conditions and with class- H insulation.</p>				

	(D) Base Frame & Foundation: Both the engine and alternator shall be mounted on suitable base frame made of MS channel with necessary reinforcement which shall be installed on suitable cement concrete foundation and vibration isolation arrangement as per recommendations of manufacturer.				
	(E) FUEL TANK: Daily service fuel tank of suitable liters capacity as per CPWD Specifications, fabricated out of 3 mm thick M.S. sheet complete with all standard accessories and fuel piping between fuel tank and diesel engine with MS class 'C' pipes of suitable dia. Complete with valves, level indications & accessories as required as per specifications.				
	(F) Exhaust System: Dry exhaust manifold with hospital type exhaust silencer and catalytic convertor.				
	(G) Starting System: 12V/24V DC starting system comprising of starter motors: voltage regulator and arrangement for initial excitation complete with suitable numbers of batteries (180 AH capacity lead acid SMF type) as required as per specifications. The battery shall be housed inside the acoustic enclosure of DG Set.				
	(H) Acoustic and weather proof enclosure with arrangement for fresh air intake for cooling of the engine & alternator, extraction, discharging hot air in to the atmosphere and the temperature rise inside the enclosure, noise level outside enclosure. The acoustic enclosure should be suitable for cable connection/connection through bus-trunking. Such arrangements on acoustic enclosure should be water proof & dust-proof conforming to IP-65 protection. The enclosure shall be as per CPCB IV + or better norms etc. and as per CPWD specifications.				
	(I) AMF Panel: Free standing floor mounted IP 42 automatic mains failure control panel including auto by-pass, suitable for KVA as below for silent type DG set complete with relays, timers, set of CTs for metering & protection and energy analyser to indicate currents, phase and line voltages, frequency, power factor, KWH, Kilo Volt Ampere Reactive Hour (KVARH), KVA (Phase & Total), KW & provision for overload, short circuit, restricted earth fault, under frequency, power (aluminium) and control (copper) cabling of suitable size upto 15				

	meter between AMF panel, LT Panel and DG Set including connection interconnection etc. as required, all complete and inter locking and communication/ Ethernet /RS485/SNMP port open protocol for BMS integration including suitable software, the panel shall be of DG Set OEM make etc. as per approved by Engineering in charge and including the following:				
	<p>1. Suitable numbers and appropriate capacity 4 pole motorised electrically operated draw out with cradle type 3 position ACB/ MCCB with electronic release for O/C &amp; E/F and shunt trip.</p> <p>2. Auto/Manual/Test/Off selector switch</p> <p>3. Protection for under and over voltage phase reversal (2 nos Over voltage relay, 2 Nos. reverse power relay and 2 Nos. under voltage relay).</p> <p>4. 3 Sets of current transformers 15 P 10 accuracy for protection and 15 VA class-I for metering</p>				
	<p>5. Energy analyser unit to indicate current, Voltage( L-N &amp; L_L), kW, kVA (Phase &amp; Total), Frequency, KWH, PF.</p> <p>6. LED Indicating lamps for load on mains and load on set</p> <p>7. Fuse/ MCB for instruments</p> <p>8. Battery charger, complete with transformer/ rectifier, D.C. voltmeter and ammeter, selector switch for trickle, off and boost and current adjustment.</p> <p>9. Main supply failure monitor</p> <p>10. Supply failure timer</p> <p>11. Restoration timer</p> <p>12. Control unit with three impulse automatic engine start/stop and failure to start lockout.</p> <p>13. Impulse counter with locking and reset facility.</p>				
	<p>14. ON/OFF/Control circuit switch with indicator</p> <p>15. Audio/Video annunciation for</p> <p>(i) High water temperature</p> <p>(ii) Low lubricating oil pressure</p> <p>(iii) Engine over speed</p> <p>(iv) Engine fails to start</p> <p>(v) Full load/maximum load warning</p> <p>16. Protection for over/under Frequency, Loss of AC sensing, Over Current, Unbalancing load with suitable number of relays and accessories</p> <p>17. Maintenance notification based on Engine Run Hour &amp; due date.</p>				

	18. Load Management through PLC to achieve auto opening and closing of incomer breakers, bus coupler switching of essential panel , interlocking providing signal to AMF Panel for load status and AMF shall give command to DG Set to auto start / auto stop depending upon load status and requirement etc. and necessary hardware and software required to perform the operation shall be provided by the contractor including all control wiring.				
a	200KVA	1	Set	1547620	1547620
2.0	Supplying and fixing exhaust gas piping of suitable dia. Welded black MS, 'C' Class pipe conforming to IS:3589/ 1239 cut to required lengths and installed with necessary bends, supports and clamps, anti-vibration mountings, laying/ fixing, testing and commissioning of following thickness resin bonded fiber glass pipe section insulation having density 80 kg/cum or mineral wool (non combustible) having density of 144 Kg/ cu m duly covered with a layer of 120 gm/sqm polythene sheet (vapour barrier) on existing pipe and finally applying 0.63mm aluminium sheet cladding complete with type3 , grade 1 roofing feltstrip(as per IS:1322 as amended up to date ) at joints etc. as per specifications and as required. i/c MS structure of suitable size angle iron and flat iron i/c painting with one coat of primer and 2 coat of synthetic enamel paint for structure etc. as required as per specifications.	40	Mtr.	13819	552760
3.0	Supplying and laying of following size DWC HDPE pipe ISI marked along with all accessories like socket, bend, couplers etc. conforming to IS 14930, Part II complete with fitting and cutting, jointing etc.direct in ground (75 cm below ground level) including excavation and refilling the trench but excluding sand cushioning and protective covering etc., complete as required.				
a	90 mm dia (OD-90 mm & ID-76 mm nominal)	20	Mtr.	336	6720
	<b>Total Sub Head:- V</b>				<b>2107100</b>
	<b>Sub Head:-VI (Lift)</b>				

1	Supplying, Installation, testing & Commissioning of <b>13 passanger ( 884 Kg) lift, MRL type</b> having contract speed of 1.50/1.60 MPS of serving 6 floors (B, GF, 1F, 2F, 3F & 4F) the lift shaft as per detailed specification enclosed and as under: ( <i>Note: Lift shall be inclusive of all ancillaries and accessories as are mandatory as per the updated Bombay Lift Act, IS andGOI guidelines, whether specifically specied in the item and specification are not</i> )				
a	<b>Speed</b> - 1.50 MPS				
b	<b>Floors</b> - 6 floor (B+G+4)				
c	<b>Traval</b> -24 Meters (Approx)				
d	<b>Stop &amp; opening</b> - 6 stops & 6 Centre Opening.				
e	<b>Controller</b> : Microprocessor based A.C. variable voltage & variable frequency.				
f	<b>Operation:-</b> Microprocessor based ( Duplex.) collective selective with/ without attendant.				
g	<b>ARD:</b> Automatic Rescue Device complete with Dry maintenance free batteries as reqd.				
h	<b>Power</b> - 415V, 3 phase, 50Hz, 4 wires system.				
i	<b>Phase Reversal Protection:</b> Shall have auto phase correction device and single phase preventer protection				
	<b>BMS Compatibility:</b> Potential free contacts for each floor position up and down movement of the lift shall be provided in the controller which can be used for the building management system.				
n	<b>Type of doors.</b>				
	<b>Car entrance door :</b>				
	<b>(a) Number :</b> 1 No. (Centre Opening)				
	<b>(b) Size:</b> 900mm centre opening				
	<b>(c)Type of doors :</b>				
	Power operated, centre opening, horizontal sliding with VVVF controller, <b>Full Glass with SS frame(2 Hrs Fire Rated) .</b>				
	<b>(d) Landing doors:</b>				
	Power operated, centre opening, horizontal sliding with VVVF controller, Full Glass with SS frame(2 Hrs Fire Rated) .				
	<b>Lift Car :</b>				
	<b>a. Lift car Size :</b> 1500x1500mm				
	<b>b. Finish :</b> Stainless steel Honeycomb/Moon Rock Finish with Granite stone flooring.				



	<b>c. Ceiling :</b> Ceiling should be mirror/hairline stainless steel with LED luminaires and ventilation grills.				
	<b>d. Ventilation :</b> Suitable ventilation from ceiling with no noise high quality ventilation (fans) with louvers.				
	<b>e. Hall Buttons :</b> Illuminated Hall Buttons With Braille Markings in car and at all landings. The Hall button panel shall be with running arrow display to indicate the moving direction of the lift car.				
	<b>f. Hand Rails :</b> One hand rail of full depth of car , at 900mm above floor level to be fixed on three side in the lift car.				
	<b>g. Voice announcement system :</b> To be provided in the car to announce the position of the elevator in the hoist way as the car passes or stops at a floor served by the elevator.				
	<b>h. OLI :</b> to be provided as per OEMs standard design and capacity.				
	<b>i. Protection :</b> 1 . Protection against (i) overload voltage (ii) under voltage (iii) single phasing.				
	2. Full height infrared curtain door protection.				
	3. Door time protection				
	4. Parking key switch.				
	5. All other standard safety features as per CPWD specs.				
	<b>j. Door close safety:</b> Full height infrared light curtain door safety in addition to pressure operated switch.				
	<b>k. Fireman switch:</b> Required for all Lifts at ground floor.				
	<b>l. Operating system:</b> Full duplex collective selective operation. All floors (except lower most basement) shall have Up and down key.				
	<b>m. Car Fittings:</b> Overload Device, Emergency Car light unit, Emergency Alarm Button, Intercom and battery operated alarm bell, Door Open/ Close Button, Manual Rescue Operation, Belt Inspection Drive, Emergency stop switch with battery backup for fan and light fitting for 1 hour.				
	<b>n. Pit ladder.</b>				
	<b>o. 4MP IP based CCTV camera</b> inside car along with 30 days backup complete with NVR to be provided.				
	<b>p. Independent service (for Duplex only)</b>				

	<i>All other accessories and/or ancillaries as required and as per technical specifications and IS requirements. The lift shall be suitable for differently abled and the entrance shall be suitable for mechanized wheel chair.</i> <i>As per CPWD General Specification for Electrical Works (Part-III Lift &amp; Escalator) 2003, BIS Codes, NBC 2016 as amended upto dated having provision for barrier free access as per Harmonised Guidelines &amp; Standards for Universal Accessibility in India - 2021 of MoHUA.</i>	2	EACH	2423395	4846790
	<b>Total Sub Head:- VI</b>				<b>4846790</b>
	<b>Sub Head:- VII (UPS)</b>				
1	<b>Online UPS- Input supply: Three Phase, Output supply: Three Phase</b> Supplying, installation, Testing & Commissioning of following capacity at full load (Unity Power Factor) at operating temperature 0 to 40 deg C, Relative humidity 0 to 95%, Online double conversion true sine wave Uninterrupted hot swappable (allow for the replacement or addition of battery modules without shutting down the entire system) modular Power Supply (UPS) system with N+1 modules (N denotes total number of modules required for rated capacity). The UPS shall include a Rectifier, inverter, battery bank suitable for 30 minutes back up (Battery VAH capacity shall not be less than 1600 VAH per KVA of UPS rating per Hour backup time) on full load (Battery shall be VRLA, SMF in ABS Container) and Static Bypass switch alongwith manual bypass, suitable isolation transformer for additional protection against neutral faults etc. UPS shall have inbuilt phase sequence correction. The UPS systems offered are to be of the latest technology with Digital Control Microprocessor based for reliable operation using Insulated Gate Bipolar Transistor (IGBT)'s both for the rectifier & inverter (3 Level) with PWM (Pulse Width Modulation). The quality of design, manufacturing and inspection process should confirm to the relevant International standards such as IEC/EN/VDE. The operating efficiency of the UPS systems shall be >96% while operating on battery mode and delivering quality power to the 100% non-linear loads. Current total harmonic effect(THD) on the input grid				

	shall be < 5% at 50 %load. (The required LC ( inductor (L) and a capacitor (C)) filters shall be included in UPS cost), extreme power factor kit to be included to limit the input power factor (PF) to 0.99 and output power factor shall be unity (i.e. kw rating of the UPS shall be kva rating x 1 ), however UPS				
	shall be suitable to take load at 0.7 lagging to 0.7 leading power factor loads. UPS shall be suitable for incoming supply AC : 3Phase 400V +/-20%, 50 Hz +/-5 Hz, AC Output voltage: 3Phase 415 Volt, 50 Hz +/- 0.2Hz, Overload capacity of 120% for 10 mins, Sine wave output. Non condensing, noise level less than 60db at 1 meter distance, protections: Input Under voltage over voltage, abnormal out voltage, battery over charging, output over current, short circuit protection, battery deep discharge protection, 10KV surge. UPS must comply with low voltage electromagnetic compatibility (EMC) achieved as per EN 6204, EN6204 Part I and Part 2, it shall be a Voltage and Frequency Independent (VFI)-type UPS. . Communication RS232/RS485/SNMP port open protocol for BMS integration, all hardware & software for IoT Communication as per approved by Engineering in charge. Required battery racks and interconnecting copper conductor cables of suitable size and connectors and all required accessories are inclusive of the cost). This system must provide a means for logging and alarming of all monitored points plus email notification. Forced air-cooling with integral inbuilt fans with redundancy (if one fan fail UPS should be able to handle at least 80% of the load, Noise Level 65 DB at 1 meter distance. The system shall be in compliance IEC 62040-1,2 & 3, IS: 16242 and CPWD Specification. Display Panel (minimum) (In-build 5 inch or more LC Display / LED ) to display : a) Input: Voltage, current, Frequency. b) Bypass: Voltage, Frequency. c) Output: Voltage, frequency, Current. d) Battery: Voltage, Capacity. e) Load: KVA, KW, Percentage. f)Temperature: STS, Inverter, PFC. g) Event Logging & Statistical Data (On LCD/LED): UPS should capture and display up to 3000 events like: Over temperature / DC Bus Fail / Fan Fail / Fuse Fail / Overload / Short-circuit / Device Fail / Inverter Fail / Rectifier Fail / Bypass Fail, etc. h)				

	Statistical Data: No. of power failures / Transfers to Bypass / Total Running time, etc. i) Mains Mode of Operation /Battery Mode of Operation / Bypass feeding the load / UPS Fault /Battery charging and discharging, overload, battery voltage and battery capacity. j) Audible Alarms : Mains Failure, Battery Low Alarm, UPS Overload, Fault, Shutdown, Input Over, Under Voltage, Output Over, Under Voltage, Battery Over, Under Voltage, Over Load and short circuit, Over Temperature. The UPS should have QR code which should contain drawing, test report OEM manual,Geo- Tag of manufacturing location etc				
a	10 KVA (Each Power module shall be < 10 KVA)	1	Each	208893	208893
b	20 KVA (Each Power module shall be < 10 KVA)	1	Each	341772	341772
	<b>Total Sub Head:- VII</b>				<b>550665</b>
	<b>Sub Head:- VIII (EV Charger)</b>				
1	Supply, Installation, Testing and commissioning of EV charging station As per specifications and in Compliance to relevant IS codes etc. <b>Light EV AC Charger (Mode-3)</b> Power : 7 kW, Input power supply: 1phase 230 +10% Volt, output supply: 230 Volt AC, Frequency:50 Hz +/-3%, Operational temperature range : - 25 to 55 degree C (outdoor), -5 to 55 degree C(Indoor)., RH upto 95%, Charging Device as per IS-17017-22-1 EV-EVSE Communication: as per relevent IS Codes, Bluetooth Low Energy, one Charge Point Plug/ Socket as per IS-60309 and IS-17017-2, Vehicle Inlet/ Connector As per EV manufacturer, suitable for 2 Wheelers and 4 wheelers.Indoor use: at least IP41; Outdoor use: at least IP44. Mechanical Strength :protection of the external enclosure against mechanical impact shall be IK08 according to IEC 62262.O/L,S/C protection. Insulation Resistance > 1 M Ω. Cable Length: 7.5 m. RCD having a rated residual operating current not exceeding 30 mA; Seprate RCD for multiple outputs. Telecommunication port of the EV supply equipment according to IS 13252 (Part 1) : 2010. OCPP(Open charge point protocol) 1.6J upgradble to ocpp 2.0. Device Should follow 17017 series of IS codes in general and the installation of the system shall comply with relevent IS Codes.	2	Each	23385	46770

2	<p>Supply, Installation, Testing and commissioning of EV charging station As per specifications and in Compliance to relevant IS codes etc.</p> <p><b>Parkbay DC Charger (Mode-3)</b></p> <p>Power Level 2: Normal Power ~24KW and above, 3 phase 415VAC(-40% to +20%), Frequency:50 Hz +/-5%, output supply: DC 12/24 Volt, Operational temperature range : -25 to 55 degree C (outdoor), -5 to 55 degree C(Indoor), RH upto 95%, Charging Device as per Device/protocol: IS-17017-23, EV-EVSE Communication as per IS-17017-24 ,ISO-15118, Infrastructure Socket as per IS-17017-2-2/3, Vehicle Connector as per IS- 17017-2-3 Vehicle Inlet/ Connector As per EV manufacturer, suitable for 4 wheelers. Indoor use: at least IP41; Outdoor use: at least IP44. Mechanical Strength :protection of the external enclosure against mechanical impact shall be IK08 according to IEC 62262. O/L,S/C protection. Insulation Resistance &gt; 1 M <math>\Omega</math>. Cable Length: 7.5 m. RCD having a rated residual operating current not exceeding 30 mA; Seprate RCD for multiple outputs. Telecommunication port of the EV supply equipment according to IS 13252 (Part 1) : 2010. OCPP(Open charge point protocol) 1.6J upgradable to ocpp 2.0. Device Should follow 17017 series of IS codes in general and the installation of the system shall comply with relevent IS Codes.</p>	1	Each	888982	888982
	<b>Total Sub Head:- VIII</b>				<b>935752</b>
	<b>Sub Head:- IX (LAN &amp; EPABX)</b>				
	<b>SECTION - I- STRUCTURED CABLING SYSTEM PASSIVE</b>				

1	Supplying and drawing following core Fiber Optic Cable having corrugated steel armoring. The Fiber should be SM Fiber Central -loose tube filled with Thixotropic jelly, duly following Standards: ISO 11801, IEC 60793-1/60794-1-2, ITU-T-REC G.652D and Telecordia GR-20-core, High quality Electro Chromium Coated Corrugated Steel tape (ECCS ) and HDPE-Sheath, Operating ambient Temperature should be – 5 deg C to +50 deg C and Storage Temperature shall be – 5 deg C to +50 deg C, Max Attenuation $\pm 0.36$ (db / km) at Operational Wavelength 1310 nm and $\pm 0.22$ db / km at Operational Wavelength 1550 nm. type of fiber should be 9/125 / G.652D & Refractive Index should be 1.4670/1.4675. The value for Mode-field, Cladding Diameter $9.2 \pm 0.4$ $\mu$ m and $125 \pm 0.7$ $\mu$ m correspondingly. The Dispersion value $< 3.5 < 18$ ps/nm-km and PMD value $< 0.2$ ps/km and Cable Cut-off wavelength $< 1260$ nm etc complete as required.				
a	Single Mode 6 Core Optical fiber cable	300	Mtr	64	19200
2	Supply and fixing following port Rack Mount loaded LIU with pigtail, Front-mounted cable saddles for jumper management, suitable to manage both splices and terminations, Preassembled shelves in multiple configurations, Rubber fiber slotted bracket built-in, metal splice shelf to protect the fibers, 2 fiber spools built-in for 900 $\mu$ m tight buffered fiber storing, Capable of storing up to 3 meters of 900 $\mu$ m tight buffered fiber per adapter, Removable front and rear covers for better access to interior of LIU, Should be Single / Multi mode LC Type fully loaded. Accessory kit consists of cable ties, mounting ear screws, and spiral wrap tube etc complete as required.				
a	6 Port LIU	2	Nos.	5471	10942
b	24 Port LIU	1	Nos.	10049	10049
3	Supply and fixing Patch Cord of Optical Fiber Multi Mode or Single Mode LC to LC Fiber Duplex having high precision ceramic ferrule with good concentricity, Fiber corning single mode G652D, Cable Type 2mm with Mechanical specification Apex Offset $\leq 50$ $\mu$ m, Fiber Height $\pm 100$ nm, End-face radius of Curvature $7\text{mm} < R < 25\text{mm}$ , Repeatability $\leq 0.2$ dB, Working ambient Temperature – 5 deg C to +50 deg C, Storage Temperature – 10 deg C to +50	36	Nos.	705	25380

	deg C, Length -- 2meter, Type -- LC-LC Duplex etc complete as required.				
4	Supplying, drawing, Installation, Testing and commissioning of Cat6A UTP 4 pair, 23 AWG solid copper cable in existing conduit/ on surface, U/FTP, LSZH, Non-Plenum, Horizontal (solid) Cable suitable for high speed data networking application supporting upto 10Gbps over a 100 meter channel. The 4 Unshielded Twisted Pairs (UTP) cable with color coded insulation for easy identification should have FLAME PROPERTIES i.e. Flammability Test - IEC 60332-1, Smoke Density - IEC 61034, LSZH standards compliance: ANSI/TIA568 C.2, ISO/IEC 11801, IEEE 802.3an, RoHS. Delay Skew should be < 45NS. The outer Cable Diameter should be 7.5 + 2 mm. Cable should have been tested and verified by UL/ ETL.				
a	1 Run of cable	1950	Mtr	74	144300
b	2 Run of cable	500	Mtr	124	62000
c	3 Run of cable	300	Mtr	174	52200
5	Supplying and fixing of following sizes of steel conduit along with accessories in surface/recess including painting in case of surface conduit, or cutting the wall and making good the same in case of recessed conduit as required.				
a	20 mm	1950	Mtr	254	495300
b	25 mm	800	Mtr	289	231200
6	Supplying, Installation, Testing and commissioning of CAT6A Copper Information Outlet (IO) with face plate of color as per site requirement, should have ETL/UL verification program certificate for compliance with ANSI/TIA-568.2-D. All copper Cable and Components should be from same OEM to maintain compatibility and interoperability.	128	Nos.	302	38656
7	Supplying, Installation, Testing and Commissioning of 24 port Cat6 Patch Panel loaded. Must be of 1U height with clear label holders and white label with the panel. 24 Ports Cat-6 Patch Panel should have ETL/UL verification program certificate for compliance with ANSI/TIA-568.2-D etc. complete as required.	8	Nos.	5278	42224
8	Supplying, Installation, Testing and commissioning of following CAT6A Patch Cord should have ETL/UL verification program certificate for compliance with				



	ANSI/TIA-568.2-D				
a	Copper Patch Cords of length 1m (3ft)	128	Nos.	173	22144
b	Copper Patch Cords of length 3m (10ft)	128	Nos.	405	51840
9	Supply and fixing 42U Rack with 6 inch Castor wheels and front brake Floor Standing Rack with Main Frame Pillar of 1.6mm CRCA Sheet with removable side panels, L- Shape adjustable Vertical Mounting Rail of 2mm with 'U'Marking completely knocked-down condition (CKD) Shape, fitted with 4 number cooling fans, minimum 8nos two line cable entry/exit provision at top and bottom with rubber protection, Front door 5mm Toughened Glass with MS frame or MS perforated with lock, Rear MS vented or perforated door, Powder coated Color- RAL- 7035 or black, complied with UL & RoHS, 2 x 6 sockets 16A power distribution units, 3 numbers closed cable organizer, Hardware mounting screws packet of 20 x 1 number, etc. complete as required.	1	Nos.	32954	32954
10	Supply and fixing 24U Rack with 4 inch Castor wheels and front brake Floor Standing Rack with Main Frame Pillar of 1.25mm CRCA Sheet with removable side panels, L- Shape adjustable Vertical Mounting Rail of 2mm with 'U'Marking completely knocked-down condition (CKD) Shape, fitted with 4 number cooling fans, minimum 5nos two line cable entry/exit provision at top and bottom with rubber protection, Front door 5mm Toughened Glass with MS frame or MS perforated with lock, Rear MS vented or perforated door, Powder coated Color- RAL- 7035 or black, complied with UL & RoHS, 2 x 6 sockets 16A power distribution units, 3 numbers closed cable organizer, Hardware mounting screws packet of 20 x 1 number, etc. complete as required.	1	Nos.	21201	21201
	<b>SECTION - II- IPABX SYSTEM</b>				
11	Supplying, installation, testing and Commissioning of IP based voice communication system with 04 Port Voicemail, 04 Port FXS, 04 Port FXO, 1 PRI Trunk lines (30 Channels) Circuit with CLIP Facility, min 100 IP users License with provision for further additions, 100 analog users, 01 Number IP based Operator Console, 100 Party Conference, Speed Dial, Music on Hold, Internal/ External ring difference, Call Barring, Call Pickup, Redundant server in active -Active mode and as per technical specification including	1	Each	1578920	1578920

	supporting accessories etc complete as required. The system should have valid TEC GR approval from DoT.				
12	Supply, installation, Testing & Commissioning of additional IP User License.	50	Each	7661	383050
13	Supplying, Installation, Testing & Commissioning of Type 1 IP Phone having 2 VoIP account, 120 x40 DOT matrix screen with backlight, Full HD duplex speaker phone, IPV6, Gigabit Ethernet, PoE etc. complete as required.	112	Nos.	11698	1310176
14	Supply, Installation, Testing & Commissioning of Type 2 IP Phone having 6 VoIP account, 320 x240 Pixel Colour Screen, Full HD duplex speaker phone, freely programmable 8 Line Keys with support to program for Up to 35 DSS keys with BLF, IPV6, Dual Gigabit Ethernet, PoE etc. complete as required.	22	Nos.	21811	479842
	<b>SECTION - III- LOCAL AREA NETWORK (LAN)</b>				
15	Supplying, installation, Testing and commissioning of 10 Giga Bandwidth Data Centre Network Switch of 48 port Layer 3 having features and specifications etc. as mentioned here under: - ToR/EOR/Core Network Switch 48x 10GbE SFP+, 4x 100GbE QSFP28, RPS, with Console Port, Management Port and 1 x USB 2.0 Type A port, The switch must provide a switching capacity of no less than 1.76 Tbps and a forwarding rate of at least 1600 Mpps, ensuring non-blocking performance for high-bandwidth applications. It should support hotswappable dual power supply modules (AC or DC) for 1+1 redundancy and load sharing, as well as hot-swappable, frontto- back airflow fan trays with N+1 redundancy to ensure continuous availability. IEEE 802.1X support for port-based and MAC-based authentication should be available, along with integration for RADIUS and TACACS+ authentication services. Guest VLANs, DoS prevention, and management access restrictions are essential. SNMP v1/v2c/v3, syslog, sFlow, and support for auto-configuration via DHCP. Support for OpenFlow v1.4, Netconf/YANG, and LLDP is required for modern network automation. Support ONIE (Open Network Install Environment), IEEE 802.1Q bb Priority-based Flow Control (PFC), OpenFlow v1.4, ERPS, IPv6	1	Nos.	1055981	1055981

	Tunneling, IP interfaces and supported, VXLAN, Private VLAN, Multicast VLAN, Guest VLAN Double VLAN (Q-in-Q), RoCEv2, PIMSSM/ SM, MSDP. Support High Availability with MLAG/VSS and Layer 2/3 VPNs Critical for Multi-tenant, Virtualized, and Containerized Environments. BGPv4/v6, OSPFv2/v3, IS-IS, RIPng. VRRP, ECMP, BFD, and route redistribution for highavailability routing. Support flexible routing domains and secure inter-segment traffic flow. Certifications: FCC, CE marked, UL/EN, RoHS and relevant MTCTE(TEC)/BIS compliance/certification as applicable etc. complete as required.				
16	Supplying, installation, Testing and commissioning of following capacity 24 port Layer 2 indoor Network Switch having features and specifications etc. as mentioned here under: At least 24 X RJ-45 Gigabit Ethernet Ports and additional 2 X 10G Base-T with 4 X SFP Ports with non-blocking architecture by having Switching capacity of min. 128Gbps and packet forwarding rate of 95Mpps or higher, 16K MAC table. Console Port, USB port, Stacking support of min. 4 units per stack. Internal dual AC Power supply, STP, RSTP, MSTP, BPDU Filter, BPDU Restriction, Min. 9K Jumbo Frame, LBD, IGMP Snooping V1/V2/V3, MLD Snopping V1/V2. IGMP /MLD Groups 1K or more, IPv4/IPv6 Loopback Interface, 16 L3 IP Interface, Ipv6 ND, VRRPv3, UDP Helper, ECMP. VLAN: 802.1Q, Port based, Q-in-Q, Multicast VLAN, Protocol VLAN, VLAN Trunking, DHCP Snooping, Server, server Screening. RADIUS , TACACS+ Authentication, QoS: 802.1P, 8 queues per port, QoS : WRR, Strict+WRR, WRED, 802.1p. ACL: MAC based, IPv4C IPv6, TCP/UDP Port number, time based ACL, TFTP Client, SNMP V1, v2c, v3, SNMP traps, RMON, DHCP server, relay, client, LLDP, LLDP-MED, OAM, Dying Gasp, 802.3ah, sflow, RIP, OSPF v2/v3, policy based route, SSL, SSH. 6 kV surge protection on all Gigabit Ethernet ports and on all GE RJ-45 access ports. Certifications: FCC, CE marked, UL/EN, RoHS and relevant MTCTE(TEC)/BIS compliance/certification as applicable, etc. complete as required.				
a	24 port PoE Layer 2 Network Switch with PoE Support of 370W or higher with each cooper port supporting 802.3at PoE+ min.	7	Nos.	125393	877751

17	Supplying, Installation, Testing and commissioning of small form-Pluggable (SFP) for Network Switches. Must be hot Pluggable, RoHS Complaint, etc. complete as required				
a	1G SFP Single Mode/Multi Mode	6	Nos.	4211	25266
b	10 G SFP + Single Mode/Multi Mode	6	Nos.	14972	89832
18	Supplying, Installation, Testing and commissioning of indoor Wireless Access Point for Low Density use having features and specifications etc. as mentioned here under - Dual-band Wi-Fi6 (802.11ax) 574Mbps (2.4GHz) + 1200Mbps (5GHz), WI-FI 6 Certified, 1 x RJ45 console port, 1G LAN POE Port with console management function factory reset, WPA/WPA2/WPA3™ Personal/Enterprise, WEP 64/128- bit, SSID broadcast disable, MAC address access control, Internal RADIUS server, SNMP, Customizable Captive Portal, Auto Channel, Works as Access Point, WDS with AP, Wireless Client/MESH Web (HTTP), Secure Socket Layer (SSL), Traffic control, Support ATF/Fast Roaming/Band Steering, Supports enhanced security – WPA-PSK/WPA2-PSK/WPA3- PSK and RADIUS client, and Cipher negotiation, and MAC/ IP ACL for networks, Certifications: FCC, CE marked, UL/EN, RoHS and relevant MTCTE(TEC)/ BIS compliance/certification as applicable, Should also work as Standalone and must be Compatible with S/W & H/W Controller with additional features like - Real-Time Monitoring and Alerts, Rich Advanced Features, Centralized Device Management, Role-Based Administration, Real-Time Monitoring, VLAN and Access Control, Auto RF Management and Bandwidth Optimization, Multi-SSID and Captive Portal Authentication, etc. complete as required.	38	Nos.	22739	864082
19	Supplying and fixing following modular switch/ socket on the existing modular plate & switch box including connections but excluding modular plate etc. as required.				
a	Telephone socket outlet	134	Nos.	168	22512
	<b>Total Sub Head:- IX</b>				<b>7947002</b>
	<b>Sub Head:-X (CCTV)</b>				
	<b>IP CCTV SYSTEM</b>				

1	<p>Supplying Installation Testing and Commissioning of 5/6MP IP IR Dome Camera having following specifications and features etc :-</p> <ol style="list-style-type: none"> <li>1) Type of Camera: Dome Camera</li> <li>2) Image Sensor: 1/2.8" or better progressive Scan CMOS get color image even at night condition</li> <li>3) Signal System: PAL/NTSC</li> <li>4) Minimum Illumination: 0.008Lux@ F1.4, AGC ON, 0 lux with IR or better</li> <li>5) Imaging: 1/3s to 1/30000s Shutter Support, Auto Gain Control , White Balance- Auto, Back Light Compensation, Multi zone Privacy Masking, HLC, Digital Watermarking.</li> <li>6) On Screen Display: Camera should display Camera title, Date &amp; Time in live &amp; recorded video both.</li> <li>7) Signal to Noise Ratio: &gt; 50 dB</li> <li>8) Day &amp; Night: True Day &amp; Night High Performance Mechanical IR cut filter with auto switch, IR Source- Inbuilt IR LED's with effective distance upto 50 Mtrs integrated IR 30 Mtrs for colour view in night.</li> <li>9) Video Compression (Minimum): H.265 or better, H.265, H.264H, H.264, Audio:- G.711U/A, G.711Mu, G.726, AAC, G.723</li> <li>10) Wide Dynamic Range: WDR (120db or more)</li> <li>11) Digital Noise Reduction: DNR (2D/3D) On/Off</li> <li>12) Streaming: Triple streaming, configurable</li> <li>13) Video Streaming &amp; Frame Rates: Triple streaming , configurable Main stream: 5/6MP @25/30 fps, Sub streams: D1 @25/30 fps or better</li> <li>14) Image Setting: Rotate Mode, saturation, brightness, contrast, sharpness adjustable through client software or web browser</li> <li>15) Profile Management: User configuration import, export</li> <li>16) Security: User Authentication, Water Marking</li> </ol>				
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	<p>17) Onboard Storage: Camera should support built-in Micro SD/SDHC/SDXC Card slot upto 512 GB. It should be supplied with minimum 128GB memory Card.</p> <p>18) Recording Management: Format SD, overwrite, storage management, video to NAS device,</p> <p>19) Edge Analytics : Tripwire, Intrusion, Motion Detection</p> <p>20) Alarm Trigger : Motion/tampering detection; network disconnection detection; IP conflict detection; memory card state detection; memory space detection</p> <p>21) Alarm Support: It should have 1/1 Alarm In/ Out Port</p> <p>22) Audio Support: It should have 1x Built-In Mic and 1/1 Audio In/ Out Port for external Mic. and Speaker (As per site requirement) with G.711U/A/ G.711Mu/ AAC/ G.726 audio compression</p> <p>23) Network Protocol: SFTP, IPv6, IPv4, DNS, RTCP, NTP, RTP, HTTP, HTTPS, SNMP TCP/IP, PPPoE, NFS, UDP, ICMP, SSL, DHCP, SMTP, RTSPS, unicast,</p> <p>24) System Capability: ONVIF</p> <p>25) VMS: Camera shall support open source VMS</p> <p>26) Cyber Security: trusted boot, AES 256-bit Encryption, Configuration encryption, trusted execution, Digest, security logs, , account lockout, video encryption, IP/MAC filtering, HTTPS, trusted upgrade.</p> <p>27) Ethernet: 1 RJ 45 10/100 Ethernet port</p> <p>28) Power Input: The camera should support simultaneous dual power input—12 VDC (via power adapter) and PoE—to ensure continuous operation in the event of a failure in one power source.</p> <p>29) Power Requirement: 12VDC/24 VAC/PoE (802.3af)/ePoE</p> <p>30) Enclosure: IP67 weather proof, IK10</p> <p>31) Operating Condition: Ambient Temperature:- (-)05°C to 50°C, humidity 95% (max) (non-condensing)</p> <p>32) IR life: 40000 hours or higher</p> <p>33) Video Bit rate: 32 KBPS - 8 MBPS or better</p> <p>34) Standards: BIS with ER, STQC Certified, CE, FCC and RoHS</p>				
a	5MP/6MP IP IR 2.7 to 4 mm ~12 to 13.5mm or better Varifocal Motorized lens Dome Camera.	14	Nos.	26993	377902
2	Supplying Installation Testing and Commissioning of 5/6 MP IP IR Bullet Camera having following specifications and features etc :-				
	<p>1) Type of Camera: Bullet Camera</p> <p>2) Image Sensor: 1/2.8" or better progressive Scan CMOS get color image even at night condition</p> <p>3) Signal System: PAL/NTSC</p>				

	<p>4) Minimum Illumination: 0.006Lux@ F1.4, AGC ON, 0 lux with IR or better</p> <p>5) Imaging: 1/3s to 1/30000s, Auto Gain Control , White Balance- Auto, Back Light Compensation, Multi zone Privacy Masking, HLC, Digital Watermarking.</p> <p>6) On Screen Display: Camera should display Camera title, Date &amp; Time in live &amp; recorded video both.</p> <p>7) Signal to Noise Ratio: &gt; 50 dB</p> <p>8) Lens Type &amp; Focus: 3.6mm/6mm fixed lens ( optional as per site requirement)</p> <p>9) Day &amp; Night: True Day &amp; Night High Performance Mechanical IR cut filter with auto switch, IR Source- Inbuilt IR LED's with effective distance upto 50 Mtrs integrated IR and 30 Mtrs for colour view in night.</p> <p>10) Video Compression (Minimum): H.265 or better, H.265, H.264H, H.264, Audio:- G.711U/A, G.711Mu, G.726, AAC, G.723</p> <p>11) Wide Dynamic Range: WDR (120db or more)</p> <p>12) Digital Noise Reduction: DNR (2D/3D) On/Off</p> <p>13) Streaming: Triple streaming, configurable</p> <p>14) Video Streaming &amp; Frame Rates: Triple streaming , configurable Main stream: 5/6MP @25/30 fps, Sub streams: D1 @25/30 fps or better</p> <p>15) Image Setting: Rotate Mode, saturation, brightness, contrast, sharpness adjustable through client software or web browser</p> <p>16) Profile Management: User configuration import, export</p> <p>17) Security: User Authentication, Digital Water Marking</p> <p>18) Onboard Storage: Camera should support built-in Micro SD/SDHC/SDXC Card slot upto 512 GB. It should be supplied with minimum 128GB memory Card.</p>				
	19) Recording Management: Format SD, overwrite, storage management, video to NAS device,				
	<p>20) Edge Analytics: Tripwire, Intrusion, Motion Detection</p> <p>21) Alarm Trigger : Motion/tampering detection; network disconnection detection; IP conflict detection; memory card state detection; memory space detection</p> <p>22) Alarm Support: It should have 1/1 Alarm In/ Out Port</p> <p>23) Audio Support: It should have 1x Built-In Mic and 1/1 Audio In/ Out Port for external Mic. and Speaker</p>				



	<p>(As per site requirement) with G.711U/A / G.711Mu/ AAC/ G.726 audio compression</p> <p>24) Network Protocol: SFTP, IPv6, IPv4, DNS,RTCP, NTP, RTP, HTTP, HTTPS, SNMP TCP/IP, PPPoE, NFS, UDP, ICMP, SSL, DHCP, SMTP, RTSPS, unicast,</p> <p>25) System Capability: ONVIF</p> <p>26) VMS: Camera shall support open source VMS</p> <p>27) Cyber Security: trusted boot, AES 256-bit Encryption, Configuration encryption, trusted execution, Digest, security logs, account lockout, , video encryption, IP/MAC filtering, HTTPS, trusted upgrade.</p> <p>28) Ethernet: 1 RJ 45 10/100 Ethernet port</p> <p>29) Power Input: The camera should support simultaneous dual power input—12 VDC (via power adapter) and PoE—to ensure continuous operation in the event of a failure in one power source.</p> <p>30) Power Requirement: 12VDC/24 VAC/PoE (802.3af)/ePoE</p> <p>31) Enclosure: IP67 weather proof, IK10</p> <p>32) Operating Condition: Ambient Temperature:- (-)05°C to 50°C, humidity 95% (max) (non-condensing)</p> <p>33) IR life: 40000 hours or higher</p> <p>34) Video Bit rate: 32 KBPS - 8 MBPS or better</p> <p>35) Standards: BIS with ER, STQC Certified, CE, FCC and RoHS</p>				
a	5MP/6MP IP IR 2.7 to 4 mm ~12 to 13.5mm or better Varifocal Motorized lens outdoor Bullet Camera.	4	Nos.	26993	107972
3	Supplying Installation Testing and Commissioning of PTZ (Pan,Tilt and Zoom) IP IR Camera having following specifications and features etc :- PTZ (Pan,Tilt and Zoom) IP IR Camera having following specifications and features etc :-				
	<p>1) IP IR PTZ Camera: Motorized PAN TILT ZOOM with IR</p> <p>2) Image Sensor: 1/2.8" or better progressive Scan CMOS</p> <p>3) Signal System: PAL/NTSC</p> <p>4) Minimum Illumination: 0.008 Lux@ F1.6, AGC ON,, 0 lux with IR, or better</p> <p>5) Imaging: 1/1s to 1/30000s, Auto Gain Control , White Balance- Auto, Back Light Compensation, Image Rotation, Multi zone Privacy Masking (Upto 24 Area), HLC, Defog, Region Of Interest and EIS features.</p> <p>6) On Screen Display: Camera should display Camera title, Date &amp; Time in live &amp; recorded video both.</p>				

	<p>7) Signal to Noise Ratio: &gt; 50 dB</p> <p>8) Event Notification: Through Relays, E-Mails or FTP</p> <p>9) Day &amp; Night: True Day &amp; Night High Performance Mechanical IR cut filter with auto switch, IR Source- Inbuilt IR LED's with effective distance. The camera should have IR LED's and cover distance up to 300 meter or above</p> <p>10) Auto Tracking: The camera should be equipped with Deeplearning- based auto tracking function using simultaneously all of the panning, tilting and zooming should be available. When a motion is detected in a registered monitoring area, the camera should track the motion (object) and capture it.</p> <p>11) Pre/Post Event Buffering: The camera should support atleast of 5 seconds of pre &amp; post event buffering.</p> <p>12) Presets: 300 Presets</p> <p>13) Video Compression (Minimum): H.265 or better, H.265, H.264H, H.264, Audio:- G.711U/A, G.711Mu, G.726, AAC, G.723</p> <p>14) Wide Dynamic Range: WDR (120db or more), HLC &amp; BLC</p> <p>15) Digital Noise Reduction: DNR (2D+3D) On/Off</p> <p>16) Image Setting: Rotate Mode, ROI ,EIS, Defog, saturation, brightness, contrast, sharpness adjustable through client software or web browser</p> <p>17) Profile Management: User configuration import, export</p> <p>18) Cyber Security: Configuration encryption, AES 256-bit Encryption, Digest, account lockout, video encryption, IP/MAC filtering, trusted boot, trusted upgrade, trusted execution</p>				
	19) Onboard Storage: Camera should support built in Micro SD/SDHC/SDXC Card slot upto 512 GB . It should be supplied with minimum 128GB Memory.				
	<p>20) Recording Management: Format SD, overwrite, storage management, video to NAS device, remote archive access via FTP login</p> <p>21) Edge based Video Analytics &amp; Alarm Trigger: Motion/tampering detection; network disconnection detection; IP conflict detection; memory card state detection; memory space detection, Tripwire, Intrusion, Object Abandon/ Missing, SMD, Face Detection</p> <p>22) Network Protocol: SFTP, IPv6, IPv4, DNS,NTP, HTTP, HTTPS, SNMP, TCP/IP,</p>				

	<p>PPPoE, NFS, ICMP, DHCP, SMTP, RTSPS.</p> <p>23) System Capability: ONVIF Profile S, G &amp; T. CCTV Camera OEM should be fulltime member of ONVIF and quoted models should be listed on ONVIF official website (All the certifications &amp; Credentials should be valid on the date of technical evaluation).</p> <p>24) VMS: Camera shall support open source VMS</p> <p>25) Connectivity: 1x LAN RJ-45 (10/100Base-T)</p> <p>26) Audio Support: Audio Interface : The camera should have 1/1 Audio In/Out to connect External Mic and Speaker Audio Compression : PCM, G.711U/A, G.711MU, G.726, MPEG2- Layer2, G.722.1</p> <p>27) Alarm In/Out : Alarm In/out- 7/2 Ch In/Out</p> <p>28) Power Input: The camera should support simultaneous dual power input— DC/ AC (via power adapter) and PoE (802.3af)— to ensure continuous operation in the event of a failure in one power source.</p> <p>29) Power Requirement: 24 VDC, 2.5 A (<math>\pm 25\%</math>), PoE+ (802.3at)</p> <p>30) Enclosure &amp; Weather Proof Standard: IP67 weather proof and IK10, TVS 8000V lightning proof, surge protection, voltage transient protection</p> <p>31) Operating Condition:- Ambient Temperature:- (-)05°C to 50°C, humidity 95% (max) (non condensing)</p> <p>32) IR life: 40000 hours or higher</p> <p>33) Video Bit rate: 32 KBPS - 8 MBPS or better</p> <p>34) Standards: BIS with ER, STQC Certified, CE, FCC and RoHS</p>				
a	<p>5MP IP IR motorized PTZ @25/30fps or better camera, Triple streaming , configurable on resolution:- Main stream: 5MP@25/30 fps Sub streams:1080p@25/30 fps, varifocal lens 3.95mm (<math>\pm 5</math>mm) ~ 177.75mm (<math>\pm 5</math>mm) or better with Automatic &amp; manual Focus Adjustment provisions, 32x Optical zoom and 12x Digital zoom with angle of view H: 65.7°–1.9°V: 39.4°–1.1°D: 73.1°–2.1, PAN Travel: Pan: 0° ~ 360° endless,Manual Pan: 260° /s, Preset : 300° /s, Tilt Travel: Tilt: - 20° ~ 90°, auto flip 180°, Manual Tilt: 120° /s, Preset : 200° /s</p>	1	Each	107974	107974

4	Supplying, drawing, Installation, Testing and commissioning of Cat6A UTP 4 pair, 23 AWG solid copper cable in existing conduit/ on surface, U/FTP, LSZH, Non-Plenum, Horizontal (solid) Cable suitable for high speed data networking application supporting upto 10Gbps over a 100 meter channel. The 4 Unshielded Twisted Pairs (UTP) cable with color coded insulation for easy identification should have FLAME PROPERTIES i.e. Flammability Test - IEC 60332-1, Smoke Density - IEC 61034, LSZH standards compliance: ANSI/TIA-568 C.2, ISO/IEC 11801, IEEE 802.3an, RoHS. Delay Skew should be < 45NS. The outer Cable Diameter should be 7.5 + 2 mm. Cable should have been tested and verified by UL/ ETL.				
a	1 Run of cable	275	Mtr.	62	17050
b	2 Run of cable	80	Mtr.	99	7920
5	Supplying and fixing of following sizes of steel conduit along with accessories in surface/recess including painting in case of surface conduit, or cutting the wall and making good the same in case of recessed conduit as required.				
a	20 mm	275	Mtr.	254	69850
b	25 mm	80	Mtr.	289	23120
6	Supplying and laying of following size DWC HDPE pipe ISI marked along with all accessories like socket, bend, couplers etc. conforming to IS 14930, Part II complete with fitting and cutting, jointing etc.direct in ground (75 cm below ground level) including excavation and refilling the trench but excluding sand cushioning and protective covering etc., complete as required.				
a	63 mm dia (OD-63 mm & ID-51 mm nominal)	10	Mtr.	289	2890
7	Supplying and drawing following core Fiber Optic Cable having corrugated steel armoring. The Fiber should be SM Fiber Central -loose tube filled with Thixotropic jelly, duly following Standards: ISO 11801, IEC 60793-1/60794-1-2, ITU-T-REC G.652D and Telecordia GR-20-core, High quality Electro Chromium Coated Corrugated Steel tape (ECCS ) and HDPE Sheath, Operating ambient Temperature should be – 5 deg C to +50 deg C and Storage Temperature shall be – 5 deg C to +50 deg C, Max Attenuation ± 0.36 (db / km) at Operational Wavelength 1310 nm and ± 0.22 db / km at Operational				

	Wavelength 1550 nm. type of fiber should be 9/125 / G.652D & Refractive Index should be 1.4670/1.4675. The value for Mode-field, Cladding Diameter $9.2 \pm 0.4 \mu\text{m}$ and $125 \pm 0.7 \mu\text{m}$ correspondingly. The Dispersion value $< 3.5 < 18 \text{ ps/nm-km}$ and PMD value $< 0.2 \text{ ps/km}$ and Cable Cut-off wavelength $< 1260 \text{ nm}$ etc complete as required.				
a	Single Mode 6 Core Optical fiber cable	80	Mtr.	64	5120
8	Supplying, Installation, Testing and commissioning of CAT6A Copper Information Outlet (IO) with face plate of color as per site requirement, should have ETL/UL verification program certificate for compliance with ANSI/TIA-568.2-D. All copper Cable and Components should be from same OEM to maintain compatibility and interoperability etc. complete as required.	19	Each	302	5738
9	Supplying, Installation, Testing and commissioning of following CAT6A Patch Cord should have ETL/UL verification program certificate for compliance with ANSI/TIA-568.2-D etc. complete as required.				
a	Copper Patch Cords of length 1m (3ft)	19	Each	173	3287
b	Copper Patch Cords of length 3m (10ft)	19	Each	405	7695
10	Supplying Installation Testing and Commissioning of 24 port Cat6 Patch Panel loaded. Must be of 1U height with clear label holders and white label with the panel. 24 Ports Cat-6 Patch Panel should have ETL/UL verification program certificate for compliance with ANSI/TIA-568.2-D etc. complete as required.	1	Each	5278	5278
11	Supply and fixing of following size Wall Mount Rack having Fixed Structure with 0.8mm CRCA Sheet, completely knocked-down condition (CKD) Shape, Vertical Mounting Rail 1.6 mm with 'U'Marking, Minimum 2 cable entry/exit provision at Top and bottom with rubber protection, Front 5mm Toughened Glass with lock, wall mounting kit, Powder coated Color-RAL- 7035, complied with UL & RoHS, 2 x 6 sockets 16A power distribution units, 3 numbers closed cable organizer, Hardware mounting screws packet of 20 x 1 number, etc. complete as required.				
a	6U Rack	6	Nos.	6939	41634

12	Supply and fixing 24U Rack with 4 inch Castor wheels and front brake Floor Standing Rack with Main Frame Pillar of 1.25mm CRCA Sheet with removable side panels, L- Shape adjustable Vertical Mounting Rail of 2mm with 'U'Marking completely knocked-down condition (CKD) Shape, fitted with 4 number cooling fans, minimum 5nos two line cable entry/exit provision at top and bottom with rubber protection, Front door 5mm Toughened Glass with MS frame or MS perforated with lock, Rear MS vented or perforated door, Powder coated Color- RAL- 7035 or black, complied with UL & RoHS, 2 x 6 sockets 16A power distribution units, 3 numbers closed cable organizer, Hardware mounting screws packet of 20 x 1 number, etc. complete as required.	1	No.	21201	21201
13	Supplying, installation, Testing and commissioning of following capacity 8 port Layer 2 indoor Network Switch having features and specifications etc. as mentioned here under: Minimum 8 X RJ-45 Gigabit Ethernet Ports and additional 2 X 1G SFP Ports with non-blocking architecture by having Switching capacity of minimum 20Gbps and packet forwarding rate of 14Mpps or higher, 8K MAC table. Internal dual AC Power supply with operating temperature of -5 0C to +50 0C. Jumbo frame: 9KB or higher, IGMP Snooping, IGMP snooping querier and support for IGMP Snooping Fast Leave, Should create 250 or more MLD groups, MLD Snooping, Per VLAN MLD Snooping C MLD Snooping Fast Leave, STP, RSTP, MSTP, Loopback detection, Multicast filtering, VLAN Tagging, QOS: 8 Que per port, WRR, IPv4/IPv6 Interface : minimum 100 IPv4 static route entries and minimum 50 IPv6 static route entries, 700 Access Control entries, SSH CSSL for IPv4 and IPv6, 802.1x, ARP Spoofing, DHCP Snooping and server screening, IP+MAC+Port Binding, Per Port Bandwidth Control, 802.1X Authentication (Supports local/RADIUS database, Port-based Access Control and EAP, OTP, TLS, TTLS, PEAP Support) Cable Diagnostic feature, LLDP, LLDP-MED, Sntp/NTP, RMON, SNMP v1,v2c, v3 and SNMP Traps. Certifications: FCC, CE marked, UL/EN, RoHS and relevant MTCTE(TEC)/BIS compliance/certification as applicable, etc. complete as required.				

a	8 port PoE Layer 2 Network Switch with PoE Support of 130W or higher with each copper port supporting 802.3at PoE+.	6	Each	35091	210546
14	Supplying, installation, Testing and commissioning of following capacity 24 port Layer 3 Network Switch having features and specifications etc. as mentioned here under: At least 20 X RJ-45 Gigabit Ethernet Ports and additional 4 combo 10/100/1000 base-t/SFP Ports with additional 4 SFP+ ports non-blocking architecture by having Switching capacity of min. 128Gbps and packet forwarding rate of 95Mpps or higher, 16K MAC table. Console Port, USB port, Dual AC Power supply with operating temperature of 0 to +50 0C. Stacking port with stacking support of minimum 8 units per stack. 32K Mac address, 9K or more Jumbo frame, ERPS with enabling ring to converge in less than 50 ms from node or link failure, Static routing, Static, 6to4, ISATAP and GRE, IPv6 Neighbor Discovery (ND), BGP, ISIS, MPLS, VRRP v2, OSPFv2/v3, PBR, Route Redistribution, RIPv1/v2/ng, IP Helper all L3 Protocols should support from day 1 for both IPv6 and IPv4, 802.1x, Port security , Radius C TACACS+ authentication C accounting, DAD, DAI, DoS attack prevention, SSH, Guest VLAN, IP Access List, MAC Access List. Multicast: VLAN, PIM-SM, PIMDM, PIM- SDM, PIM-SMv6, DVMRP v3 and MSDP, IGMP C MLD Snooping, Flow mirroring, IGMP C MLD Snooping Querier, Per-VLAN IGMP C MLD Snooping. SNMP, Dual configurations, Multiple images, RMON, LLDP/LLDP-MED, sFlow, DHCP/BOOTP Client, IPv4/IPv6, Syslog server, Debug command, 802.3ah Ethernet Link OAM, 802.1ag Connectivity Fault, Y.1731 OAM, 802.1Qbb Priority- based Flow Control (PFC), Dying Gasp, Cable Diagnostics , 6 kV surge protection on all Gigabit Ethernet ports and on all GE RJ-45 access ports. Certifications: FCC, CE marked, UL/EN, RoHS and relevant MTCTE(TEC)/BIS compliance/ certification as applicable, etc. complete as required.	1	No.	193791	193791
15	Supplying Installation Testing and Commissioning of following Channel Network Video Recorder (NVR) with camera licenses to record for all channels having specifications and features etc as mentioned below : 1) Network Video Recorder Embedded/				



	<p>Installed OS (Linux) along with Camera Licenses to record per NVR and to provide a live view, storage and simultaneously Multi-channel playback of all IP camera or more and must be ONVIF with minimum support of 384 Mbps incoming Bandwidth.</p> <p>2) NVR should support video compressions : H.265 or better, H.264, MJPEG.</p> <p>3) Must support 1 channel RCA Input, 2 channel RCA Output for Two-way Talk with G.711U/A, G.711u, PCM, G726 audio compressions.</p> <p>4) Intelligent auto power on when power resumes after power outage.</p> <p>5) Storage: It should support minimum 8 SATA Slots with 16TB capacity/ Slot and RAID support of RAID 0/1/5/6/10. (4 SATA (32 Channel) &amp; 8 SATA Slot for 64 Channel)</p> <p>6) Connectivity Interface : 2 Nos. x 10/100/1000 Mbps Ethernet Ports, 1x RS485, 1x RS232, 1x eSATA Port</p> <p>7) Backup Interface : Its should have 4 Nosx USB port (2x USB3.0, 2xUSB2.0)</p> <p>8) Video Output Ports: 2x HDMI and 2 VGA</p> <p>9) Alarm Ports: It should have 16/8 Ch In/ Out ports to connect various type of external sensors and output devices like hooter/ Siren etc.</p> <p>10) Email &amp; SMS Alert options: Option for SMS/ Email Alerts to minimum 5 designated mobile number for power failure, HDD failure, vandalism, tempring, network disconnection and panic</p> <p>11) Web &amp; Mobile Application: Web, Mobile app ( For iPhone, iPad, Android Phone) for alerts and viewing.</p> <p>12) Protocols: HTTP, HTTPS, TCP/IP, IPv4/IPv6, UDP, DHCP, DNS, SMTP, UPnP, IP Filter, PPPoE, FTP, DDNS, Alarm Server, IP Search, Multicast, Auto Registration, ONVIF (Profile T, Profile S, Profile G), CGI, SDK and OEM Cloud for remote monitoring without any public IP need.</p> <p>13) Standards: CE, FCC, RoHS, BIS Certified</p> <p>14) Power Supply : Should support AC100-240V, 50/60Hz Power supply.</p>				
	<p>15) Operating Condition : -5°C to 50°C, humidity 90% (max) (non-condensing)</p> <p>16) The VMS application shall support all the features &amp; functionalities of the offered cameras.</p> <p>17) VMS should consist Licenses for all channels to record Cameras with</p>				

	<p>General, motion detection, intelligent, alarm and POS recording modes. VMS should be provided with Camera Licenses , with no dependency of VMS licenses by binding with the MAC address of the cameras to achieve the functionality.18) The NVR OEM shall be responsible for providing a mobile application compatible with both Android and iOS devices, enabling remote monitoring and playback of cameras/NVR footage.19) The OEM must provide its own DDNS server hosted in India, eliminating the need for a public IP address for remote monitoring over the Internet.20) Must support Continuous, Alarm, Motion, Instant, Panic Recording Mode21) It should support Resolution: 32MP; 24MP; 16MP; 12MP; 8MP; 5MP; 4MP; 1080p; 720p; D1; CIF; QCIF22) When alarm recording is enabled and an event occurs, you can click the alarm icon on monitoring page to view the alert details. The snapshot function is supported on monitoring and playback page23) The Network Video Recorder (NVR) shall be configured to send email whenever a system message is created or an alarm event occurs. The email server shall be a valid SMTP server. Each recipient email address shall be configured to receive any combination of critical, warning, or informational messages or alarm notifications. When an alarm occurs, the email message includes the NVR name, time of alarm and a list of camera that is configured to record upon alarm24) It should have Web and GUI interface.25) Built-In Artificial Intelligence: NVR should have built-in AI :- - 2 Channel face detection and recognition, - Minimum 4 Channel perimeter protection, - Minimum 8 Channel Smart Motion Detection</p>				
	<p>26) Face Recognition Database Capacity: It should support total Blacklist and Whitelist capacity of Minimum 20,000 Faces or more with Face Detection speed of 12 face images/sec and facility to add Name, gender, birthday, address, credential type, credential No., countries &amp; regions and state to each face image. 27) Face &amp; Human Attributes Search: Search Pictures/ Video by Gender, age group, glasses, expressions, face mask, beard, Top color, top type, hat, bag, age, gender and umbrella. 28) ANPR Capability: It should support ANPR Camera with License plate, plate color, vehicle body, vehicle model, vehicle</p>				

	<p>logo, calling, seatbelt, vehicle registration location etc vehicle attributes.</p> <p>29) Alarm Notifications based on: Motion detection, video tampering, video loss, scene changing, PIR alarm, Camera external alarm, Face detection, face recognition, perimeter protection (intrusion and tripwire), ANPR, people counting, stereo analysis, crowd distribution, heat map, Disk Full, Storage Error, IP Conflict and abnormal behavior of fan, cybersecurity exception</p> <p>30) Alarm Notification should be linked with Recording, snapshots, Camera external alarm output, buzzer, logs, presets and email.</p> <p>31) General AI Based Search: Search Pictures by channel, time, event type, target classification (Fall Detection, People Approach Detection, People No. Exception Detection, People Staying Detection, Violence Detection.</p> <p>32) Smart playback function: Should support smart search for the selected area in the video and smart playback to improve the playback efficiency</p> <p>33) VCA (Video Content Analytic): Should support multiple video contented analytics based on camera analytics</p> <p>34) Analytics by NVR: Perimeter protection and face recognition</p>				
a	32 Channel Network Video Recorder (NVR) having display split :- Main screen: 1/4/8/9/16/25/32(36), 2nd screen: 1/4/8/9/16	1	Each	64784	64784
16	Supplying, Installation, Testing and Commissioning following capacity Surveillance grade Hard Disk with upto 256MB/s Transfer Rate, 256 MB Cache, 7200 RPM Disk Speed, 3.5 inch form factor, SATA Interface, BSMI, ICES-003/NNB-003, CE, FCC, KC, Maghreb, RCM, UKCA, VCCI, CB-Scheme, TUV, UL Certifications.				
a	10TB (Terabytes)	1	Each	24798	24798
17	SITC of 43" Display Panel, 4K UHD (3840x2160) Resolution, Brightness: 400 cd/m <sup>2</sup> , Response time (typical): 8 ms, Display colors: 16.7 Million, Operating system: Android 9, Contrast ratio (typical): 1200:1, Video input: HDMI 1.4 (x2), USB 2.0 (x2), Audio input: 3.5 mm jack, Audio output: 3.5mm jack, External control: RJ45, RS232 etc all complete etc as required.	1	Nos.	38295	38295
	<b>Total Sub Head:- X</b>				<b>1336845</b>

	<b>Sub Head:-XI (Fire Fighting, Fire Alarm, Sprinkler, PA System &amp; Fire Extinguisher)</b>				
<b>A</b>	<b>FIRE PUMP EQUIPMENT</b>				
1	Supplying, installation, testing and commissioning of Electric driven Main Fire Pump suitable for automatic operation and consisting of following, complete in all respects, as required :				
	Horizontal type, multistage, centrifugal, split casing pump of cast iron body & bronze impeller with stainless steel shaft, mechanical confirming to IS : 1520				
	Suitable HP squirell cage induction motor TEFC type suitable for operation on 415 volts, 3 phase, 50 Hz, AC supply with IP55 class of protection for enclosure, horizontal foot mounted type with Class-'F' insulation, conforming to IS-325.				
	M.S.fabricated common base plate, coupling, coupling guard, foundation bolts etc.as required.				
	Suitable cement concrete foundation duly plastered and with anti vibration pads.				
	<b>2280 lpm at 56 m Head</b>	1.00	Set	349421	349421
2	Supplying, installation, testing and commissioning of diesel engine driven main fire pump suitable for automatic operation and consisting of following, complete in all respects, as required : (Diesel Driven Pump)				
	Horizontal type, multistage, centrifugal pump of cast of iron body and bronze impeller with stainless steel shaft, mechanical seal conforming to IS 1520.				
	Suitable HP, 1500 RPM water cooled with radiator, diesel engine conforming to relevant IS standard complete with auto starting mechanism, 12 /24 volts electric starting quipment, diesel tank, exhaust pipe extended upto 10 m outside pump house duly insulated with 50 mm thick glass wool with 1.0 mm thick aluminium sheet cladding, residential silencer, instruments and protection as per standard specification, stop solenoid for auto stop in the event of fault with audio indications, painted with post office red colour etc. as required.				
	M.S.fabricated common base plate, coupling, coupling guard, foundation bolts etc.as required.				

	Suitable cement concrete foundation duly plastered and with anti vibration pads.				
	<b>2280 lpm at 56 m Head</b>	1.00	Set	639343	639343
3	Supplying, installation, testing and commissioning of electric driven pressurisation pump suitable for automatic operation and consisting of following, complete in all respects, as required : (Jockey Pump)				
	Horizontal type, multistage, centrifugal pump of cast of iron body and bronze impeller with stainless steel shaft, mechanical seal conforming to IS 1520.				
	Suitable HP squirrel cage induction motor TEFC type suitable for operation on 415 volts, 3 phase, 50 Hz, AC supply with IP55 class of protection for enclosure, horizontal foot mounted type with Class-'F' insulation, conforming to IS-325.				
	M.S.fabricated common base plate, coupling, coupling guard, foundation bolts etc.as required.				
	Suitable cement concrete foundation duly plastered and with anti vibration pads.				
	<b>180 lpm at 56 m Head</b>	1.00	Set	87105	87105
4	<b>CONTROL PANELS</b>				
	Fabrication, supply, Installation testing & commissioning of Electrical control panel of cubical construction, floor mounted type, fabricated out of 2mm thick CRCA sheet, compartmentalised with hinged lockable doors, dust and vermin proof, powder coated of approved shade after 7 tank treatment process, cable alley, interconnection with suitable size copper conductor cable/solid copper strip, having switchgears and accessories, mountings and internal wiring, earth terminals, numbering etc. complete in all respect, suitable for main fire pump, pressurisation pump & diesel pump set complete as per CPWD specification with following in coming and Outgoings, suitable for operation on 415V, 3 phase, 50Hz Ac Supply with enclosure protection class IP 42 as required :				
	INCOMING - 250A, 50kA 4 Pole MCCB, Ics=100% Icu rating Digital Voltmeter 0-500V with selector switch Digital Ammeter (0-630 A) with selector switch & CTs etc. LED type RYB phase indicating lamps, ON, OFF, trip I ndicating lamps Set of Copper Bus Bar				

	300A				
	OUTGOING ( Note : All outgoing feeders for pumps should have digital Ammeter with selector switches, and LED type ON, OFF, trip indicating lamps)520				
	Main Fire Pump 125 A, 50kA TPN MCCB, Ics=100% Icu, with fully automatic Star/Delta starter suitable for 60 HP pump with overload protection, current sensing type single phase preventor complete with all accessories and internal wiring required for automatic operation, selector switch for local/remote, manual/OFF operation.				
	Jockey Pump 63 A, 50kA TPN MCCB, Ics=100% Icu, with suitable HP fully automatic Star/Delta starter with overload protection, current sensing type single phase preventor complete with all accessories and internal wiring required for automatic operation, selector switch for local/remote, auto/manual/OFF operation.				
	Diesel Engine Control Control for diesel engine comprising - Automatic/Manual selector switch & 3 attempts starting device, timers and relays as required, push buttons, start/stop in manual mode Indicating lamp for high/ Low Lub. Oil pressure, High Water Temp and Engine on indication Battery charger suitable for 12V/24 V DC with boost and trickle selector switch, 0-30 V DC volt meter, and 0-20 A DC Ammeter All standard relays and accessories for automatic operation of diesel engine				
	SYSTEM CONTROLLER Designing, Supply, Installation, Testing and commissioning of system controller to control operation of main electric fire pump, diesel pump, Pressurization pump, Terrace pump in sequence as per specification consisting of relays, timers. Sensors, annunciation window for fault indication, complete as per specification	1.00	Set	256783	256783

5	Providing, laying, testing & commissioning of 'C' class heavy duty MS pipe conforming to IS 3589/IS 1239 including Welding, fittings like elbows, tees, flanges, tapers, nuts bolts, gaskets etc. and fixing the pipe on the wall/ceiling with suitable clamp/support frame and painting with two or more coats of synthetic enamel paint of required shade complete as required:				
a	25mm dia	10.00	Rmt	920	9200
b	65mm dia	5.00	Rmt	1955	9775
c	80mm dia	10.00	Rmt	2277	22770
d	100mm dia	15.00	Rmt	3077	46155
e	150mm dia	15.00	Rmt	4299	64485
f	200mm dia	10.00	Rmt	6620	66200
6	Providing and fixing forged brass ball valve of brass body with hard chrome plated steel ball inside PTFE (Teflon) seat & ring with chrome plated centre handle with female BSP threads complete in all respects.				
a	25mm dia	5.00	Each	1739	8695
7	Supplying, fixing, testing and commissioning of butterfly valve of PN 1.6 rating with bronze/gunmetal seat duly ISI marked complete with nuts, bolts, washers, gaskets conforming to IS 13095 of following sizes as required :				
a	65mm dia	2.00	Each	4712	9424
b	80mm dia	2.00	Each	5406	10812
c	150mm dia	2.00	Each	9737	19474
d	200mm dia	3.00	Each	16248	48744
8	Providing, installation, testing and commissioning of non-return valve of following sizes confirming to IS: 5312 complete with rubber gasket, GI bolts, nuts, washers etc.as required :				
a	65mm dia	1.00	Each	6913	6913
b	150mm dia	2.00	Each	18884	37768
c	200mm dia	1.00	Each	30896	30896
9	Providing, installation, testing and commissioning of stainless steel Y-strainer fabricated out of 1.6 mm thick stainless steel, Grade 304, sheet with 3 mm dia holes with stainless steel flange.				
a	80mm dia	1.00	Each	5117	5117
b	200mm dia	2.00	Each	23571	47142



10	Supplying and fixing air vessel made of 250 mm dia, 8 mm thick MS sheet, 1200 mm in height with air release valve on top and flanged connection to riser, drain arrangement with 25 mm dia gun metal wheel valve with required accessories, pressure gauge and painting with synthetic enamel paint of approved shade as required.	1.00	Each	19402	19402
11	Providing & fixing of pressure switch in M.S./GI pipe line including connection etc. as required.	3.00	Each	1670	5010
12	Providing & fixing of flow switch in M.S./GI pipe line including connection etc. as required.				
a	150mm dia	2.00	Each	9644	19288
13	P/F/T/C of gun metal / Brass Air Release Valve of 25 mm dia of approved quality etc. complete to the entire satisfaction and direction of Fire Officer/Engr-in-Charge	1.00	Each	1584	1584
<b>B</b>	<b>FIRE HYDRANT SYSTEM</b>				
15	Providing, laying, testing & commissioning of 'C' class heavy duty MS pipe conforming to IS 3589/IS 1239 including Welding, fittings like elbows, tees, flanges, tapers, nuts bolts, gaskets etc. and fixing the pipe on the wall/ceiling with suitable clamp/support frame and painting with two or more coats of synthetic enamel paint of required shade complete as required :				
a	25mm dia	5.00	Rmt	920	4600
b	80mm dia	120.00	Rmt	2277	273240
c	100mm dia	106.00	Rmt	3077	326162
d	150mm dia	70.00	Rmt	4299	300930
16	Supplying and fixing single headed internal hydrant valve with instantaneous Gunmetal/Stainless Steel coupling of 63 mm dia with cast iron wheel ISI marked conforming to IS 5290 (Type -A) with blank Gunmetal/Stainless Steel cap and chain as required :				
a	Single headed Stainless Steel	5.00	Set	6632	33160
17	Supplying and fixing Single headed external yard hydrant valve with 1 No. 63 mm dia instantaneous FM Gunmetal/Stainless Steel coupling and cast iron wheel, ISI marked, conforming to IS 5290 (type A) with blank Gunmetal/Stainless Steel cap and chain as required :				
a	Single headed Stainless Steel	6.00	Set	6632	39792

18	Supplying, fixing, testing and commissioning of butterfly valve of PN 1.6 rating with bronze/gunmetal seat duly ISI marked complete with nuts, bolts, washers, gaskets conforming to IS 13095 of following sizes as required :				
a	80mm dia	6.00	Each	5406	32436
b	100mm dia	5.00	Each	7271	36355
c	150mm dia	2.00	Each	9737	19474
19	Supplying and fixing orifice plate made out of 6 mm thick stainless steel (Grade 304) with orifice of required size to be fitted between flange & landing valve of external and internal hydrants to reduce pressure at the outlet to the level of 3.5 kg/cm <sup>2</sup> complete as required.	11.00	Each	1424	15664
20	Supplying and fixing 63 mm dia, 15 m long RRL hose pipe with 63 mm dia male and female couplings duly bound with GI wire, rivets etc. conforming to IS 636 (type-A) as required :				
a	Stainless Steel (Grade 304)	22.00	Each	4667	102674
21	Supplying and fixing first-aid Hose Reel with MS construction spray painted in post office red, conforming to IS 884 complete with the following as required. 20 mm nominal internal dia water hose thermoplastic (Textile reinforced) type -2 as per IS: 12585 20 mm nominal internal dia gun metal globe valve & nozzle. Drum and brackets for fixing the equipments on wall. Connections from riser with 25 mm dia stop gun metal valve & M.S. Pipe and socket.				
a	30 M	5.00	Each	9440	47200
22	Supplying & fixing 63 mm dia gun metal short branch pipe with 20 mm nominal internal diameter size nozzle conforming to IS 903 suitable for instantaneous connection to interconnect hose pipe coupling as required :				
a	Stainless Steel (Grade 304)	5.00	Each	1756	8780
23	Supplying and fixing of fire brigade connection of cast iron body with gun metal male instantaneous inlet couplings complete with cap and chain as reqd. for suitable dia MS pipe connection conforming to IS 904 as required :				
a	2 way - 150 mm dia M.S. Pipe near UG Sump	1.00	Each	7262	7262
b	4 way - 150 mm dia M.S. Pipe	1.00	Each	14820	14820

24	Providing, installation, testing and commissioning weather proof lockable cabinet of size 750 X 600 X 250mm made out of 18 guage M.S. sheet having central opening and 3 mm thick glazed glass door suitably marked on the outside with the letters "FIRE HOSE" including necessary locking arrangement and shall be painted with one coat of primer and two coats of synthetic enamel paint of approved shade as required as per specifications.	6.00	Each	4636	27816
25	P/F/T/C of gun metal / Brass Air Release Valve of 25 mm dia of approved quality etc. complete to the entire satisfaction and direction of Fire Officer/Engr-in-Charge	2.00	Each	1584	3168
<b>C</b>	<b>SPRINKLER SYSTEM</b>				
26	Providing, laying, testing & commissioning of 'C' class heavy duty MS pipe conforming to IS 3589/IS 1239 including Welding, fittings like elbows, tees, flanges, tapers, nuts bolts, gaskets etc. and fixing the pipe on the wall/ceiling with suitable clamp/support frame and painting with two or more coats of synthetic enamel paint of required shade complete as required :				
a	25mm dia	740.00	Rmt	920	680800
b	32mm dia	22.00	Rmt	1039	22858
c	40mm dia	340.00	Rmt	1259	428060
d	50mm dia	235.00	Rmt	1557	365895
e	65mm dia	125.00	Rmt	1955	244375
f	80mm dia	90.00	Rmt	2277	204930
g	100mm dia	160.00	Rmt	3077	492320
h	150mm dia	100.00	Rmt	4299	429900
27	Supplying, fixing, testing and commissioning of butterfly valve of PN 1.6 rating with bronze/gunmetal seat duly ISI marked complete with nuts, bolts, washers, gaskets conforming to IS 13095 of following sizes as required :				
a	50mm dia	10.00	Each	4114	41140
b	80mm dia	2.00	Each	5406	10812
c	100mm dia	2.00	Each	7271	14542
d	150mm dia	7.00	Each	9737	68159
28	Providing, fixing, testing & commissioning of 15mm dia quartzoid bulb type sprinklers of rating K80 68 degree centigrade with required accessories :				
a	Pendent Sprinkler	530.00	Each	599	317470

b	Upright Sprinkler	453.00	Each	599	271347
29	Providing & fixing of flow switch in M.S./GI pipe line including connection etc. as required.				
a	150mm dia	5.00	Each	9644	48220
30	Supplying, installation, testing & commissioning of sprinkler flexible pipe (UL Listed) of stainless steel complete with 15 NPT on reducer thread with maximum working pressure of 175 PSI test pressure of 875 PSI (Burst) with branch line (Inlet) 25mm NPT male thread to sprinkler head (Outlet) 15mm NPT female thread with reducer, nipple, 2 side brackets, center bracket, stockbar of following sizes complete as required.				
a	1200mm	530.00	Set	1800	954000
31	Providing, installation, testing & commissioning of adjustable rosette plate for 15mm dia in white finish UL Listed or FM approved complete as required.	530.00	Each	264	139920
32	Supplying, installation, testing & commissioning of main control and indicating panel made out of 16 SWG MS sheet to accommodate the following items duly powder coated in approved colour with louvers for ventilation, locking arrangement, audio and visual indication for fire alarm and public address system, monitoring system including connections, interconnections etc complete as required. 10 Zone panel for fire alarm system 250 Watt amplifier racks suitable for operation on 230V AC/24V DC supply conforming to IEC-268-3 complete with all accessories as required - 2 Nos.(one to act as standby) Talk back master station with LED PTT (press to talk) push button for operation on 230V AC/24 V DC supply conforming to IEC-268 for simplex mode of operation / communication suitable for 20 Nos.talk back unit -1 set. Announcement control desk suitable for selection of different zones selectively and ON ALL CALL switch with visual indication etc. complete as required -1 set. Amplifier change over switch for inter changing amplifier -1 No. Monitor panel for loudspeaker complete with output selector, ON / OFF switch, fuse, visual indications etc. complete as required - 1 No. Gooseneck microphone with stand and ON/OFF switch- 1 No. Main ON / OFF switch, fuse indication	1.00	Each	75339	75339

	lamps, DC and AC voltmeters & ammeters, terminal blocks etc. complete as required -1 set. Battery charger trickle cum boost to take complete load of fire alarm & PA system complete with all accessories including providing & fixing of 2 nos.12 volt, 60 AH each sealed maintenance free batteries -1 set.				
<b>D</b>	<b>FIRE EXTINGUISHERS</b>				
33	Supply, installation, testing and commissioning of ABC Powder Type (Stored Pressure) Fire Extinguisher 6 Kg. Capacity ISI Mark IS:15683 operating temperature (+5)°C to (+55)°C for Class 2A & 21B type of fire filled with MAP Powder Complete in all respect.	52.00	Each	3138	163176
35	Supply, installation, testing and commissioning fire extinguisher of carbon dioxide type consisting of brand new high pressure steel cylinder bearing IS: 7285 mark and having the approval of controller of explosives Nagpur, wheel type valve bearing IS:3224 mark internal discharge tube, 1 Mtr. long high pressure discharge hose, non conducting horn, suspension bracket, fully charged bearing IS: making fixed to wall as directed conforming IS : 15683:2018				
a	4.5kg capacity cylinder	15.00	Each	5630	84450
36	Supply, installation, testing and commissioning fire extinguisher of 9 ltr capacity Mechanical foam type as per latest IS 15683:2018 consisting of Two pieces deep drawn Body of MS sheet. No Vertical Weld on the body. Skirt ring on base of all fire extinguishers for long life. Initial charge : 540 ml AFFF 6% liquid as per IS 4989 part 2. Gross weight of a charged extinguisher should be approx. 17 Kgs. Body should be tested @35 bar& burst pressure should be more than 100 bar. Syphon tube should be made of SS to avoid corrosion & provide high performance. Control Valve should be made of Brass and should have a spring release type pressure relief valve. Painting should be as per shade no.538 of IS 5. The body should be internally and externally epoxy powder coated.	5.00	Each	3531	17655
37	FIRE BUCKET STAND WITH 4 NOS. OF FIRE BUCKET Including canopy support structure made out of 50x50x6 angle verticals and horizontal member.	10.00	Each	4859	48590

	The top canopy shall be made out of 1 mm thick corrugated aluminum sheet. The overall height of the canopy shall be 2 Mtr.s from FGL and the buckets shall be hung at support provided at 1 Mtr. from FGL. The Aluminum shade shall be fixed to the MS structure with SDST screws of Hilti or equivalent make .All the MS Strucutre shall be applied with two coats of primer and two coats of synthetic Enamel paint as approved by Client.				
<b>G</b>	<b>FIRE DETECTION &amp; ALARM SYSTEM (ADDRESSABLE)</b>				
39	Supplying, installation, testing and commissioning of micro processor based intelligent addressable main fire alarm panel, central processing unit with the following loop modules and capable of supporting not less than 240 devices (including detectors) and minimum 120 detectors per loop and loop length up to 2 km, network communication card, minimum 320 character graphics/ LCD display with touch screen or other keypad and minimum 4000 events history log in the non volatile memory (EPROM), power supply unit (230 ± 5% V, 50 hz), 48 hrs back-up with 24 volt sealed maintenance free batteries with automatic charger. The panel shall have facility to connect printer to printout log and facility to have seamless integration with analog/digital voice evacuation system (which is part of the schedule of work under SH: PA System) and shall be complete with all accessories . The panel shall be compatible for IBMS system with open protocol BACnet/ Modbus over IP complete as per specifications.				
a	Two Loop Panel.	1.00	Each	250420	250420
40	Supplying, installation, testing & commissioning of intelligent analog addressable photothermal detector complete with mounting base complete as required.	267.00	Each	3004	802068
41	Supplying, installation, testing & commissioning of response indicator on surface/recessed MS Box having two LED, metallic cover complete with all connections etc as required.	133.00	Each	306	40698
42	Supplying, installation, testing & commissioning of fault isolator complete with base as required.	21.00	Each	3434	72114

43	Supplying, installation, testing & commissioning of intelligent addressable thermal detector with rate of rise cum fixed temperature thermistor complete with base as required.	15.00	Each	2866	42990
44	Supplying, installation, testing & commissioning of addressable fire control module complete as required.	5.00	Each	3156	15780
45	Supplying, installation, testing & commissioning of intelligent addressable duct detector including suitable Photo detector complete with base as required.	5.00	Each	8183	40915
46	Supplying, installation, testing & commissioning of addressable manual call point complete as required.	11.00	Each	4063	44693
47	Supplying, installation, testing & commissioning of addressable horn cum strobe complete as required.	11.00	Each	3682	40502
48	Supplying, installation, testing & commissioning of fire fighter telephone handset complete as required.	1.00	Each	6016	6016
49	Supplying, installation, testing & commissioning of fire fighter phone jack complete as required.	1.00	Each	1689	1689
50	Supplying & laying of 2x1.5 sqmm fire alarm armoured cable, 600/1000V rated with annealed copper conductor having XLPE insulation, steel wire armouring & RLS outer sheath complete as required.	1,925.00	Mtr.	192	369600
51	Supplying and fixing of following sizes of steel conduit along with accessories in surface/recess including painting in case of surface conduit, or cutting the wall and making good the same in case of recessed conduit as required.				
a	20 mm	1,925.00	Mtr.	254	488950
<b>H</b>	<b>PUBLIC ADDRESS SYSTEM</b>				
52	Supplying, installation, testing & commissioning of 6 zone, voice alarm controller with USB, MP3 player (including 6 zone button paging station) with seamless integration facility with main fire alarm panel for voice evacuation complete as required.	1.00	Each	132115	132115
53	Supplying, installation, testing & commissioning of 1.5/3/6W metal box ceiling/wall speakers complete as required.	11.00	Each	1891	20801
54	Supplying, installation, testing & commissioning of digital audio amplifier 75 Watt, 25V rms operating at 240 Volt AC Supply complete as required.	5.00	Each	152368	761840



55	Supplying, installation, testing & commissioning of exit point directional sound speaker with voice and integral audio amplifier with selectable sound pulse patterns complete as required.	10.00	Each	10618	106180
56	Supplying, installation, testing & commissioning of Voice command keypad 6 zone, with microphone assembly complete as required.	1.00	Each	85450	85450
56	Supplying and drawing of cable Fire Retardant PVC insulated copper conductor cable in the existing surface / recessed steel conduit of following pairs, cores and size including connections and interconnections etc. as required.				
a	speaker cable Two pair, 2-core, 1.5 sqmm	240.00	Mtr.	97	23280
57	Supplying and fixing of following sizes of steel conduit along with accessories in surface/recess including painting in case of surface conduit, or cutting the wall and making good the same in case of recessed conduit as required.				
a	20 mm	240.00	Mtr.	254	60960
	<b>Total Sub Head:- XI</b>				<b>11646058</b>
	<b>Sub Head:- XII (Water Supply Pumping System)</b>				
1	Providing, laying, testing & commissioning of 'B' class medium duty G.I. pipe conforming to IS 1239 including welding, fittings like elbows, tees, flanges, tapers, nuts, bolts, gaskets etc. and fixing the pipe on the wall/ceiling with suitable clamp/support frame and painting with two or more coats of synthetic enamel paint of required shade complete as required				
a	100 mm dia	15.00	Metre	1925	28875
b	80 mm dia	10.00	Metre	1514	15140
c	65 mm dia	5.00	Metre	1330	6650
d	50 mm dia	15.00	Metre	1066	15990
2	Supplying, fixing, testing and commissioning of butterfly valve of PN 1.6 rating with bronze/gunmetal seat duly ISI marked complete with nuts, bolts, washers, gaskets conforming to IS 13095 of following sizes as required :				
a	100 mm dia	2.00	Each	7271	14542
b	80 mm dia	4.00	Each	5406	21624
c	65 mm dia	2.00	Each	4712	9424
d	50 mm dia	2.00	Each	4114	8228
3	Providing, installation, testing and commissioning of stainless steel Y-strainer fabricated out of 1.6 mm thick stainless steel, Grade 304, sheet with 3				

	mm dia holes with stainless steel flange.				
a	100 mm dia	2.00	Each	7270	14540
b	80 mm dia	2.00	Each	5117	10234
4	Providing, installation, testing and commissioning of non-return valve of following sizes confirming to IS: 5312 complete with rubber gasket, GI bolts, nuts, washers etc.as required :				
a	65 mm dia	2.00	Each	6913	13826
b	80 mm dia	2.00	Each	8255	16510
5	Supplying, installing, testing and commissioning of approved make monoblock water transfer pumps for pumping domestic water from UG Sump to over head tank . The pump shall be coupled to the adequate 10 HP electrical motor ,mounted on a common base frame working on 440V, 50Hz, 3Ph. The motor shall confirm to T.E.F.C. (From Domestic Water Sump to O.H.T) The rate quoted shall be inclusive of				
	Suitable control panel indoor wall mounting type with change over switch including dry run protection.				
	Industrial type electronic automatic liquid level controllers, or float switch for automatic operation				
	Alarm indicating with signal in the event of pumps failure etc.,				
	GI manifold made out of GI 'C'Class pipe with Collers,Tee and Flange provision for connection of the above items . GI manifold shall be finished with hot dip galvanizing to 100 microns.				
	The pumps shall be suitable for the requirements as mentions below:				
	<b>6.0LPS @ 35.0m Head, 1 Set = 1 No. Working + 1 No. Stand By (From Domestic Water Sump to OHT)</b>	1.00	Set	149502	149502
6	Supplying, installing, testing and commissioning of approved make monoblock water transfer pumps for pumping domestic water from UG Sump to over head tank . The pump shall be coupled to the adequate 10 HP electrical motor ,mounted on a common base frame working on 440V, 50Hz, 3Ph. The motor shall confirm to T.E.F.C. The rate quoted shall be inclusive of				
	Suitable control panel indoor wall mounting type with change over switch including dry run protection.				

	Industrial type electronic automatic liquid level controllers, or float switch for automatic operation				
	Alarm indicating with signal in the event of pumps failure etc.,				
	GI manifold made out of GI 'C'Class pipe with Collers,Tee and Flange provision for connection of the above items . GI manifold shall be finished with hot dip galvanizing to 100 microns.				
	The pumps shall be suitable for the requirements as mentions below:				
	<b>3.0LPS @ 35.0m Head, 1 Set = 1 No. Working + 1 No. Stand By (From STP to Flushing OHT &amp; for Landscaping)</b>	1.00	Set	129568	129568
7	Supplying, installing, testing and commissioning approved make submersible pump made of C.I Construction suitable for building application. The quoted rate shall also include providing auto lvl.controller. necessary safety devices viz. dry run protection, over load relays etc., complete working on 400/440V, 50Hz, 3Ph, with starter, <b>Duty of Pump : 1.0lps @15.0m Head 1No. (To lift pumproom collection smp water to External drain)</b>	1.00	Set	94131	94131
8	<b>Supplying &amp; fixing PVC insulated PVC sheathed copper conductor submersible flat cable ISI Marked in existing metal/HDPE / PVC/ pipe/ in bore well/ in sump including fixing the cable to GI/HDPE pipe with suitable cable tags of following sizes etc. as required.</b>				
a	3 Core 4.0 Sq. mm Flat Cable	50.00	Mtr.	186	9300
<b>8</b>	<b>Pump Panel &amp; Accessories</b>				
	Design, fabrication, assembling, wiring, supply, installation, testing and commissioning of outdoor type (IP54) Pump control panel fabricated out of 2 mm thick CRCA sheet steel, Cable gland plates shall be provided on top as well as at the bottom of the panels. Panels shall be treated with all anti-corrosive process before painting as per specifications with 2 coats of red oxide primer and final approved shade of powder coated point. 1 nos 25x5mm GI strip throughout the width of Panel consisting 2 Nos. earthing terminals shall be provided for 3 phase, 4 wire, 50 Hz supply system, Control wiring with 2.5 sq.mm PVC insulated FRLS copper conductor cable including				

	providing suitable size of MS Angle i/c providing suitable foundation in cement concrete 1:2:4. Panel should be complete with isolation push button for every equipment and auto manual selection switches and having following Accessories-				
	<b>Incomer</b>				
	100 A, 16kA, 4P MCCB - 1 No.				
	<b>METERING &amp; INDICATION</b>				
	1 set of R,Y,B phase indicating lamps				
	Digital Multifunction meter with RS 485 port -1 Set				
	<b>Busbar</b>				
	160 A, 25 kA, TPN Aluminium Bus bar - 1 Set				
	<b>Outgoing</b>				
	40 A TPN MCB with Star Delta starter suitable for upto 10 HP Pump - 3 Nos.				
	32 A TPN MCB with Star Delta starter suitable for upto 7.5 HP Pump - 2 Nos.				
	32 A TPN MCB with Star Delta starter suitable for upto 3.0 HP Pump - 1 Nos.	1	Job	169378	169378
	<b>Make : CPRI approved manufacturer</b>				
	<b>Total Sub Head:- XII</b>				<b>727462</b>
	<b>Sub Head:- XIII (Illuminated Signage)</b>				
1	SITC of exit signage, single/double side, directional arrow as per site requirement, visible from 20 mtrs. with integral battery capacity of 3 hrs , IP 20 rating, operating voltage 20-240V AC/ 50-60 Hz, Battery Specification - 3.6V/ 0.8 AH [ NI-CAD Type],Material Type - Polycarbonate type/Aluminum/ABS, Mounting option - Wall Mount / Ceiling Mount/ Recess Mount. complete etc. as required at site.	12	Nos.	8012	96144
2	Supplying & laying of 2x1.5 sqmm fire survival armoured cable, 600/1000V rated with annealed copper conductor having glass mica fire barrier tape covered by an extruded layer of Cross Linkable Ethylene Propylene Rubber (EPR) insulation and LSZH inner bedding, steel wire armouring & LSZH outer sheath complete as required.	550	Mtr.	386	212300
	<b>Total Sub Head:- XIII</b>				<b>308444</b>
	<b>Sub Head:- XIV (VRV/ VRF System)</b>				
<b>1</b>	<b>VRF / VRV SYSTEMS-OUTDOOR</b>				

	UNIT				
	<p>Supplying, Installation, Testing &amp; Commissioning of Modular type Variable Refrigerant Flow/Variable Refrigerant Volume air cooled Outdoor units suitable for cooling/heating having 100% hermetically sealed inverter type twin Rotary/Scroll Compressor(s), minimum two compressors (with individual separate PCB) for above 14HP modules, microprocessor based Controller, top discharge type condensing unit(s), with R-410-A Refrigerant or equivalent, vibration Isolators with suitable foundation etc. complete as required. To have better efficiency condensor fan shall be capable to operate at different speed with respect to load. The unit shall deliver the rated capacity and in confirmation as per IS 18728:2024 and CPWD Specifications and work even at 50°C ambient temperature without tripping. The system shall be able to deliver 100% of the rated capacity upto 39°C. The unit shall be suitable to work on 400V +/- 10%, 3 Phase, 50Hz AC power supply and BMS compatible. The unit shall be filled with first charge of the refrigerant and ready for use as required. The condenser should be coated with a hydrophilic film to prevent water accumulation on the surface of the heat exchanger, enhance water dispersion, and reduce the risk of degradation, thereby improving overall performance and durability. The Indian Seasonal Energy Efficiency Ratio (ISEER) of the unit shall be as per Energy Conservation and Sustainable Building Code (ECSBC) 2024 as below and complete as per CPWD specification, connections, inter connections etc. as required. (For capacity &lt;40 kW ISEER 6.4, Capacity &gt; 40 and &lt;70 ISEER 6.5, Capacity &gt; 70 ISEER 6.6 for ECSBC+ Building)</p>				
a.	14 HP to 22 HP	315	HP	20385	6421275
2	<b>VRF INDOOR UNIT - FOUR WAY CASSETTE AC</b>				
	Supplying, Installation, Testing and Commissioning of following minimum capacity VRV/VRF 4 way Cassette Type Indoor ceiling mounted unit equipped with synthetic washable media pre-filter, fan section with low noise				

	fan/dynamically balanced blower, multispeed motor, coil section with Copper coil, electronic expansion valve, outer cabinet, drain pump, grill, necessary supports, vibration Isolation, Corded remote control etc., suitable for operation on single phase 230 V $\pm$ 10%, 50Hz AC supply, complete, as required. The Indoor units must shut down upon receiving a signal from the BMS System/Fire Signals. The system shall be capable to adjust air flow as per room requirement in auto mode. The cooling capacity of indoor unit will be at air inlet conditions of 27 0C DB and 19 0C WB temperature. (Make will be same as of Outdoor)				
a.	4.1 TR	11	NOS	45781	503591
b.	3.6 TR	9	NOS	44269	398421
c.	2.6 TR	10	NOS	40814	408140
d.	2.4 TR	6	NOS	40814	244884
e.	2.0 TR	23	NOS	39734	913882
f.	1.6 TR	12	NOS	39464	473568
g.	1.2 TR	3	NOS	38601	115803
h.	1.0 TR	1	NOS	27880	27880
<b>3</b>	<b>VRF COMPACT CASSETTE AC:</b>				
	Supplying, Installation, Testing and Commissioning of following minimum capacity 4-way compact VRV/VRF Cassette Type Indoor ceiling mounted unit equipped with synthetic washable media pre-filter, fan section with low noise fan/dynamically balanced blower, multispeed motor, coil section with DX Copper coil, electronic expansion valve, outer cabinet, drain pump, grill, necessary supports, vibration Isolation, Corded remote control etc., suitable for operation on single phase 230 V $\pm$ 10%, 50Hz AC supply, complete, as required. The Indoor units must shut down upon receiving a signal from the BMS System/Fire Signals. The system shall be capable to adjust air flow as per room requirement automatically. The cooling capacity of indoor unit will be at air inlet conditions of 27 0C DB and 19 0C WB temperature. (Make will be same as of Outdoor)				
a.	1.2 TR COMPACT CASSETTE	1	NOS	39950	39950
b.	1 TR COMPACT AC CASSETTE	2	NOS	39410	78820
c.	0.8 TR COMPACT CASSETTE	4	NOS	25122	100488

<b>4</b>	<b>VRF HI-WALL AC:</b>				
	Supplying, Installation, Testing and Commissioning of following minimum capacity VRF/VRV High wall type Indoor unit equipped with and comfort washable synthetic media prefilter, fan section with low noise fan/dynamically balanced blower, multispeed motor, coil section with copper coil, electronic expansion valve, outer cabinet, cord less remote control, drain pan, necessary accessories etc., suitable for operation on 230 V $\pm$ 10%, 50 Hz, single phase AC supply, complete as required. The Indoor units must shut down upon receiving a signal from the BMS System/Fire Signals. The system shall be capable to adjust air flow as per room requirement automatically. The cooling capacity of indoor unit will be at air inlet conditions of 27 0C DB and 19 0C WB temperature. (Make will be same as of Outdoor)				
a.	2 TR HI WALL	1	NOS	22674	22674
b.	1.6 TR HI WALL	1	NOS	22027	22027
c.	1.2 TR HI WALL	11	NOS	21595	237545
d.	1 TR HI-WALL	1	NOS	17816	17816
<b>5</b>	<b>REFNUTS:</b> Supplying, Installation, Testing and Commissioning of Y/T/Multi Joints. Joints shall be of same Original Equipment. Manufacturer (OEM) make as of ODUs and IDUs				
a.	Indoor units Joints	96	NOS	4535	435360
b.	Outdoor units Joints	18	NOS	8098	145764
<b>6</b>	<b>REFRIGERATION PIPE:</b> Supply, Installation, testing and commissioning including vacuumization and Nitrogen testing of following nominal sizes of soft/hard drawn copper refrigerant piping for VRV/VRF system, complete with fittings, with suitable adjustable ring type hanger supports, jointing/brazing including accessories, insulated with XPLE Class-O tubular insulation/with Class-O closed cell elastomeric nitrile rubber tubular sleeves sections of 19 mm thick insulation as given below for Suction and Liquid lines, all accessories as per specifications etc. as required :				
a	6.4 mm dia (OD) (Soft drawn) with tube thickness 1.2 mm	650	Mtr.	256	166400
b	9.5 mm dia (OD) (Soft drawn) with tube thickness 1.2 mm	750	Mtr.	346	259500



c	12.7 mm dia (OD) (Soft drawn) with tube thickness 1.2 mm	450	Mtr.	487	219150
d	15.86 mm dia (OD) (Soft drawn) with tube thickness 1.2 mm	300	Mtr.	615	184500
e	19 mm dia (OD) (Hard drawn) with tube thickness 1.2 mm	250	Mtr.	739	184750
f	22.2 mm dia (OD) (Hard drawn) with tube thickness 1.2 mm	250	Mtr.	904	226000
g	25.4 mm dia (OD) (Hard drawn) with tube thickness 1.2 mm	250	Mtr.	1068	267000
7	Supplying, laying, fixing, testing & commissioning of uPVC' pipes complete with all necessary fittings such as elbows, tees, reducers etc and supports such as clamps etc. complete as per specifications, complete in all respect. The pipes shall be of Class-III; 6 Kg/cm <sup>2</sup> pressure rating. Drain pipes shall be insulated using 9mm closed cell elastomeric Nitrile Rubber of suitable thickness with treated woven glass cloth laminated on one side				
a.	40 mm dia UPVC pipes	120	Mtr.	640	76800
b.	32 mm dia UPVC pipes	200	Mtr.	615	123000
c.	25 mm dia UPVC pipes	250	Mtr.	585	146250
	<b>Total Sub Head:- XIV</b>				<b>12461238</b>
	<b>Sub Head:-XV (BOOM BARRIER)</b>				
1.0	Supply, installation, testing and commissioning of automatic electromechanical boom barrier having brushless DC motor suitable road width 6 mtrs for intensive applications with MS housing & aluminium boom with fork rest, IP 67 Protection etc. Power Consumption- Not More than 60 Watt (for Gate Entry/Exit) and set of Entry/Exit push buttons for manual open and closing of barriers, Photocell based safety device to avoid closing of the barrier when a Vehicle is crossing the barrier, Wireless Remote with Receiver, Boom rest complete including necessary C.C. work required for installation of boom barrier etc. as required at site.	1	Each	222567	222567
	<b>Total Sub Head:- XV</b>				<b>222567</b>
	<b>Sub Head:- XVI (Solar PV Module)</b>				
1	Supply, Installation, Testing and Commissioning of on-grid Solar Photovoltaic Power Plant conforming to various applicable standards BIS, IEC, MNRE guidelines, the Central Electricity				

	Authority Regulations and CPWD Specifications as amended up to date, consisting of Mono/Poly Crystalline silicon solar cells module, net metering facility, necessary control, protections, earthing, cabling, mounting structure, junction boxes, power conditioning units, Real time online web interfaced Data Monitoring System, Distribution panels, grid connecting arrangement, conduits, pipes, cable trays and other accessories etc. as required.				
	a) High Energy Efficiency Solar Photovoltaic Module of capacity 330 Wp or above, manufactured in India, conforming to IS 14286/IEC 61215, IS/IEC 61730-Part-1, IS/IEC 61730-Part-2. Solar Photovoltaic Module conversion efficiency shall not be less than 23% at STC with temperature coefficient of Pmax better than -0.30% per degree Celsius. PV modules used in solar power plants/ systems must be warranted for their output peak watt capacity, which should not be less than 90% at the end of 10 years and 80% at the end of 25 years. Solar Modules shall be designed to operate in relative humidity upto 100% with temperature between -10 Deg C and +85 Deg C. Further, each PV module used in any solar power project must have Radio frequency identification tag with information such as name of manufacturer, month and year of manufacturing, country of origin (separately for Solar cell and module), I-V curve, Unique Serial No and Model No of the module, Wattage, Im, Vm and FF, name of test lab issuing IEC certificate.				
	b) Power Conditioning Unit (PCU) of 350-800 V DC Input voltage range and 415 V AC, three phase, 4 wire, 50Hz +/- 2.5 Hz, output voltage suitable to generate AC with a variation of 10% at nominal voltage. Power with efficiency not less than 97%, total harmonic distortion less than 3% and suitable for ambient temperature from 0 to 50 degree C , Minimum IP-65 for outdoor and Minimum IP 21 for indoor, Built-in meter and data logger, MPPT, switching devices IGBT/MOSFETs and controller Microprocessor /DSP . PCU/inverter shall be capable of complete automatic operation including wake-up, synchronization & shutdown. The PCU				

	shall be able to withstand unbalanced load conforming to IEC standard with shutdown/standby mode. It must be provided with grid islanding along with manual disconnect pole isolation switch besides automatic disconnection. Minimum protections: Mains Under / Over Voltage, Over current, Over/Under grid frequency, Over temperature, Surge voltage induced at output due to external source, Shortcircuit, Lightening, Anti Islanding (for grid synch. Mode) and other protections as per applicable standards. LCD/LED display of minimum parameters: DC input voltage, DC current, AC Voltage and current (all 3 phases, in case of 3 phase), Instantaneous & cumulative AC output power, Daily DC energy produced and other parameters applicable standard. Communication interface RS 485 / RS 232.				
	c) Module mounting structure: The roof top solar plant generation units shall be installed by using supporting Aluminium/Galvanized MS structure (mass of zinc coating shall be as per IS4759 ) having minimum head room clearance of 2.4 meter above the terrace level / ground level. The mounting structure would be designed to sustain wind load and seismic parameter of the site of installation. All the structure shall be design as per applicable BIS code and the material shall also confirm the applicable BIS Code. Structural material shall be corrosion resistant and electrolytically compatible with the materials used in the module frame, its fasteners, nuts and bolts. The suitable arrangements for maintenance and cleaning shall be provided.				
	d) Real time online web interfaced Data Monitoring System complete with accessories for various parameters such as Solar Irradiance, temperature, AC Output Voltage and current, Output Power, Power factor, DC Input Voltage and Current, Time Active, Time disabled, Time Idle, Power produced and other parameters as per standard practices.				
	e) Array junction box & Main junction box with IP 65 protection and termination arrangement for incoming and outgoing cable along with glands, lugs and other accessories etc. as required. Each junction box shall be made of GRP/FRP/Powder				

	Coated Aluminum /cast aluminum alloy with full dust, water & vermin proof arrangement with High quality Suitable capacity Metal Oxide Varistors(MOVs) (semiconductor diode with resistant applied voltage)/ surge arrestors and suitable Reverse Blocking Diodes, isolation switches isolate the DC input to Inverter, copper bus bar etc.				
	f) Lightning ,surge voltage protection, earthing protection and grid islanding.				
	g) Cables: Connections & Interconnections by required size IR/UV protected XLPE insulated copper conductor 1.1 kV grade armored power and control cables(ISI Marked) along with supplying & fixing of necessary channel/conduit, GI cable trays , supports, lugs, thimble and other accessories etc. as required.				
	h) DC Distribution Board And AC Distribution Panel Board: IP65, free standing, metal cladded, having copper bus bar, having required protection and control gears, connection interconnection, etc. as required.	40	KWp	54280	2171200
	<b>Total Sub Head:- XVI</b>				<b>2171200</b>
	<b>SUB HEAD:- XVII (STP/ ETP)</b>				
<b>A</b>	Supplying, Installation, Testing and Commissioning of Effluent Treatment Plant for the following duty				
	<b>Daily Average Flow: Effluent Treatment Plant (1 KLD)</b>				
	Reuse of ETP treated water after treatment: Horticulture, Landscaping, Irrigation etc.				
	Nature of Wastewater: Lab effluent				
	<b>Influent Characteristics (Considered for ETP)</b>				
	pH : 2 - 10				
	BOD5 : 200 - 300 mg/l				
	S. Solids : 200 - 300 mg/l				
	COD : 700 - 900 mg/l				
	TDS : 400-500 mg/l				
	Heavy Metals : Present				
	<b>Influent Characteristics (Considered</b>				

	<b>for Grey and Black)</b>				
	pH : 8 - 10				
	BOD5 : 250 - 350 mg/l				
	S. Solids : 150 - 300 mg/l				
	COD : 400 - 600 mg/l				
	Oil & Grease : < 50 mg/l				
	<b>Effluent Discharge Standard after treatment (As per NGT/PCB norms)</b>				
	pH : 6.5 - 8.0				
	BOD5 : Less than 10 mg/l				
	S. Solids : Less than 10 mg/l				
	COD : Less than 50 mg/l				
	Oil & Grease : < 5 mg/l				
	<b>EFFLUENT TREATMENT PRE-TREATMENT PLANT (1 KLD)</b>				
	<b>Primary Treatment</b>				
<b>1</b>	Supply, Installation, Testing and Commissioning of <b>Stainless Steel</b> suitable sized manually operated bar screen.	1	Nos.	14418	14418
	<b>Bar spacing: 8-10 mm (Or as suitable)</b>				
<b>2</b>	Supply, Installation, Testing and Commissioning of Reactor Feed Pumps. Pumps shall have the following duty:	2	Nos.	28838	57676
	<b>Flow Rate</b> : 0.05 m3/h				
	<b>Head</b> : 8 - 10 m				
	<b>Make: Wilo/Kirloskar</b>				
	<b>Physico-Chemical Treatment</b>				
<b>3</b>	Supply, installation, testing & commissioning of Alum, Lime and poly dosing system as a part of physico-chemical treatment, the system shall be comprising of dosing pump and dosing tank (100 Litres).	1	Set	86513	86513
	a) Alum Dosing System				
	Capacity: 0 - 6 LPH				
	b) Lime Dosing System				
	Capacity: 0 - 6 LPH				

	c) Poly Dosing System				
	Capacity: 0 - 6 LPH				
	d) Tubedek Media				
4	Providing and fixing all interconnecting piping and accessories of required MOC as MS/UPVC	1	Lot	52869	52869
5	Supply, Installation, testing and Commissioning of <b>sludge transfer pumps</b> for transferring sludge to SHT complete with all accessories, motor of required capacity.	2	Nos.	28838	57676
	<b>Quantity</b> : 2 Nos.				
	<b>Flow Rate</b> : 0.5 m3/h				
	<b>Head</b> : 8 -10 m				
	<b>Make</b> : Kirloskar/Eqv.				
6	Supply, Installation, Testing and Commissioning of the following MSFRP tanks	1	Lot	216282	216282
	a) Flash Mixer				
	b) Flocculator				
	c) Settling Tank				
7	Supply, Installation, Testing and Commissioning of the following tanks in MSFRP/HDPE				
	a) Equalization Tank (HDPE) (vol. 1000 ltr. Approx.)	1	No.	14418	14418
	<b>SEWAGE TREATMENT PLANT (GREY +BLACK COMBINED)</b>				
B	<b>SBR based Black Water Treatment Plant</b>				
	Supplying, Installing, Testing and Commissioning of Black Water Treatment Plant of the following duty				
	Daily Average Flow : 15 KLD (1 KLD Effluent after pre-treatment shall be mixed with Sewage)				
	Nature of wastewater : Lab Effluent + Sewage (Black +Grey Water)				
	<b>Primary Treatment</b>				

1	Supply, Installation, Testing and Commissioning of Stainless <b>Steel</b> suitable sized manually operated bar screen.	2	Nos.	21629	43258
	<b>Bar spacing: 8-10 mm (Or as suitable for fine screening)</b>				
	<b>Bar spacing: 20-30 mm (Or as suitable for coarse screening)</b>				
2	Supply, Installation, Testing and Commissioning of Reactor Feed Pumps. Pumps shall have the following duty:	2	Nos.	48064	96128
	<b>Flow Rate</b> : 1.5 m3/h				
	<b>Head</b> : 8 - 10 m				
	<b>Make: Wilo/Kirloskar</b>				
3	Providing and fixing all interconnecting piping and accessories of required MOC as MS/UPVC.	1	Lot	177832	177832
	<b>Biological Treatment</b>				
4	Supply, Installation, testing and Commissioning of SBR based Biological system comprising of following equipments:				
4.1	Air Blowers	2	Nos.	129770	259540
	<b>Capacity</b> : 30-40 m3/h @ 5000 mmwc				
	<b>Type</b> : Twin Lobe				
4.2	Diffusers	1	Lot	28838	28838
	<b>Type</b> : Coarse (Disc Type) / Fine (Tubular Type)				
4.3	Decanting System	1	Nos.	240314	240314
4.4	Pipes & fittings for air piping & grid	1	Lot	57675	57675
4.5	Level switches & controllers	1	Lot	14420	14420
	<b>Tertiary Treatment</b>				
5	Supply, Installation, Testing and Commissioning of Centrifugal Horizontal Filter Feed Pumps with all other accessories required to complete the system.	2	Nos.	24031	48062
	<b>Quantity</b> : 2 Nos. (1W + 1S)				



	<b>Flow Rate</b> : 0.65 m3/h				
	<b>Head</b> : 25 - 30 m				
	<b>Make</b> : Kirloskar/Eqv.				
<b>6</b>	Supplying, Installation, Testing and Commissioning of FRP vessel filter with frontal piping and valves with all the required accessories. Filter shall include media, standard fittings like pressure gauges, sampling cock, rinse drain.				
<b>6.1</b>	<b>Multigrade Sand Filter</b>	1	Nos.	52869	52869
	<b>Flow rate</b> : 0.65 m <sup>3</sup> /hr				
	<b>Filtration rate</b> : 15 m <sup>3</sup> /m <sup>2</sup> /hr				
	<b>Dia.</b> : 300 mm				
	<b>HOS</b> : 1100 mm (min)				
	<b>Filter Media</b> : Fine and Coarse Sand, Pebbles and gravels				
	<b>Vessel Make</b> : Pentair/Eqv.				
<b>6.2</b>	<b>Activated Carbon Filter</b>	1	Nos.	57675	57675
	<b>Flow rate</b> : 0.65 m <sup>3</sup> /hr				
	<b>Filtration rate</b> : 15 m <sup>3</sup> /m <sup>2</sup> /hr				
	<b>Dia.</b> : 300 mm				
	<b>HOS</b> : 1100 mm				
	<b>Filter Media</b> : Fine and Coarse Sand, Pebbles, gravels and Activated Carbon				
	<b>Make</b> : Pentair/Eqv.				
<b>7</b>	Supply, Installation, testing and Commissioning of chemical dosing system comprising of Sintex Tank with inlet/outlet connection, piping and valves along with metering pump for dosing.	1	Set	24031	24031
	<b>Pump Capacity</b> : 0 - 6 LPH				
<b>8</b>	Supply, Installation, testing and Commissioning of <b>sludge transfer pumps</b> for transferring sludge to SHT complete with all accessories, motor of required capacity.	2	Nos.	28838	57676
	<b>Quantity</b> : 2 Nos.				
	<b>Flow Rate</b> : 0.5 m <sup>3</sup> /h				
	<b>Head</b> : 8 -10 m				
	<b>Make</b> : Kirloskar/Eqv.				

9	Supply, Installation, testing and Commissioning of sludge dewatering system along with sludge feed pump complete with all accessories, motor of required capacity.	1	Set	81708	81708
	<b>Quantity</b> : 2 Nos.				
	<b>Flow Rate</b> : 0.5 m3/h				
	<b>Head</b> : 8 - 10 m				
10	<b>Electrical Panel &amp; Accessories</b>				
	Design, fabrication, assembling, wiring, supply, installation, testing and commissioning of motor control centre fabricated out of 14 gauge CRCA sheet steel. Cable gland plates shall be provided on top as well as at the bottom of the panels. Panels shall be treated with all anti-corrosive process before painting as per specifications with 2 coats of red oxide primer and final approved shade of powder coated point. 2 Nos. earthing terminals shall be provided for 3 phase, 4 wire, 50 Hz supply system. Panel should be complete with isolation push button for every equipment and auto manual selection switches.	1	Job	216283	216283
	<b>Make</b> : CPRI approved manufacturer				
11	<b>MS Tanks</b>				
	Supply, Installation, Testing and Commissioning of the following MS tanks	1	Lot	1225601	1225601
	a) Equalization Tank				
	b) Anoxic Tank				
	c) Sludge Holding Tank				
	b) SBR Tank				
	c) Intermediate water Tank				
	d) Treated Water Tank				
	<b>Total Sub Head:- XVII</b>				<b>3181762</b>
	<b>Sub Head:- XVIII (Bike Parking)</b>				
1.0	SITC of Multi Level Hydraulic Power Mechanical Bike Parking System for 90 nos bike having following Specifications: a) Parking Slot- Min. 2 Bike per unit. b) Operation- Push Button Operation with Key c) Platform - 3 mm M.S Paint Sheet with min. 250 Kg capacity	1	Each	3543192	3543192

	d) Lifting System- Hydraulic Telescopic Single Acting Cyling with 2000 mm Height e) Power supply: Electrical panel control system on relay logic. f) Foundation: High tensile wedge type ANCHOR FASTENERS g) Safety Features: Electro Mechanical Locking systems and Bottom BIKE safety sensor (Additional) h) Valve with tank and motor:- As per OEM standard. i) Hydraulic oil:- As per OEM Standard				
	<b>Total Sub Head:- XVIII</b>				<b>3543192</b>
	<b>Sub Head - XIX - (WATER TREATMENT PLANT)( 1 Cum/h)</b>		-	-	
	<b>Supply, Installation, testing and Commissioning of Water Treatment Plant for the following capacity</b>		-	-	
	<b>Daily Average Flow - 1 m<sup>3</sup>/h</b>		-	-	
			-	-	
1	Supplying, installing, testing, commissioning of Centrifugal Horizontal Filter feed pumps along with motor and other accessories required to complete the system.				
a	Pumps : 2 Nos.(1w + 1s)				
b	Flow rate (each) : 1 m <sup>3</sup> /hr				
c	Head : 25-30 m				
	<b>Make: Kirloskar/Eqv.</b>	2	Nos.	22346	44692
	<b>Note: All pumps shall have IE-4 energy efficient motors.</b>		-	-	
2	Supplying, installation, testing & commissioning of FRP vessel filter with frontal piping and Valves with all the required accessories. Filter shall include media, standard fittings like pressure gauges, sampling cock, rinse drain.		-	-	
			-	-	
a)	<b>Multigrade Sand Filter</b>		-	-	
	Flow: 1 m <sup>3</sup> /hr		-	-	
	Surface loading rate: 15 m <sup>3</sup> /m <sup>2</sup> /hr		-	-	
	Filter Dia : 300 mm		-	-	
	HOS: 1200 mm		-	-	
	Valve: Multiport Valve		-	-	

	Filter media: Fine Sand, pebbles and gravels		-	-	
	<b>Make: GWESPL</b>		-	-	
		1	No.	16536	16536
b)	<b>Activated Carbon Filter</b>				
	Flow: 1 m3/hr				
	Surface loading rate: 15 m3/m2/hr		-	-	
	Filter Dia : 300 mm		-		
	HOS: 1200 mm	1	No.	22346	22346
	Valve: Multiport valve		-		
	Filter media: Activated Carbon, Fine Sand, pebbles and gravels		-		
	<b>Make: GWESPL</b>				
3	Providing and fixing all <b>piping</b> of required MOC as MS/UPVC and isolation control valves for making the system complete.	1	Lot	75977	75977
4	Supplying, Installation, testing and commissioning of <b>Chlorine dosing system</b> comprising of Sintex Tank with inlet/ outlet connection, piping and valves alongwith metering pump for dosing.				
	Pump capacity: 0-6 LPH	1	Set	22346	22346
	Tank capacity: 100 Litres				
	<b>Make: E-Dose</b>				
5	Design, fabrication, assembling, wiring, supply, installation, testing and commissioning of motor control centre fabricated out of 14 gauge CRCA sheet steel. Cable gland plates shall be provided on top as well as at the bottom of the panels. Panels shall be treated with all anticorrosive process before painting as per specifications with 2 coats of red oxide primer and final approved shade of powder coated paint. 2 Nos. earthing terminals shall be provided for 3 phase, 4 wire, 50 Hz supply system. Panel should be complete with Isolation push button for every equipment and auto manual selection switches	1	Job	73594	73594
	<b>Total Sub Head:- XIX</b>				<b>255491</b>
	<b>Sub Head:- XX (Audio Video)</b>				
	<b>DISPLAY</b>				

2	Supply, Installation, Testing & Commissioning of 85/ 86" or Higher, LED Back Lit Panel, Panel Technology - (IPS/ VA/ ADS), Native Resolution- 3840 x 2160 (UHD), Brightness -500cd/m2 or better, Contrast Ratio- 1100 : 1 or better, Haze: 25% or better, Dynamic CR- 400,000 : 1 or better, Operating System- WebOS/ Tizen/ Android, Orientation - Portrait & Landscape, Viewing Angle(H x V) -178 x 178, Response Time- 8 ms or better, Operation Hours- 24 Hrs , Connectivity - Input Ports -Digital HDMI(2 or more)/Display Port(1), External Control RS232C(1), RJ45(1), IR(1, Internal), USB -1, Output Ports- Audio Out-1, AUDIO -Audio Power 20W(10W x 2), Additional feature Inbuilt : Internal Memory 8 GB or better, Wi-Fi, Screen Sharing feature with all devices, Media Player, Local Key Operation, Picture in Picture (Optional), Environment Conditions ,Operation Temperature- 0 °C to 40 °C or better, Operation Humidity - 10 % to 80 % or better, POWER - Power Supply 100-240V~, 50/60Hz, Power Type- Built-In Power, Speakers - 20W(10W x 2) , Power Supply 100 – 240 V, 50/60 Hz, Certifications UL/BIS, Warranty - 5 years, Wall mount accessories as per site requirement, Remote control, Standard cable etc complete as required.	4	Nos	238268	953072
	<b>AUDIO</b>				
4	Supply, Installation, Testing & Commissioning of Ceiling-mount loudspeaker. Frequency range - 80 Hz to 16 kHz or better, Rated RMS Power - 15 Watts or better, Sensitivity-86 dB SPL or better, Coverage Angle-135° x 135° or better, Maximum SPL Continuous/Peak-100dB/106dB or better, Rated Impedance - 8 / 16 Ohms. Transformer Tapping - 70V & 100V - 16, 8, 4 watts or better. Transducer - 3.5-4 inches or better, Material - Painted ABS polymer Baffle and Power coated steel grille or better. Safety rating - UL1480, UL2043 or better. Mounting rails and Ceiling installation Rings should be included. Quoted Speakers, Amplifier should be from the same OEM for interoperability and smooth integration. (with 5 years warranty)	12	Nos	15077	180924
5	Supply, Installation, Testing & Commissioning of Quad Channel Class-D amplifier. Per Channel Power 60 - 75W	2	Nos	122290	244580

	@8Ω, 4Ω or better. 70V, 100V support or better. Power Sharing or Bridge/Parallel modes for better power distribution. Frequency Response- 22 Hz – 20 kHz or better. Signal to Noise ratio -> 100 dB or better, Cooling - fanless or noiseless fan operation, Gain - 22 dB or better, GPI port for external volume controller, Indicators for Power, signal, limit, mute or better. Better to have Remote standby and Power saving features - Auto-standby. Quoted Speakers, Amplifier should be from the same OEM for interoperability and smooth integration. (with 5 years warranty)				
6	Supply, Installation, Testing & Commissioning of Open Architecture Digital Signal Processor. Fixed/Modular/Server based with minimum 12 Mic/Line inputs and 8 Line outputs. Shall support phantom power on each microphone input. AEC channels - 12 or more with 200ms tail length for Analog and Networked microphones. Minimum 16x16 Dante channels and support for up to 64x64 Network audio channels via Dante /AES67 or similar protocol. SIP Softphone integration for Audio conferencing. USB-B / USB-C port for AV USB Bridging for software or web-based conferencing applications emulating and providing USB Audio (Speakerphone) and USB Video (Camera) driver. 24 bit-A/D-D/A converters or better, 48 kHz Sample rate or better, Input frequency response of 22 Hz to 20 kHz or better, Input dynamic range > 108 dB or better. Control Ports : RS232, Ethernet or better. (with 5 years warranty) Note: Required hardware / accessories / expanders / perpetual software license should be quoted to meet the minimum specification to fulfil the requirements	4	Nos	717534	2870136
7	SITC of Boundary microphone with programmable mute button. The microphone shall be a surface mounted, black, electret condenser microphone with a omnidirectional polar pattern. Microphone should include a programmable mute button with a touchsensitive functionality for muting the microphone. The microphone shall include a logic controlled, bi-coloured status indicator ring. The visible diameter and height of the microphone above the mounting surface shall be 1 1/4 " (32mm) and 5/8" (24 mm). The microphone shall	40	Nos	136644	5465760

	be resistant to RF interference from portable mobile and handheld devices. The frequency response range shall be 50 Hz to 17 kHz and the sensitivity 42 mV/Pa. Maximum SPL: 114 dB. Equivalent Output Noise: 21 dB SPL. Signal-to-Noise Ratio: 75 dB. Dynamic Range: 93 dB. (with 5 years warranty).				
	<b>SWITCHING</b>				
8	<p>Supply, Installation, Testing &amp; Commissioning of Network Video Endpoint configured as Encoder. Minimum Input configurations –1 x USB-C supporting audio, video, USB 2.0 or better for BYOD presentation, power and Video Conferencing. Should have 1 x HDMI with associated 1 x USB A/B/accessories for BYOD presentation and video conferencing. Should have Video encoding from both inputs and should support Software based Video Conferencing accessing room Camera, Microphones and Speakers from single USB-C connectivity and by connecting HDMI with associated USB-A/B/accessories. USB-C should also support 60 watt or better charging for connected laptop/device. Local Output – 1x HDMI with Scaling for preview, HDMI audio embedding and de-embedding by Network Audio supported via Dante/AES67 or similar protocol to stream the HDMI audio to connected Digital Signal Processor. Video Resolution – 4K60 4:4:4 or better. Power – PoE/PSU and AUX, Control Port – 1xRS232 or more, mounting hardware should be included. (with 5 years warranty)</p> <p>Noted: Required accessories / hardware with perpetual software should be quoted and supplied to meet the requirement and match the compliance.</p>	2	Nos	279760	559520
9	<p>Supply, Installation, Testing &amp; Commissioning of Network Video Endpoint configured as Decoder. Outputs -1xHDMI with scaling or better. Local Inputs – 1xHDMI / 1xUSB-C for local switching. HDMI audio embedding, de-embedding via network audio protocol i.e., Dante/AES67 or similar, Video Resolution – 4K60 4:4:4 or better. Power – PoE / PSU and AUX, Control Port – RS232 or better, mounting hardware should be included. (With 5 year on site warranty)</p>	2	Nos	260528	521056



	Note: Required hardware / accessories / expanders / perpetual software license should be quoted to meet the minimum specification to fulfil the requirements.				
10	Table Mount Enclosure : - Supply, Installation, Testing & Commissioning of Table Mount enclosure with 1xHDMI, 1xUSB-C and 1xUSB-A passthrough cables and 2 nos. x 3 pin universal Power sockets. Manually open and close lid with Black and Clear anodize color options. (With 5 year on site warranty), Should be CE, FCC compliant. etc complete as required.	2	Nos	26626	53252
11	Supply, Installation, Testing & Commissioning of Wireless Presentation System. Simultaneous display of up to four presentation sources in a quad/dual window, Supports multiple user connections simultaneously, 1 HDMI or better output; 1 or better USB Port; 1 or better. Resolution should be 3840 X 2160 or better output resolution along with ethernet port. It should support Windows, Mac, iOS, and Android.(With 5 year on site warranty) etc complete as required.	2	Nos	376922	753844
	<b>CONTROL SYSTEM</b>				
12	Supply, Installation, Testing & Commissioning of Hardware or Software based control system with 8x Bidirectional RS232 Ports, 8x GPIO Ports, 1x RJ45 Ports to control the devices mentioned in BOQ with perpetual licenses to connect Wall/Table mount touch screen controllers and iOS and Windows devices as wireless touch controller. (With 5 years onsite warranty) etc complete as required.	2	Nos	121333	242666
13	Supply, Installation, Testing & Commissioning of High Definition, Multi-touch Touch Screen Controller with 24-bit colour display. Viewable Screen Dimensions (diagonal) – 7-inch or better, Resolution - 1280 × 800 or better, Brightness - 350 Nits or better, Aspect ratio – 16:9 / 16:10 or better, Power – PoE, Mounting – Wall and Tabletop, Orientation options- Vertical / horizontal. Better to have configurable LEDs on both side or similar for status indication. Sensors - Ambient Light Sensor, Proximity Detection or better. (with 5 years warranty)	2	Nos	219347	438694
	<b>VIDEO CONFRENCING</b>				

14	Supply, Installation, Testing & Commissioning of 4K Network PTZ Conference camera with minimum 20X optical zoom & 55-65 degree horizontal coverage. Low Noise CMOS 4K image sensor with User-configurable resolution and quality for IP streams (up to 1080p). HDMI resolutions up to 4K30 or better and SDI-3G resolution up to 1080p60 or better. Image rotation controls to allow for inverted mounting using ceiling bracket. Minimum Illumination - 0.5 Lux @ (F1.8, AGC ON) or better, Horizontal Rotation Range - $\pm 170^\circ$ , Vertical Rotation Range - $-30^\circ$ to $+90^\circ$ or better, White Balance controls- Auto, indoor, outdoor, one-push, manual, specified color temperature or better. Camera should be able to transmit video via network to USB endpoint connected for video conferencing. Power – PoE & AUX. Shall include wall mounting bracket included. (With 5 year on site warranty) etc complete as required	2	Nos	574357	1148714
	<b>NETWORK SWITCH</b>				
15	Supply, Installation, Testing & Commissioning of 24/26 Port L2 / L3 Gigabit POE++ Network Switch. PoE Budget - 1440W or better. Multicast support with IGMP V1/V2 or better, QoS support, IPV4/IPV6 Support, Switching Capacity in Gigabits per Second, 1 Gbps Non-blocking ports with standard accessories. (With 5 year on site warranty) etc complete as required.	2	Nos	317656	635312
	<b>Rack &amp; Cabling</b>				
16	Supply, Installation, Testing & Commissioning of 18U / 19U Equipment Rack with standard accessories. (With 5 year on site warranty) etc complete as required.	2	Nos	26658	53316
17	SITC of following cables for Conference Hall, Meeting Room and wherever required. (i) HDMI to HDMI (M) of various lengths. (ii) USB cable (A to C and A to B and A to A) of various lengths. (iii) 2 core shielded Audio microphones cables as per desire length. (iv) Speaker Cables ,UTP CAT6A , STP CAT6A cables (v) LAN patch cords of various sizes i/c all mounting accessories like connectors,	2	Lot	335921	671842

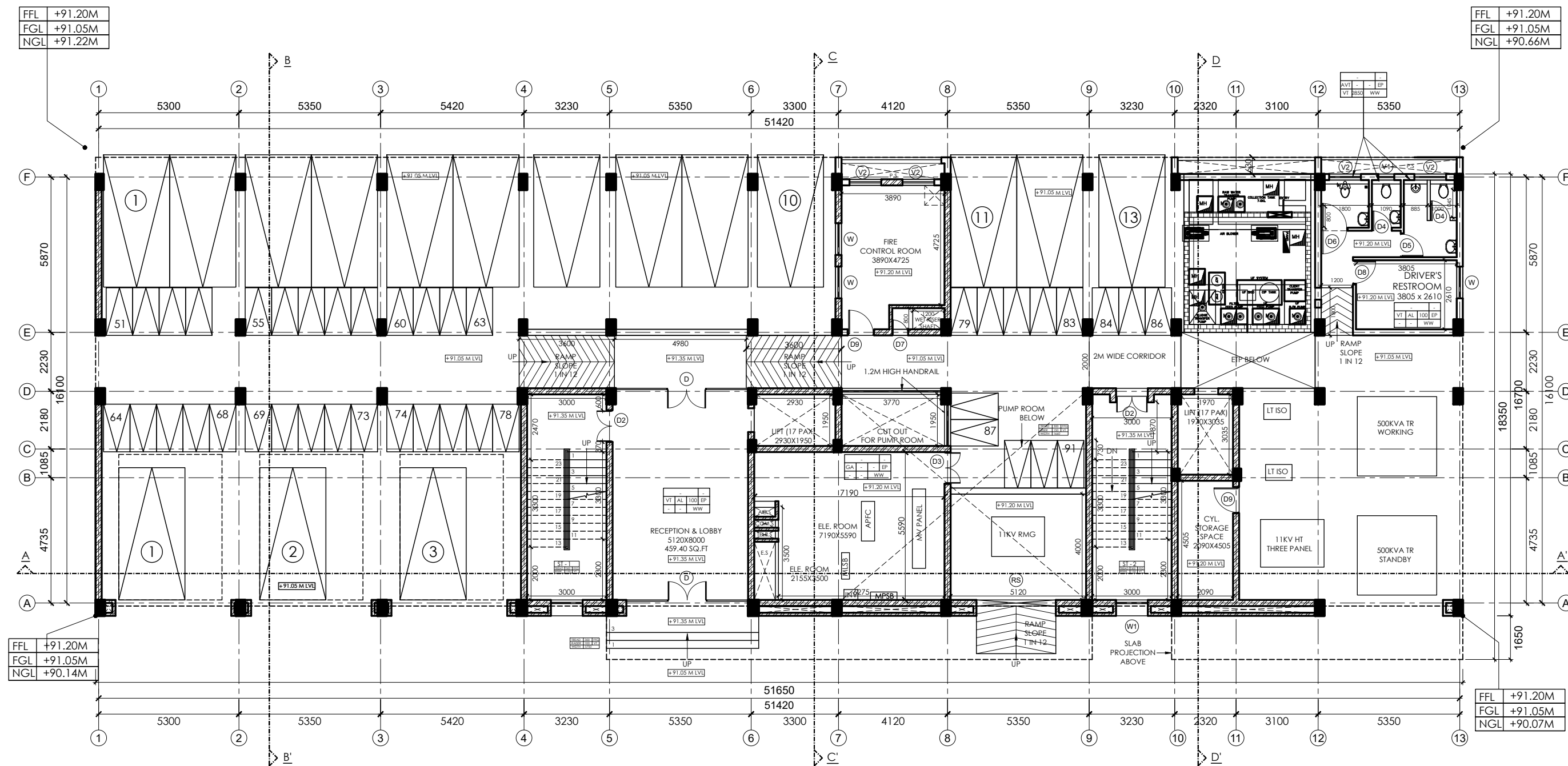
	brackets, sleeves etc. complete as required Note: The quotationer to quote the rate of the item considering the all cabling required for commissioning the system.				
	<b>Total Sub Head:- XX</b>				<b>14792688</b>
	<b>Total (Sub Head:- I to XX)</b>				<b>92626863</b>

# FINANCIAL BID

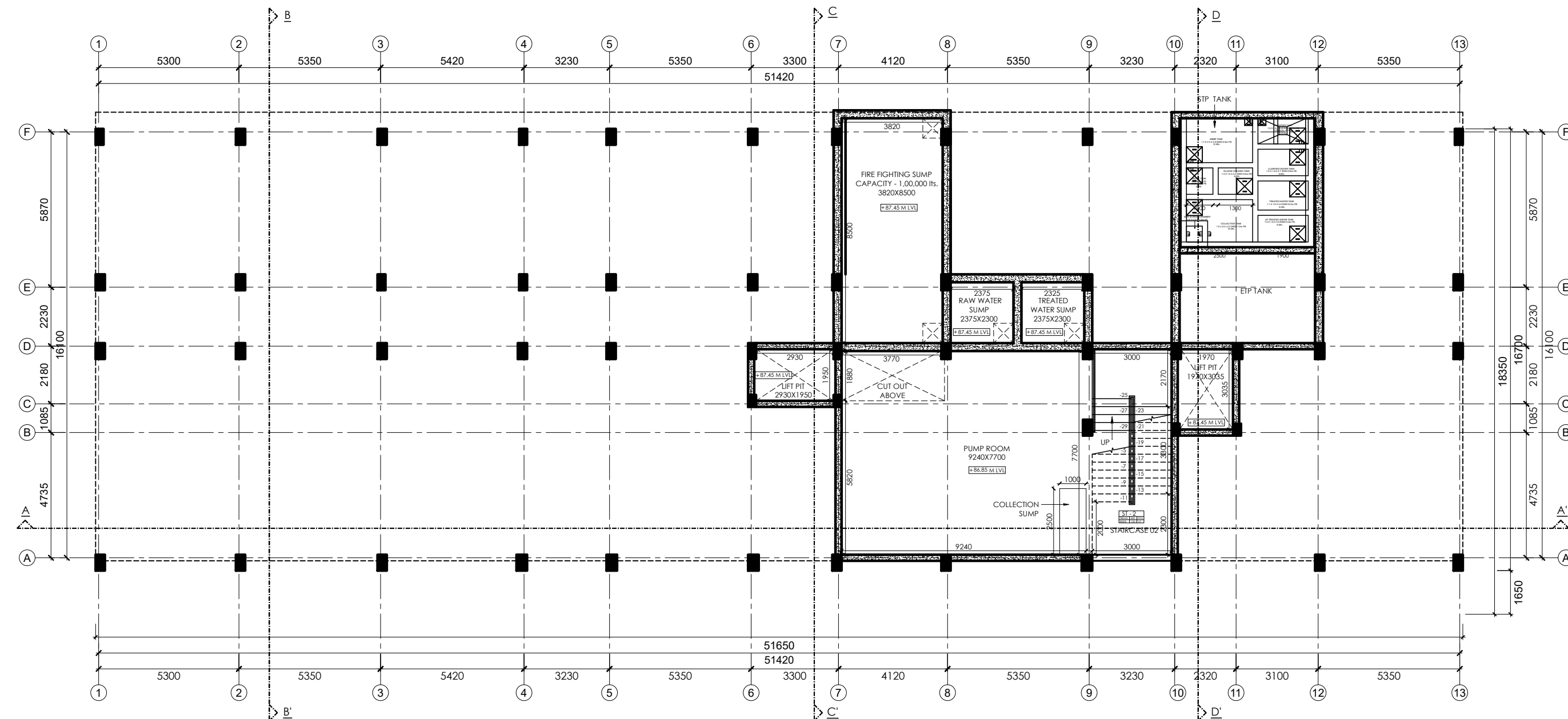
<b>CIVIL CONSTRUCTION UNIT</b>					
<b>NIT NO. 4/2025-26/CE/CCU/CED-III/Chennai</b>					
<b>Name of work : Construction of Integrated Regional Office at Chennai.</b>					
<b>SCHEDULE OF QUANTITY</b>					
<b>Name of the Contractor</b>					
<b>Sl. No.</b>	<b>Name of component</b>	<b>Estimated cost (Rs.)</b>	<b>Percentage above or below the estimated cost or 'At par'</b>	<b>% in Figures</b>	<b>Total Cost (Rs.)</b>
1	2	3	4	5	6
1	<b>Civil Work + Electrical &amp; Mechanical Works</b>	<b>Rs. 27,87,27,051/-</b>	*	*	*

:- To be filled online in bid document.

- 1) The Column Nos. 4 & 5 are mandatory to be filled by the bidders / tenderers. If these columns are left blank, the tender become invalid.
- 2) The amount in figures in column No.6 shall appear automatically corresponding to the percentage quoted in column No.4 & 5.
- 3) The tenderer is required to quote the percentage only above or below or at par with the estimated cost to cover all the rates of item covered under the respective packages.
- 4) The percentage shall be written in 2 (two) places of decimal.
- 5) If the percentage selection in column No 4 is "At Par", by default the percentage will be considered as "Zero" only. In other words, if "At par" is selected in column No.4, then no need to fill column No. 5



GROUND FLOOR PLAN | SERVICES & PARKING  
+91.20 M LVL



BASEMENT FLOOR PLAN | PUMP ROOM & UG SUMP  
+86.85 M LVL

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3. All dimensions in millimeters and levels in meters.
4. Dimensions to be followed as indicated and not to be scaled.

#### AREA STATEMENT :

PLOT AREA - 0.2024 HECTARES 2024 SQ.M)	TOTAL PLINTH AREA 4215.34 SQ.M (OR) 45373.54 SQ.FT
PERMISSIBLE FSI - 2 (4048 SQ.M)	TOTAL FSI AREA 3792.68 SQ.M (OR) 40824.07 SQ.FT
BASEMENT FLOOR PLAN   SERVICES 176.45 SQ.M (OR) 1899.29 SQ.FT	ACHIEVED FSI - 1.87 PLOT COVERAGE - 47.80%
GROUND FLOOR PLAN   SERVICES 264.08 SQ.M (OR) 2842.58 SQ.FT	CAR PARKING REQUIRED - 1 CAR/100 SQ.M 3792.68 X 75% = 2844.51 / 100 = 28 CARS 10% VISITORS PARKING = 3 CARS TOTAL = 31 CARS (31 PROVIDED)
FIRST FLOOR PLAN   WCCB & RO OFFICE 934.94 SQ.M (OR) 10063.58 SQ.FT	BIKE PARKING REQUIRED - 1 BIKE / 25 SQ.M 3792.68 X 75% = 2844.51 / 25 = 114 BIKES 10% VISITORS PARKING = 12 BIKES TOTAL = 126 BIKES (131 PROVIDED)
SECOND FLOOR PLAN   RO OFFICE 967.59 SQ.M (OR) 10415.06 SQ.FT	PH PARKING REQUIRED - 3 CARS (3 PROVIDED)
THIRD FLOOR PLAN   CPCB OFFICE 897.93 SQ.M (OR) 9665.25 SQ.FT	
FOURTH FLOOR PLAN   CPCB OFFICE & GUEST ROOMS 897.93 SQ.M (OR) 9665.25 SQ.FT	
TERRACE FLOOR PLAN   HEADROOM 76.42 SQ.M (OR) 822.63 SQ.FT	

#### REVISIONS

AS BUILT	
CONSTRUCTION	
APPROVAL	
INFORMATION	*
TENDER	
SCHEME	
ISSUED FOR	

FOR INFORMATION

#### NAME OF THE PROJECT:

PROPOSED CONSTRUCTION OF THE OFFICE BUILDING FOR  
MoEF & CC'S RO, WCCB & CPCB

#### CLIENT:

M/s. MoEF & CC, CHENNAI

#### DRAWING TITLE:

SITE PLAN  
WITH PARKING DETAILS

#### STRUCTURAL CONSULTANT:

ZACHARIA GEORGE F.I.E

SCALE: 1:150 @ A2	DESIGN BY: PDG	DRAWN BY: SUDIKSHA	CHECKED BY: PDG
DATE: 31-08-2025	SIGN:	SIGN:	SIGN:

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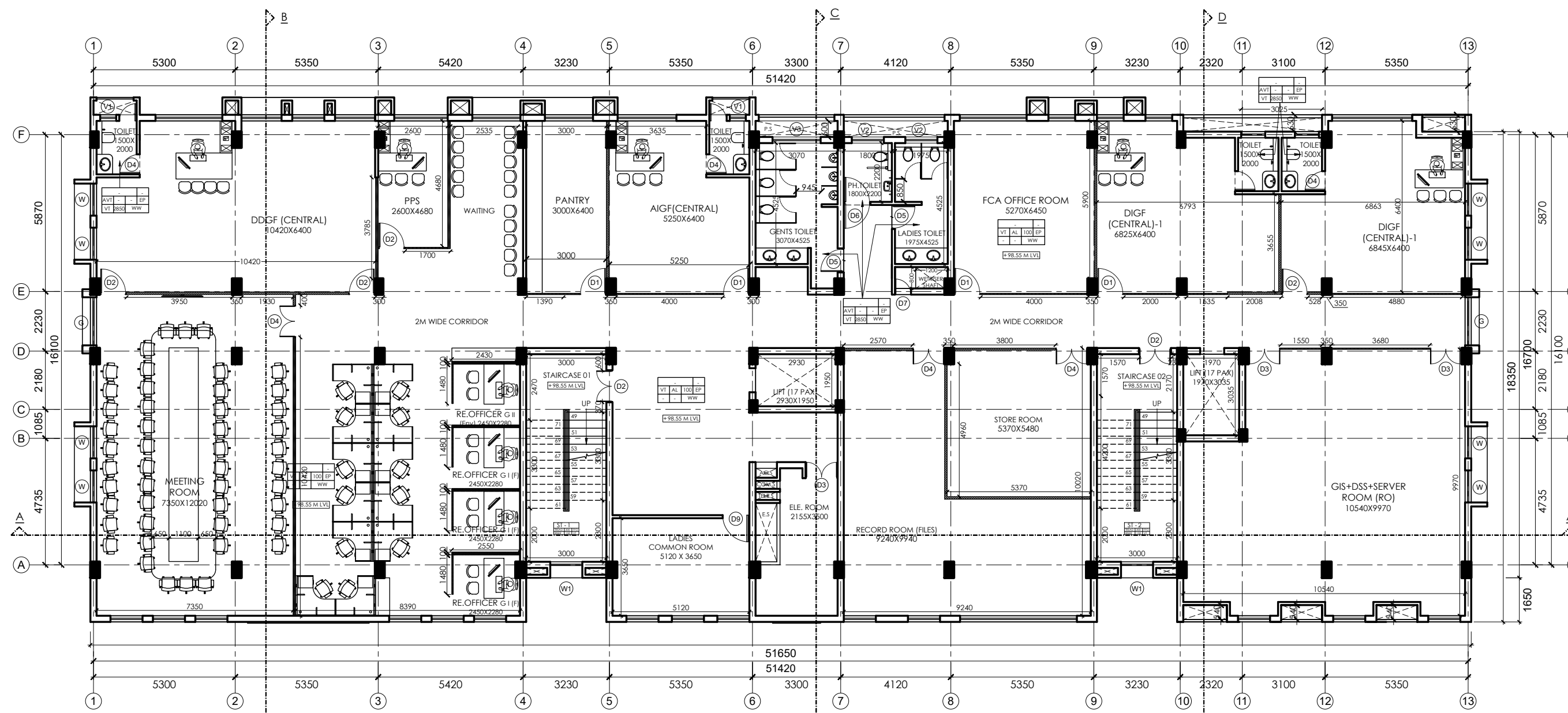
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website : www.paparchitect.com

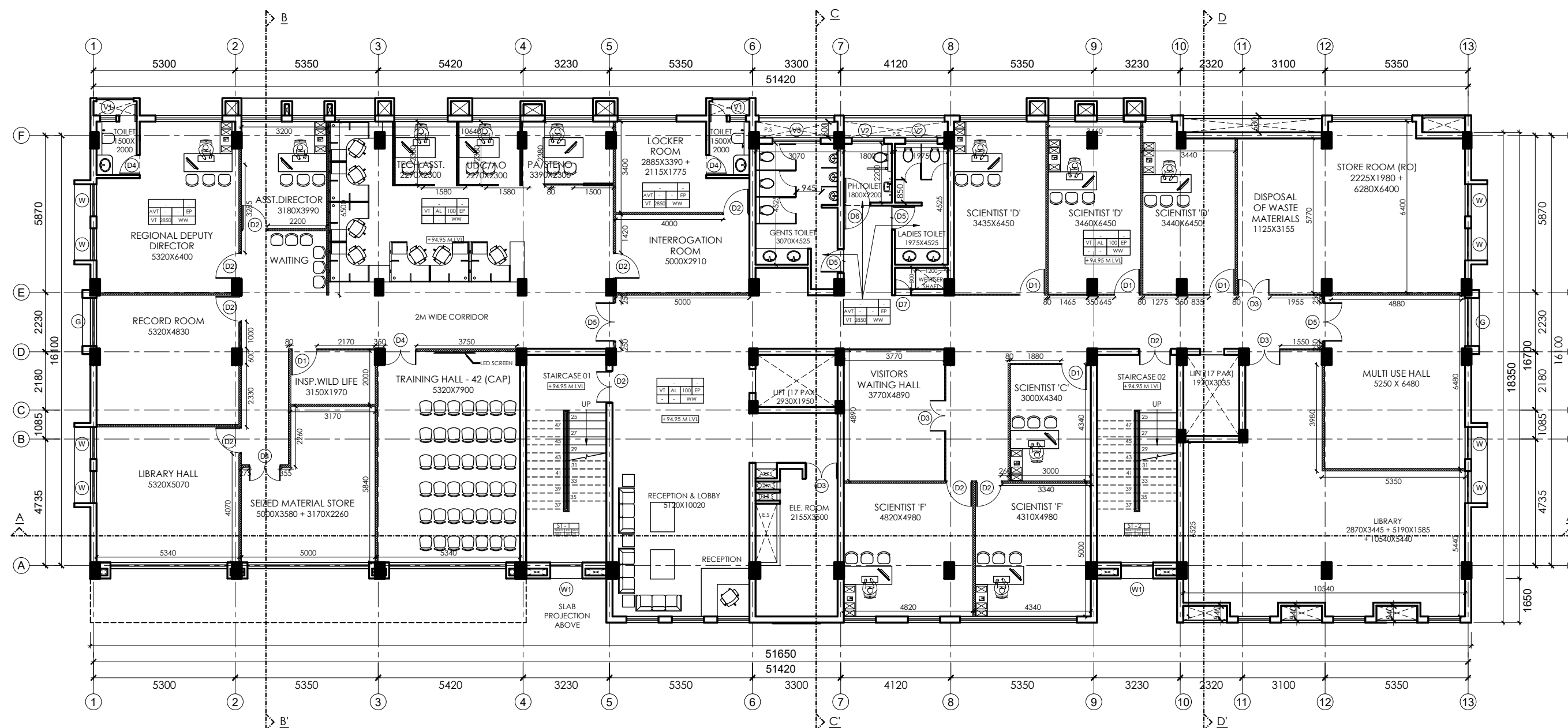


DWG NO: 4195-01-AR-01 SHT 01 OF 01 REV NO:





SECOND FLOOR PLAN | RO OFFICE  
+98.55 M LVL

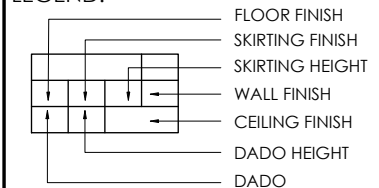


FIRST FLOOR PLAN | WCCB & RO OFFICE  
+94.95 M LVL

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#### LEGEND:



#### DESCRIPTION:

- GR - GRANITE STONE
- VT - VITRIFIED TILE
- AVT - ANTI SKID VITRIFIED TILE
- FFG - FLAMED FINISH GRANITE
- AL - ALUMINIUM
- GA - GRANO FLOORING
- EP - EMULSION PAINT
- WW - WHITE WASH

#### AREA STATEMENT

BASEMENT FLOOR	176.45 SQ.M
GROUND FLOOR	264.08 SQ.M
FIRST FLOOR	934.94 SQ.M
SECOND FLOOR	967.59 SQ.M
THIRD FLOOR	897.93 SQ.M
FOURTH FLOOR	897.93 SQ.M
TERRACE	76.42 SQ.M
TOTAL BUILT-UP AREA	4215.34 SQ.M

#### SHAFT

SYMBOL	DESCRIPTION
PS	PLUMBING SHAFT
ES	ELECTRICAL SHAFT

NOTE:  
FOUNDATION TO BE DESIGNED FOR BASEMENT+GROUND+4 FLOORS

#### UG SUMP

FIRE FIGHTING SUMP	1,00,000 LTRS
RAW WATER SUMP	15,000 LTRS
TREATED WATER SUMP	15,000 LTRS

#### STP

17KLD CAPACITY

#### REVISIONS

AS BUILT	
CONSTRUCTION	
APPROVAL	
INFORMATION	*
TENDER	
SCHEME	
ISSUED FOR	

FOR INFORMATION

#### NAME OF THE PROJECT:

PROPOSED CONSTRUCTION OF THE OFFICE BUILDING FOR  
MoEF & CC'S RO, WCCB & CPCB

#### CLIENT:

M/s. MoEF & CC, CHENNAI

#### DRAWING TITLE:

BASEMENT FLOOR PLAN

#### STRUCTURAL CONSULTANT:

ZACHARIA GEORGE F.I.E

#### SCALE:

1:125 @ A2

#### DESIGN BY:

PDG

#### DRAWN BY:

SUDIKSHA

#### CHECKED BY:

PDG

#### DATE:

31-08-2025

#### SIGN:

SIGN:

#### SIGN:

SIGN:

#### SIGN:

SIGN:

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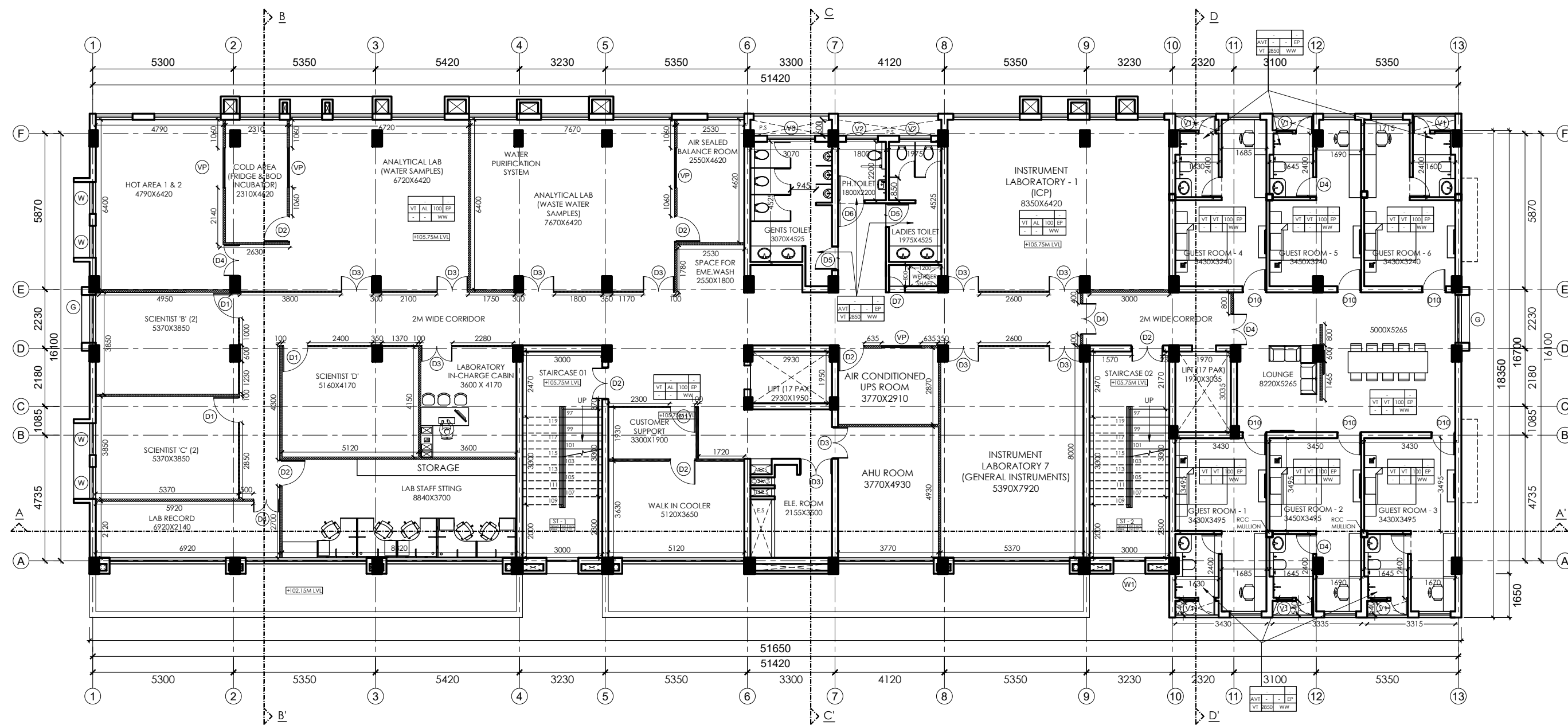


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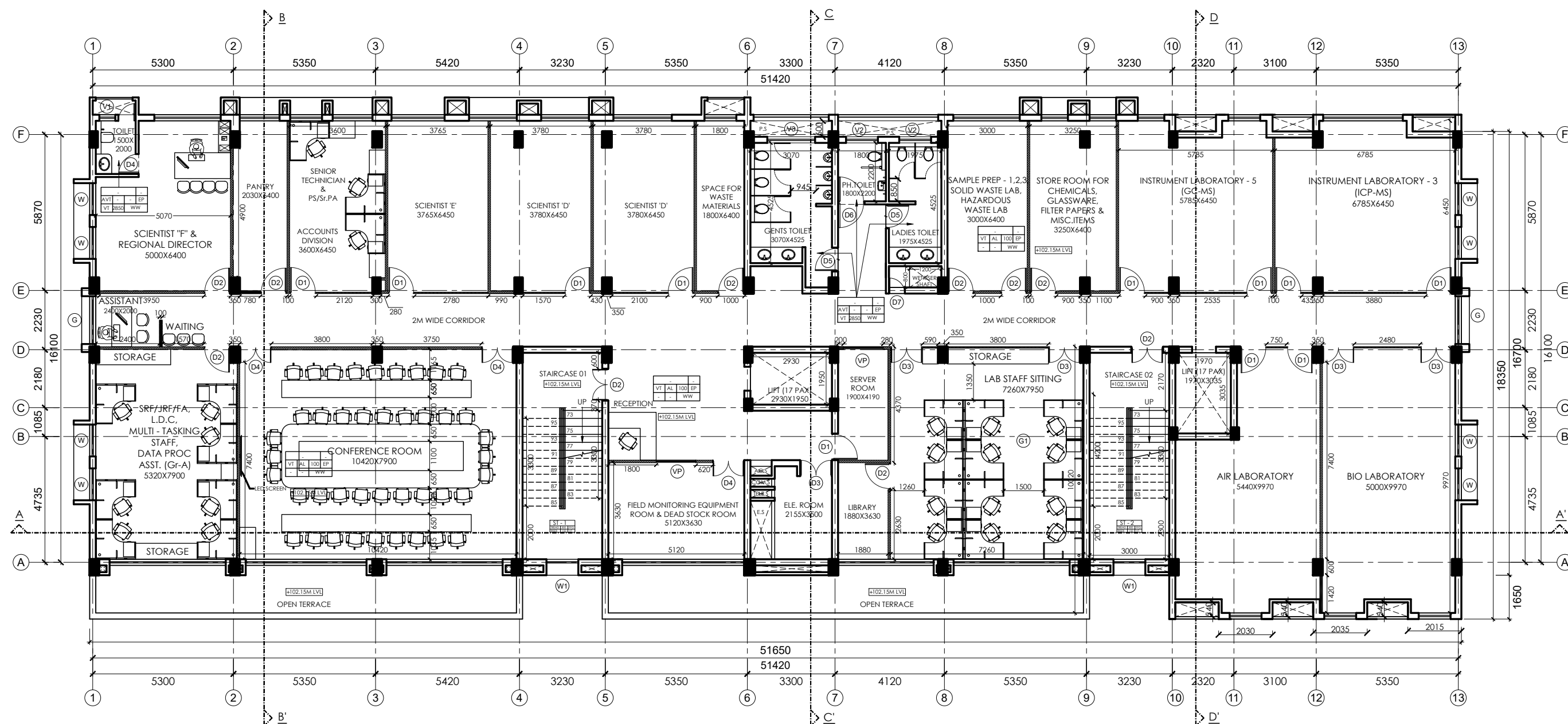
SHT 01 OF 01

REV NO:





FOURTH FLOOR PLAN | CPCB OFFICE & GUEST ROOMS  
+105.75 M LVL



THIRD FLOOR PLAN | CPCB OFFICE  
+102.15 M LVL

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#### LEGEND:

FLOOR FINISH	GR - GRANITE STONE
SKIRTING FINISH	VT - VITRIFIED TILE
SKIRTING HEIGHT	AVT - ANTI SKID VITRIFIED TILE
WALL FINISH	FFG - FLAMED FINISH GRANITE
CEILING FINISH	AL - ALUMINIUM
DADO HEIGHT	GA - GRANO FLOORING
DADO	EP - EMULSION PAINT
	WW - WHITE WASH

#### AREA STATEMENT

BASEMENT FLOOR	176.45 SQ.M
GROUND FLOOR	264.08 SQ.M
FIRST FLOOR	934.94 SQ.M
SECOND FLOOR	967.59 SQ.M
THIRD FLOOR	897.93 SQ.M
FOURTH FLOOR	897.93 SQ.M
TERRACE	76.42 SQ.M
TOTAL BUILT-UP AREA	4215.34 SQ.M

#### SHAFT

SYMBOL	DESCRIPTION
PS	PLUMBING SHAFT
ES	ELECTRICAL SHAFT

NOTE:  
FOUNDATION TO BE DESIGNED FOR  
BASEMENT+GROUND+4 FLOORS

#### REVISIONS

AS BUILT	
CONSTRUCTION	
APPROVAL	
INFORMATION	*
TENDER	
SCHEME	
ISSUED FOR	

FOR INFORMATION

#### NAME OF THE PROJECT:

PROPOSED CONSTRUCTION OF THE OFFICE BUILDING FOR  
MoEF & CC'S RO, WCCB & CPCB

#### CLIENT:

M/s. MoEF & CC, CHENNAI

#### DRAWING TITLE:

FIRST & SECOND FLOOR PLANS

#### STRUCTURAL CONSULTANT:

ZACHARIA GEORGE F.I.E

#### SCALE:

1:150 @ A2

#### DESIGN BY:

PDG

#### DRAWN BY:

SUDIKSHA

#### CHECKED BY:

PDG

#### DATE:

31-08-2025

#### SIGN:

SIGN:

#### SIGN:

SIGN:

#### SIGN:

SIGN:

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DWG NO: 4195-01-AR-06

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REV NO:

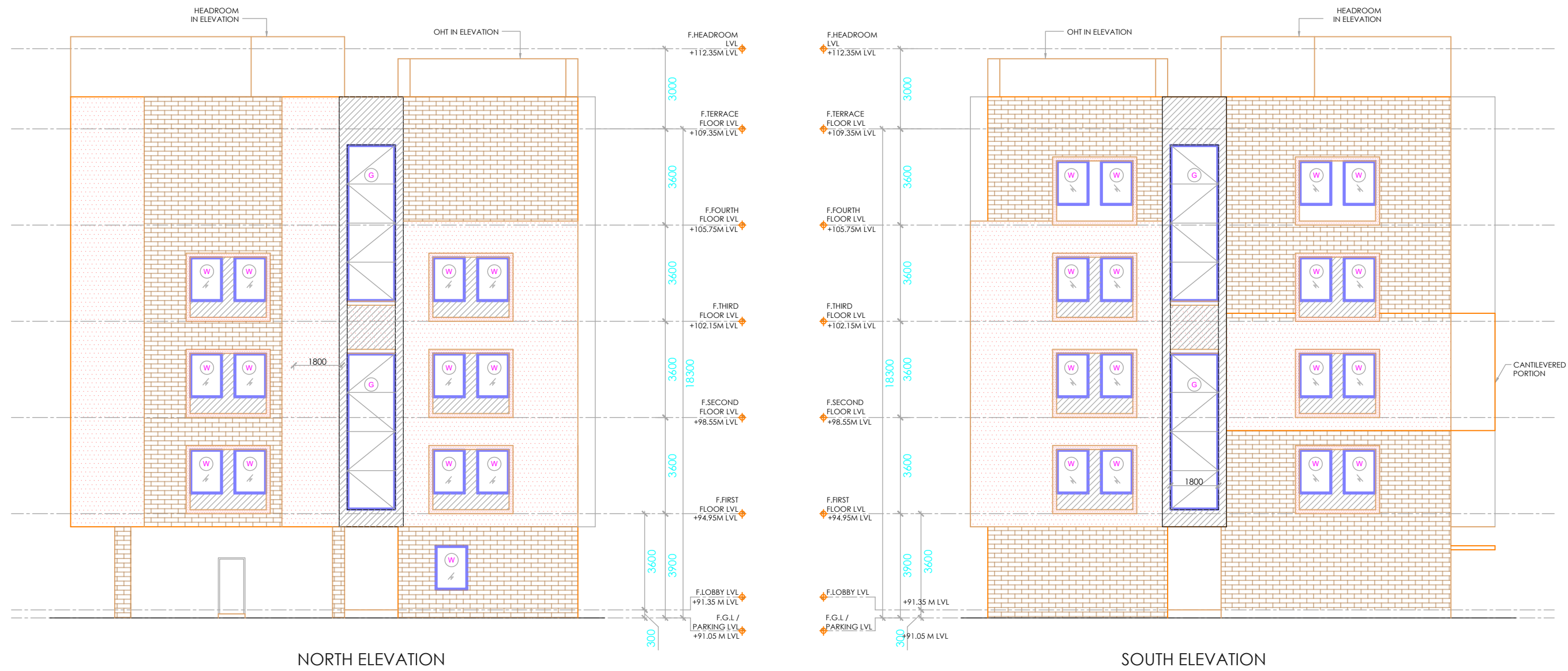


- | AREA STATEMENT      |              | SHAFT  |                  |
|---------------------|--------------|--------|------------------|
|                     |              | SYMBOL | DESCRIPTION      |
| BASEMENT FLOOR      | 176.45 SQ.M  | PS     | PLUMBING SHAFT   |
| GROUND FLOOR        | 264.08 SQ.M  | E5     | ELECTRICAL SHAFT |
| FIRST FLOOR         | 934.94 SQ.M  |        |                  |
| SECOND FLOOR        | 967.59 SQ.M  |        |                  |
| THIRD FLOOR         | 897.93 SQ.M  |        |                  |
| FOURTH FLOOR        | 897.93 SQ.M  |        |                  |
| TERRACE             | 76.42 SQ.M   |        |                  |
| TOTAL BUILT-UP AREA | 4215.34 SQ.M |        |                  |
- NOTE:  
FOUNDATION TO BE DESIGNED FOR  
BASEMENT+GROUND+4 FLOORS

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  3. All dimensions in millimeters and levels in meters.
  4. Dimensions to be followed as indicated and not to be scaled.

LEGEND:		DESCRIPTION:	
	FLOOR FINISH	GR	- GRANITE STONE
	SKIRTING FINISH	VT	- VITRIFIED TILE
	SKIRTING HEIGHT	AVT	- ANTI SKID VITRIFIED TILE
	WALL FINISH	FFG	- FLAMED FINISH GRANITE
	CEILING FINISH	AL	- ALUMINIUM
	DADO HEIGHT	GA	- GRANO FLOORING
	DADO	EP	- EMULSION PAINT
		WW	- WHITE WASH

AREA STATEMENT		SHAFT	
BASEMENT FLOOR	176.45 SQ.M	SYMBOL	DESCRIPTION
GROUND FLOOR	264.08 SQ.M	PS	PLUMBING SHAFT
FIRST FLOOR	934.94 SQ.M	ES	ELECTRICAL SHAFT
SECOND FLOOR	967.59 SQ.M		
THIRD FLOOR	897.93 SQ.M		
FOURTH FLOOR	897.93 SQ.M		
TERRACE	76.42 SQ.M		
TOTAL BUILT-UP AREA	4215.34 SQ.M		

OHT			
FLUSHING WATER OHT	5,750 LTRS	DOMESTIC WATER OHT	11,500 LTRS
RAIN WATER OHT	5,750 LTRS	FIRE FIGHTING WATER OHT	11,500 LTRS

REVISIONS	
AS BUILT	
CONSTRUCTION	
APPROVAL	
INFORMATION	*
TENDER	
SCHEME	
ISSUED FOR	

NAME OF THE PROJECT:  
PROPOSED CONSTRUCTION OF THE OFFICE BUILDING FOR  
MoEF & CC'S RO, WCCB & CPCB

CLIENT:  
M/s. MoEF & CC, CHENNAI

DRAWING TITLE:  
TERRACE PLAN

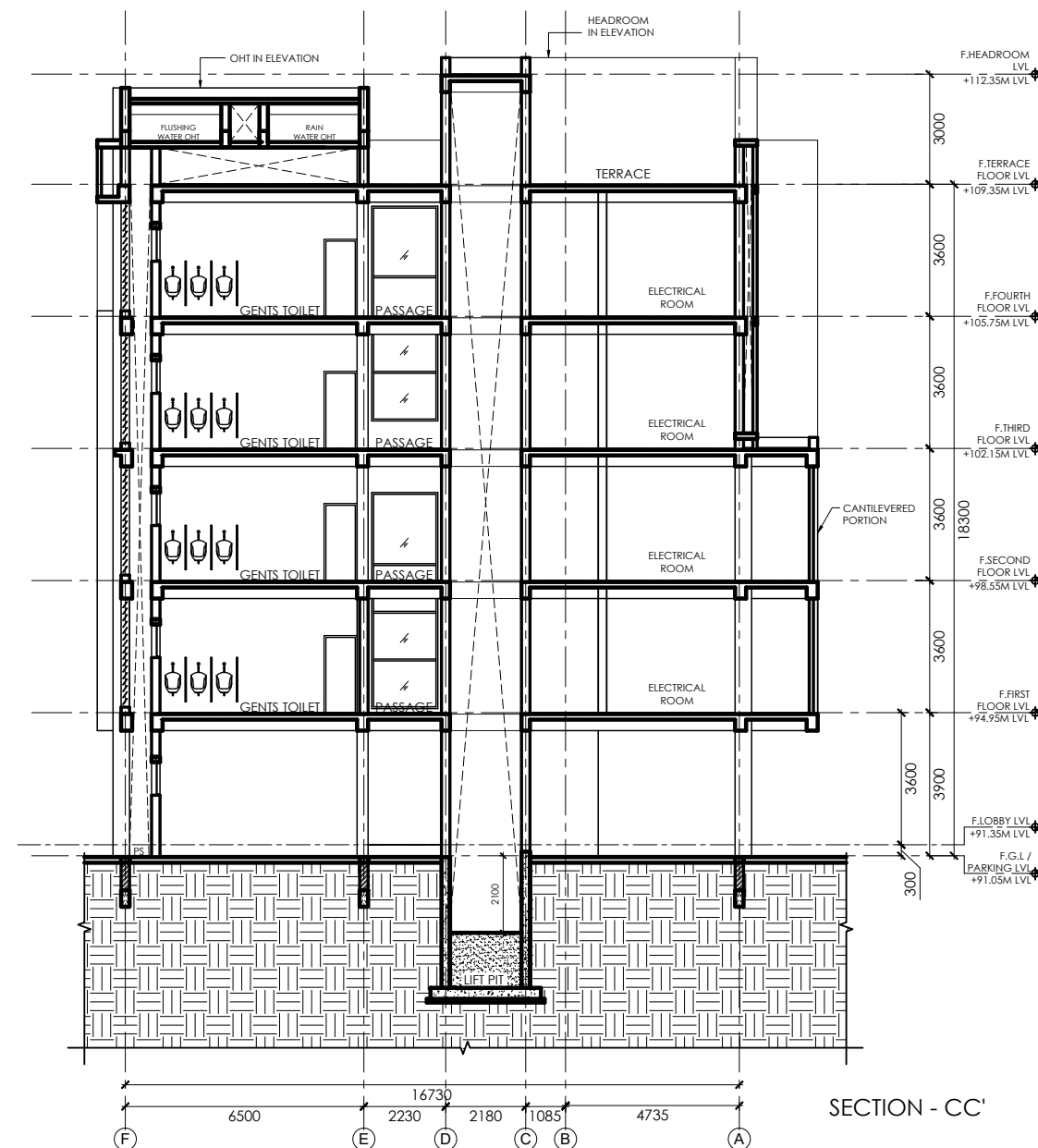
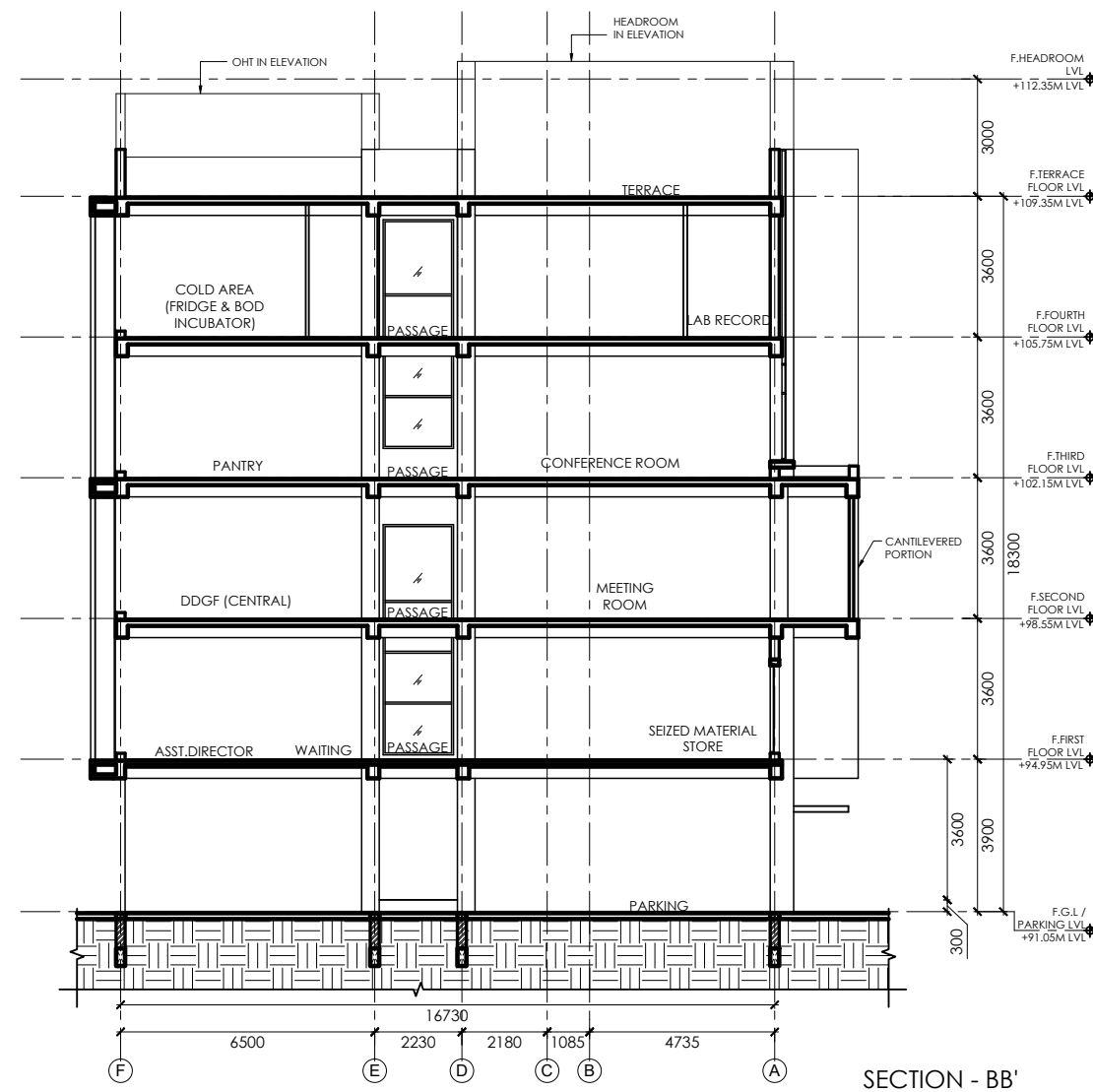
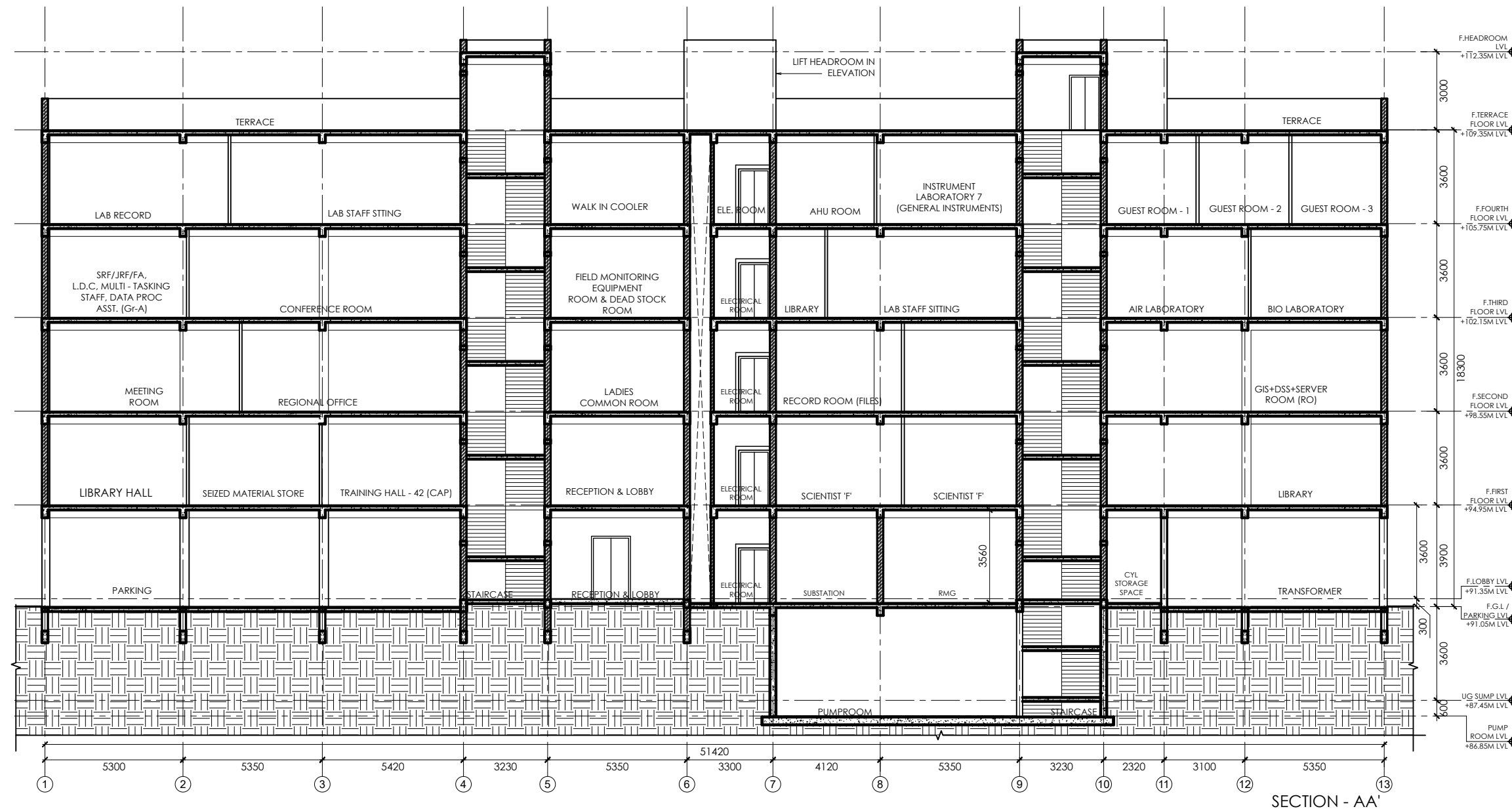
STRUCTURAL CONSULTANT:  
ZACHARIA GEORGE F.I.E

SCALE: 1:125 @ A2	DESIGN BY: PDG	DRAWN BY: RAJESH.T	CHECKED BY: PDG
DATE: 31-08-2025	SIGN:	SIGN:	SIGN:

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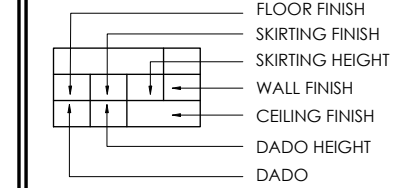
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3. All dimensions in millimeters and levels in meters.
4. Dimensions to be followed as indicated and not to be scaled.

## LEGEND:



DESCRIPTION:
GR - GRANITE STONE
VT - VITRIFIED TILE
AVT - ANTI SKID VITRIFIED TILE
FFG - FLAMED FINISH GRANITE
AL - ALUMINIUM
GA - GRANO FLOORING
EP - EMULSION PAINT
WW - WHITE WASH

## AREA STATEMENT

BASEMENT FLOOR	176.45 SQ.M
GROUND FLOOR	264.08 SQ.M
FIRST FLOOR	934.94 SQ.M
SECOND FLOOR	967.59 SQ.M
THIRD FLOOR	897.93 SQ.M
FOURTH FLOOR	897.93 SQ.M
TERRACE	76.42 SQ.M
TOTAL BUILT-UP AREA	4215.34 SQ.M

## SHAFT

SYMBOL	DESCRIPTION
PS	PLUMBING SHAFT
ES	ELECTRICAL SHAFT

NOTE:  
FOUNDATION TO BE DESIGNED FOR  
BASEMENT+GROUND+4 FLOORS

## REVISIONS

AS BUILT	
CONSTRUCTION	
APPROVAL	
INFORMATION	
TENDER	*
SCHEME	
ISSUED FOR	

TENDER

NAME OF THE PROJECT:  
PROPOSED CONSTRUCTION OF THE OFFICE BUILDING FOR  
MoEF & CC'S RO, WCCB & CPCB

CLIENT:  
M/s. MoEF & CC, CHENNAI

DRAWING TITLE:  
EAST ELEVATION (FRONT)

STRUCTURAL CONSULTANT:

ZACHARIA GEORGE F.I.E

SCALE: 1:125 @ A2	DESIGN BY: PDG	DRAWN BY: RAJESH.T	CHECKED BY: PDG
DATE: 31-08-2025	SIGN:	SIGN:	SIGN:

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email : mail@paparchitect.com

website : www.paparchitect.com



DWG NO: 4195-01-AR-09 SHT 01 OF 01 REV NO: