

Enquiry Particulars	
Regional Office	EE - CED - II, CCU
Office Inviting Bids	EE - CED - II, CCU
Tender ID	71271
NIT/RFP NO	14/2023-24/CE/CCU/CED-I/Delhi
Name of Work	Construction of New Building in the existing premises of Privesh Bhawan, CPCB, Delhi.
Subwork/Packages	
Time Allowed	24 months
Tender Type	OPEN
Procurement Type	WORKS
Type of Work	Civil Works - Buildings
Category of Tendered	NON-CPWD CONTRACTOR
Estimated Cost	68,44,70,924
Bid Type	Percentage
Bid Submission Closing Date & Time	02/04/2024 15:00
Bid Validity Period (In Days)	75
Bid Validity Expiry Date	16/06/2024 15:30 (After Technical cum Eligibility Bid Opening)
Tender Notice Type	Standard Notice Tender
Competitive Bidding Type	NCB

Tender Inviting Authority Particulars	
Office Inviting Bids	EE - CED - II, CCU
Designation	
Address	Room No. 733, CCU
Contact Details	9650371895
Email	eep2ccu-mef@nic.in

EMD Details		
EMD(INR)	EMD In Favour Of	Mode of Payment
Rs. 78,44,709	Executive Engineer, CED-I, CCU, MoEF&CC	DD,FDR,BC,BG

Bid Openers						
Department User Name	Region	Mobile Number	Email	Designation	Certificate serial No	Certificate Expiry
Jaswinder Pal	EE - CED - II, CCU	9650371895	jaswinder.pal1972@gov.in	Executive Engineer	16b5fed	30/04/2026 05:15
Sameer Khanna	EE - CED - II, CCU	9891244858	sameer.khanna1203@gmail.com	Assistant Engineer	1d0f73713f	22/08/2025 16:05

Tender Documents				
S.No	File Name	File Description	File Size (in Bytes)	Uploaded Date
1	NIT14CE_PART_A.pdf	NIT Part A	1228680	09/03/2024 13:17

2	NIT14CE_PART_ B.pdf	NIT Part B	2101182	09/03/2024 13:17
3	NIT14CE_PART_ C.pdf	NIT Part C	7609743	09/03/2024 13:18

#### Mandatory Documents Details

S.No	Documents Required from Vendor	Document Type
1	For CPWD enlisted Contractors	Mandatory
2	Copy of enlistment order in in appropriate class and category issued by CPWD	Mandatory
3	Copy of original EMD in proper form.	Mandatory
4	Copy of receipt for deposition of original EMD to division office of any EE, CPWD or CCU.	Mandatory
5	GST Registration certificate or Undertaking as per NIT document	Mandatory
6	Certificate of Financial Turnover from CA Form A	Mandatory
7	List of projects under execution in Form C1	Mandatory
8	Bidding Capacity as per Form C2	Mandatory
9	Affidavit for non-execution of eligible similar works through another contractor on back to back basis or subletting basis furnished on Rs.100 non judicial stamp paper attested by Notary. Undertaking for similar works in Form H	Mandatory
10	Affidavit for Non Black Listing should be furnished on Rs.100 non Judicial stamp paper attested by Notary in Form- I.	Mandatory
11	Any other document as specified in NIT	Mandatory
12	For Non-CPWD Registered Contractors	Mandatory
13	Copy of original EMD in proper form	Mandatory
14	Copy of receipt for deposition of original EMD to division office of any EE, CPWD or CCU	Mandatory
15	Letter of transmittal	Mandatory
16	Certificate of Financial Turnover from CA Form A.	Mandatory
17	Bankers certificate or Networth Form B and B-1	Mandatory
18	List of eligible similar nature of works in Form C	Mandatory
19	List of projects under execution in Form C1.	Mandatory
20	Bidding Capacity as per Form C2.	Mandatory
21	Performance report of works mentioned in Form C and C1 in Form D	Mandatory
22	Structure and Organisation Form E	Mandatory
23	Affidavit for non-execution of eligible similar works through another contractor on back to back basis or subletting basis furnished on Rs.100 non judicial stamp paper attested by Notary. Undertaking for similar works in Form H.	Mandatory
24	GST registration certificate or Undertaking as per NIT document.	Mandatory
25	Any other Document as specified in the bid documents	Mandatory

#### Tender Covers

S.No	Cover Name	Bid Opening date	Dependent Cover Name
1	Technical cum Eligibility Bid	02/04/2024 15:30	

2	Financial Bid	Financial Bid Date To be Decided Later	Technical cum Eligibility Bid
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<b>Technical cum Eligibility Bid</b>		
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S.No	Documents Required from Vendor	Mandatory
1	Enlistment order copy of contractor	Mandatory
2	Work Experience Certificate	Mandatory
3	Certiifcate of financial turnover from CA	Mandatory
4	Net Worth	Mandatory
5	Structure and organisation	Mandatory
6	Eligibility documents	Mandatory

<b>Financial Bid</b>		
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S.No	File Name	File Size(in Bytes)
1	71271-PercentageComposite1.xls	60928

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**Certified that this NIT contains Pages 1 to 362.**

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

PART A

GENERAL INFORMATION

## **INFORMATION & INSTRUCTIONS FOR BIDDERS FOR e-BIDDING**

The Executive Engineer, CED-I, Civil Construction Unit (CCU), Ministry of Environment, Forest & Climate Change (MoEF&CC), CGO Complex, Lodhi Road, New Delhi -110003 (**email-[eeeced1ccu-mef@nic.in](mailto:eeeced1ccu-mef@nic.in), Mo. 9650371895**) on behalf of President of India invites online Percentage rate bids from CPWD enlisted contractors of appropriate class in Buildings & Roads (erstwhile composite /Building/ Infrastructure) category and firms/contractors of repute in two bid system for the following work:

NIT No.	14/2023-24/CE/CCU/CED-I/Delhi
Name of Work	<b>Construction of New Building in the existing premises of Parivesh Bhawan, CPCB, Delhi.</b>
Location	Delhi
Estimated cost put to bid	Rs. <b>68,44,70,924/-</b>
Earnest Money	Rs. <b>78,44,709/-</b>
Period of Completion	24 Months
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 02.04.2024
Time date of opening of technical bid	03:30 PM on 02.04.2024
Pre-Bid Conference	Pre-bid conference shall be held on 15.03.2024 at 11 AM with the eligible and intending bidders in <b>the office of CE, CCU, 7<sup>th</sup> floor, Pt. Deendayal Antyodaya Bhawan, CGO Complex, Lodhi Road, New Delhi -110003.</b>

*\*\*To be filled in by the Executive Engineer*

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. ***Joint ventures/Consortium and Special Purpose Vehicles are not allowed to tender.***

1. Contractors who fulfill the following requirements shall be eligible to apply [1(a)(i), 1(b), 1(c) & 1(d) are not applicable for CPWD enlisted contractors of appropriate class. 1(e) is applicable for CPWD enlisted contractors also]:
  - a) Should have satisfactorily completed the works as mentioned below during the last Seven years ending last day of the month previous to the one in which tenders are invited-
    - (i) Three similar works each costing not less than **Rs. 27.38 Crores** or two similar works each costing not less than **Rs. 41.07 Crores** or one similar work costing not less than **Rs. 54.76 Crores.**

“Similar Work” shall mean construction of minimum one multi-storeyed RCC/Composite framed structure building having eight storeys with minimum one basement or completing balance Construction work of one building (i/c structural work) minimum up to eight storey with minimum one basement.

**Note-1:** Machine room and mummy shall not be counted as a storey.

**Note-2:** For this purpose, each basement, stilt constructed in the building shall be considered as a storey.

**Note-3:** Components of work executed other than those included in definition of similar work shall be deducted while calculating cost of similar work.

**Note-4:** For the purpose, “Cost of work” shall mean gross value of the completed work including the cost of materials supplied by the Government/Client, but excluding those supplied free of cost. This should be certified by an officer not below the rank of Executive Engineer / Project Manager or equivalent.

**In case the certificate of work experience has been issued by any Pvt. Firm / Agency / Builder, the bidders will have to submit the documentary proof of the TDS (Form -26AS) with income tax department to ensure actual value of work done.**

**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 previous day of last date of submission of tenders.**

- b) Should have had Average Annual Financial Turnover of Rs. **20.53** Crores on construction works during the last three years ending 31<sup>st</sup> March 2023 (Scanned copy of Certificate from CA with Unique Document Identification Number (UDIN) to be uploaded). The value of annual turnover figures shall be brought to the current value by enhancing the actual turnover figures at simple rate of 7% per annum.
- c) Should not have incurred any loss (profit after tax should be positive) in more than two years during the available last five consecutive balance sheets (standalone financial statement), ending 31<sup>st</sup> March 2023.
- d) Should have a Banker's Certificate from a commercial Bank for Rs. **27.38** Crores or Net Worth certificate from CA with Unique Document Identification Number (UDIN) of minimum 10 % amount of ECPT (Scanned copy of original to be uploaded).
- e) Should have bidding capacity equal to or more than the estimated cost of the work put to tender. The bidding capacity shall be worked out by the following formula:

Bidding Capacity = {[AxNx1.5]-B} Where,

A = Maximum turnover in construction works executed in any one year during the last seven years taking into account the completed as well as works in progress. The value of completed

works shall be brought to current costing level by enhancing at a simple rate of 7% per annum.

N = Number of years prescribed for completion of work for which bids have been invited.

B = Value of existing commitments and ongoing works to be completed during the period of completion of work for which bids have been invited.

**Notes:**

- i) The bidder should submit bidding capacity as per Form 'C-2'.
- ii) Bidding capacity is applicable for all the contractors including CPWD enlisted contractors.
- iii) Bidding capacity formula, for CPWD contractors who are enlisted based on rule 6.1.7 of Enlistment Rules-2022 i.e. government retired engineer/ architect for three years from the date of issue of enlistment order, is as follows: -

$$\text{Bidding Capacity} = \{[AxNx1.5]-B\}$$

Where,

A = Banker certificate figure as submitted by applicant (i.e. government retired engineer/ architect) at the time of enlistment for first year of enlistment and subsequent fresh bankers certificate for second and third year respectively. Value of A for first year will be mentioned in the enlistment order by the member secretary of advisory committee for enlisting authority.

N = Number of years prescribed for completion of work for which bids have been invited.

B = Value of existing commitments and on-going works to be completed during the period of completion of work for which bids have been invited. This value is for newly enlisted entity.

Within three years from the date of issue of enlistment order, the newly enlisted entity has to develop its own bidding capacity and thereafter the general bidding capacity formula being used for other entities shall be bidding capacity. Newly enlisted entity may like to follow general bidding capacity formula even before period of three years if it so chooses.

- iv) Bidding capacity, for CPWD contractors who are enlisted based on rules 9.6.3 & 9.6.4 of Enlistment Rules-2022 i.e. new entity based on previously enlisted entity for three years from date of issue of enlistment order, is as follows:

Annual turnover of newly enlisted entity shall be in proportion to the shareholding of partners/directors in the original enlisted entity at the time of enlistment of the newly enlisted entity.



Within three years from the date of issue of enlistment order, the newly enlisted entity has to develop its own bidding capacity and thereafter the general bidding capacity formula being used for other entities shall be applicable to it for calculation of bidding capacity. Newly enlisted entity may like to follow general bidding capacity formula even before period of three years, if it so chooses.

Bidding Capacity for newly enlisted entity based on rules 9.6.3 & 9.6.4 enlistment rules -2022 shall be as follows: -

$$\text{Bidding Capacity} = \{[A \times N \times 1.5] - B\}$$

Where,

A' = Proportionate share of newly enlisted director/partner in originally enlisted company/firm multiplied by the factor A, as given below. Value of A' will be mentioned in the enlistment order by member secretary of Advisory committee for Enlistment Authority, it will remain same for three years.

A = Maximum turnover in construction works executed in any one year during the last seven years taking into account the completed as well as works in progress. The value of completed works shall be brought to current costing level by enhancing at a simple rate of 7% per annum. This value is of originally enlisted entity at the time of enlistment of newly enlisted entity.

N = Number of years prescribed for completion of work for which bids have been invited.

B = Value of existing commitments and ongoing works to be completed during the period of completion of work for which bids have been invited. This value is for newly enlisted entity.

v) Enlisted entities based on rules 6.1.7, 9.6.3 or 9.6.4 of enlistment rules-2022 can submit MoU from agency having requisite experience for structural system technology if the enlisted entity does not have required experience.

2. 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.
3. This information and Instructions for bidders posted on website shall form part of bid document.
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> or [www.cpwd.gov.in](http://www.cpwd.gov.in) free of cost.
5. The bid can only be submitted after deposition of original EMD either in the office of Executive Engineer inviting bids or division office of any Executive Engineer, CCU/CPWD within the period of bid submission and uploading the mandatory scanned documents such as Insurance Surety Bonds, Account Payee Demand draft or Banker's Cheque or Fixed Deposit Receipts or/ and Bank

Guarantee including e- Bank Guarantee (for balance amount as prescribed) from any of the Commercial Bank towards EMD in favour of Executive Engineer as mentioned in NIT, receipt for deposition of original EMD to division office of any Executive Engineer (including NIT issuing EE), CCU/CPWD 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 instruction 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. Certificate of Financial Turn Over: At the time of submission of bid contractor may upload Affidavit/Certificate from CA mentioning Financial Turnover of last 7 years ending 31<sup>st</sup> March 2023 or for the period as specified in the bid document and further details if required may be asked from the contractor after opening of technical bids. There is no need to upload entire voluminous balance sheet.
11. 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.
12. The Technical Bid shall be opened first on due date and time as mentioned above. The time and date of opening of financial bid of contractors qualifying the technical bid shall be communicated to them at a later date.
13. Pre-Bid conference shall be held on 15.03.2024 at 11 AM with the eligible and intending bidders in **office of CE, CCU, 7<sup>th</sup> floor, Pt. Deendayal Antyodaya Bhawan, CGO Complex, Lodhi Road, New Delhi -110003** to clear the doubt of intending bidders, if any.
14. 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.
15. 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.

16. 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.
17. 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.
18. **List of Documents to be filled in by the tenderers in various forms, to be scanned and uploaded in JPG/PDF format within the period of bid submission:**

**For CPWD enlisted Contractors**

- (i) Copy of enlistment order in in appropriate class and category issued by CPWD
- (ii) Copy of original EMD in proper form.
- (iii) Copy of receipt for deposition of original EMD to division office of any EE, CPWD/CCU.
- (iv) 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 under taking along with bid documents.  

"If work is awarded to me, I/we shall obtain GST registration certificate, as applicable, 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".
- (v) Certificate of Financial Turnover from CA (Form 'A').
- (vi) List of projects under execution in Form 'C-1'.
- (vii) Bidding Capacity as per Form- 'C-2'
- (viii) Affidavit for non-execution of eligible similar work(s) through another contractor on back-to-back basis or subletting basis furnished on Rs.100/- non-judicial stamp paper attested by Notary. Undertaking for similar works in Form- 'H'.
- (ix) Affidavit for Non-Black Listing should be furnished on Rs.100/- non-Judicial stamp paper attested by Notary in Form- 'I'.
- (x) Any other document as specified in NIT

**For Non-CPWD Registered Contractors -**

- a. Copy of original EMD in proper form.
- b. Copy of receipt for deposition of original EMD to division office of any EE, CPWD/CCU.

- c. Letter of transmittal
- d. Certificate of Financial Turnover from CA (Form 'A').
- e. Bankers certificate or Networth (Form 'B' and 'B-1').
- f. List of eligible similar nature of works in Form – 'C'.
- g. List of projects under execution in Form 'C-1'.
- h. Bidding Capacity as per Form- 'C-2'
- i. Performance report of works (mentioned in Form-C and C-1) in Form – 'D'.
- j. Structure & Organisation (Form 'E')
- k. Affidavit for non-execution of eligible similar work(s) through another contractor on back-to-back basis or subletting basis furnished on Rs.100/- non-judicial stamp paper attested by Notary. Undertaking for similar works in Form- 'H'.
- l. 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, 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".

- m. Any other Document as specified in the bid documents.

**If any required document is not scanned and uploaded while submitting bid, the bid submitted shall become invalid and will not be considered in e-Tendering process and the bid shall be summarily rejected.**

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

**(For and on behalf of President of India)**

**NOTICE INVITING TENDER**

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 and firms/contractor of repute in two bid system for the following work:

**Name of work: Construction of New Building in the existing premises of Parivesh Bhawan, CPCB, Delhi.**

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. 68,44,70,924/-** This estimate, however, is given merely as a rough guide.
- 1.2. Intending bidders is eligible to submit the bid provided he has definite proof from the appropriate authority, which shall be to the satisfaction of the competent authority, of having satisfactorily completed similar works of magnitude specified below: -

[1.2.1, 1.2.2, 1.2.3 & 1.2.4 are not applicable for CPWD enlisted contractors of appropriate class. 1.2.5 is applicable for CPWD enlisted contractors also]

- 1.2.1. Should have satisfactorily completed the works as mentioned below during the last 7 years ending last day of the month previous to the one in which tenders are invited –

- (i) Three similar works each costing not less than **Rs. 27.38 Crores** or two similar works each costing not less than **Rs. 41.07 Crores** or one similar work costing not less than **Rs. 54.76 Crores**.

“Similar Work” shall mean construction of minimum one multi-storeyed RCC/Composite framed structure building having eight storeys with minimum one basement or completing balance Construction work of one building (i/c structural work) minimum up to eight storey with minimum one basement.

**Note-1:** Machine room and mumty shall not be counted as a storey.

**Note-2:** For this purpose, each basement, stilt constructed in the building shall be considered as a storey.

**Note-3:** Components of work executed other than those included in definition of similar work shall be deducted while calculating cost of similar work.

**Note-4:** For the purpose, “Cost of work” shall mean gross value of the completed work including the cost of materials supplied by the Government/Client, but excluding those supplied free of cost. This should be certified by an officer not below the rank of Executive Engineer / Project Manager or equivalent.

**In case the certificate of work experience has been issued by any Pvt. Firm / Agency / Builder, the bidders will have to submit the documentary proof of the TDS (Form - 26AS) with income tax department to ensure actual value of work done.**

**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 bid.**

To become eligible for issue of bid, the bidders shall have to furnish an affidavit as under: -

“I/We undertake and confirm that eligible similar works(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 bidding in CCU 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. (Scanned copy to be uploaded at the time of submission of bid)”

- 1.2.2. Should have had Average Annual Financial Turnover of Rs. **20.53** Crores on construction works during the last three years ending 31<sup>st</sup> March 2023 (Scanned copy of Certificate from CA with Unique Document Identification Number (UDIN) to be uploaded). The value of annual turnover figures shall be brought to the current value by enhancing the actual turnover figures at simple rate of 7% per annum.
- 1.2.3. Should not have incurred any loss (profit after tax should be positive) in more than two years during the available last five consecutive balance sheets (standalone financial statement), ending 31<sup>st</sup> March 2023.
- 1.2.4. Should have a Banker's Certificate from a commercial Bank for Rs. **27.38** Crores or Net Worth certificate from CA with Unique Document Identification Number (UDIN) of minimum 10 % amount of ECPT (Scanned copy of original to be uploaded).
- 1.2.5. Should have bidding capacity equal to or more than the estimated cost of the work put to tender. The bidding capacity shall be worked out by the following formula:

Bidding Capacity = {[AxNx1.5]-B} Where,

A = Maximum turnover in construction works executed in any one year during the last seven years taking into account the completed as well as works in progress. The value of completed works shall be brought to current costing level by enhancing at a simple rate of 7% per annum.

N = Number of years prescribed for completion of work for which bids have been invited.

B = Value of existing commitments and ongoing works to be completed during the period of completion of work for which bids have been invited.

**Notes:**

- a) The bidder should submit bidding capacity as per Form 'C-2'.
- b) Bidding capacity is applicable for all the contractors including CPWD enlisted contractors.
- c) Bidding capacity formula, for CPWD contractors who are enlisted based on rule 6.1.7 of Enlistment Rules-2022 i.e. government retired engineer/ architect for three years from the date of issue of enlistment order, is as follows: -

$$\text{Bidding Capacity} = \{[A \times N \times 1.5] - B\}$$

Where,

A = Banker certificate figure as submitted by applicant (i.e. government retired engineer/ architect) at the time of enlistment for first year of enlistment and subsequent fresh bankers certificate for second and third year respectively. Value of A for first year will be mentioned in the enlistment order by the member secretary of advisory committee for enlisting authority.

N = Number of years prescribed for completion of work for which bids have been invited.

B = Value of existing commitments and on-going works to be completed during the period of completion of work for which bids have been invited. This value is for newly enlisted entity.

Within three years from the date of issue of enlistment order, the newly enlisted entity has to develop its own bidding capacity and thereafter the general bidding capacity formula being used for other entities shall be bidding capacity. Newly enlisted entity may like to follow general bidding capacity formula even before period of three years if it so chooses.

- d) Bidding capacity, for CPWD contractors who are enlisted based on rules 9.6.3 & 9.6.4 of Enlistment Rules-2022 i.e. new entity based on previously enlisted entity for three years from date of issue of enlistment order, is as follows:

Annual turnover of newly enlisted entity shall be in proportion to the shareholding of partners/directors in the original enlisted entity at the time of enlistment of the newly enlisted entity.

Within three years from the date of issue of enlistment order, the newly enlisted entity has to develop its own bidding capacity and thereafter the general bidding capacity formula being used for other entities shall be applicable to it for calculation of bidding capacity. Newly enlisted entity may like to follow general bidding capacity formula even before period of three years, if it so chooses.

Bidding Capacity for newly enlisted entity based on rules 9.6.3 & 9.6.4 enlistment rules -2022 shall be as follows: -

$$\text{Bidding Capacity} = \{[A' \times N \times 1.5] - B\}$$

Where,

A' = Proportionate share of newly enlisted director/partner in originally enlisted company/firm multiplied by the factor A, as given below. Value of A' will be mentioned in the enlistment order by member secretary of Advisory committee for Enlistment Authority, it will remain same for three years.

A = Maximum turnover in construction works executed in any one year during the last seven years taking into account the completed as well as works in progress. The value of completed works shall be brought to current costing level by enhancing at a simple rate of 7% per annum. This value is of originally enlisted entity at the time of enlistment of newly enlisted entity.

N = Number of years prescribed for completion of work for which bids have been invited.

B = Value of existing commitments and ongoing works to be completed during the period of completion of work for which bids have been invited. This value is for newly enlisted entity.

- e) Enlisted entities based on rules 6.1.7, 9.6.3 or 9.6.4 of enlistment rules-2022 can submit MoU from agency having requisite experience for structural system technology if the enlisted entity does not have required experience.
2. Agreement shall be drawn with the successful tenderer 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 **24 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 but before last time and date of submission of bid as notified.



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-I, CCU, MoEF&CC, New Delhi**) 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/bidder 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 works shall remain open for acceptance for a period of **seventy-five (75)** days from the date of opening of technical bids. Further,
- i. If any tenderer withdraws his tender or makes any modification in the terms & conditions of the tender which is not acceptable to the department within 7 days after last date 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 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. 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. The pre bid meeting will be held on 15.03.2024 at 11 AM with the eligible and intending bidders in **office of CE, CCU, 7<sup>th</sup> floor, Pt. Deendayal Antyodaya Bhawan, CGO Complex, Lodhi Road, New Delhi -110003** to clear the doubt of intending bidders if any.
20. This notice inviting Bid shall form a part of the contract document. The successful bidder/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: -
- a) The Notice Inviting Bid, all the documents including additional conditions, special conditions, particular specification, 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.
  - b) Standard CPWD Form '7' and other Standard CPWD Forms as applicable with amendment upto last date of submission of bid.
- \*\* to be filled by EE
21. The bidders must associate with himself, with agencies as per NIT conditions.
22. **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 shall be carried out by OEM of Lift only. 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. MOU should be submitted within six months of the award of work. It shall be the responsibility of main contractor to sort out any dispute / litigation with the Specialized Agencies without any time & cost overrun to the Department. The main 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.

23. The main 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.
24. In case the main 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.
25. The main 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.
26. 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-I, CCU  
(For and on behalf of the President of India)

**(For and on behalf of President of India)**

TECHNICAL BID

Section-I

**BRIEF PARTICULARS OF WORK**

- 1) The **Salient details of the work for which bids are invited are as under:**

S. N.	Name of work	Estimated cost	Period of completion
1.	<b>Construction of New Building in the existing premises of Parivesh Bhawan, CPCB, Delhi.</b>	Rs. 68,44,70,924/-	24 Months

- 2) The site of work is located/situated at Delhi.
- 3) The scope of work consists of **Construction of New Building in the existing premises of Parivesh Bhawan, CPCB, Delhi** including all civil, electrical, mechanical, horticulture services.
- 4) Scope of work consists obtaining minimum GREEN PLUS Rating as per CPWD Green Rating Manual (GHAR) 2021 and minimum 4-star rating under GRIHA norms.
- 5) Electrical & Mechanical services/works: All the electrical & mechanical services mentioned in Part C of the tender document are in scope of work.
- 6) The Agency shall supply all documents required in obtaining all mandatory approvals and shall also extend full support to getting all required statutory & Municipal approval “Occupation and Completion” or any other document required to declare all assets eligible for bringing it in use. Contractor shall assist to CCU appointed Consultant to get completion certificate from local body, NOC from fire department and any other statutory approval related to building for handing over the assets. Contractor shall extend necessary support, as per statutory requirements, to the CPWD for these approvals. Nothing extra time Extension/Extra amount shall be paid on this account.
- 7) The Agency shall hand over the assets after completion of work with as built drawings, services route plans, Maintenance manuals, Warrantees / Guarantees or any other document required by the Engineer-in-charge for maintaining these establishments.
- 8) Scope of work also includes to train the 30% workers of the site as per SKILLED INDIA program under National Skill Development Corporation (NSDC) Norms & Conditions.

Section-II  
INFORMATION AND GUIDE-LINES FOR BIDDERS

**1.0 General:**

- 1.1 Letter of transmittal and forms for deciding eligibility are given in Section III.
- 1.2 All information called for in the enclosed forms should be furnished against the relevant columns in the forms. If for any reason, information is furnished on a separate sheet, this fact should be mentioned against the relevant column. Even if no information is to be provided in a column, a "nil" or "no such case" entry should be made in that column. If any particulars/query is not applicable in case of the bidder, it should be stated as "not applicable". The bidders are cautioned that not giving complete information called for in the application forms or not giving it in clear terms or making any change in the prescribed forms or deliberately suppressing the information may result in the bid being summarily disqualified. Bids made by telegram or e-mailed or telex and those received late will not be entertained.
- 1.3 References, information and certificate from the respective clients certifying suitability, technical knowledge or capability of the bidder should be signed by an officer not below the rank of Executive Engineer or equivalent.
- 1.4 The bidder may furnish any additional information, which he thinks is necessary to establish his capabilities to successfully complete envisaged work. He is, however advised not to furnish superfluous information. No information shall be entertained after submission of eligibility criteria document unless it is called for by the Employer.

**2.0 Definitions:**

- 2.1 In this document the following words and expression have their meaning here by assigned to them.
- 2.2 Employer / Engineer-in-Charge/ Executive Engineer or EE, CED-I means the President of India, acting through the The Executive Engineer, CED-I, Civil Construction Unit (CCU), Ministry of Environment, Forest & Climate Change (MoEF&CC), CGO Complex, Lodhi Road, New Delhi - 110003 or his successor or legal assignee thereof.
- 2.3 Bidder/Agency/Contractor/tenderer means the individual, proprietary firm, firm in partnership, limited company, private or public or corporation.
- 2.4 "YEAR" means "Financial year" unless stated otherwise.

**3.0 Method of Application:**

- 3.1 If the bidder is an individual, the application shall be signed by him above his/her full type written name and current address. If the bidder is an individual, the application shall be signed by him above his full type written name and current address.

- 3.2 If the bidder is a proprietary firm, the application shall be signed by the proprietor above his full type written name and the full name of his firm with its current address
- 3.3 If the bidder is a firm in partnership, the application shall be signed by all the partners of the firm above their full typewritten names and current addresses, or, alternatively, by a partner holding power of attorney for the firm. In the latter case a certified copy of the power of attorney should accompany the application. In both cases a certified copy of the partnership deed and current address of all the partners of the firm should accompany the application.
- 3.4 If the bidder is a limited company or a corporation, the application shall be signed by a duly authorized person holding power of attorney for signing the application accompanied by a copy of the power of attorney. The bidder should also furnish a copy of the Memorandum of Articles of Association duly attested by a Public Notary

#### 4 **Final Decision-Making Authority:**

The employer reserves the right to accept or reject any bid and to annul the process and reject all bids at any time, without assigning any reason or incurring any liability to the bidders.

#### 5 **Particulars of works:**

The particulars of the work given in section – I are provisional. They are liable to change and must be considered only as advance information to assist the bidder.

#### 6 **Site Visit:**

The bidder is advised to visit the site of work, at his own cost, and examine it and its surroundings to himself to collect all information that he considers necessary for proper assessment of the prospective assignment.

#### 7.0 **Initial Criteria for Eligibility:**

Enlistment of the contractors should be valid on the last date of submission of bids. In case only the last date of submission of bids is extended, the enlistment of contractor should be valid on the original date of submission of bids. ***Joint ventures/Consortium and Special Purpose Vehicles are not allowed to tender.***

Contractors who fulfill the following criteria shall also be eligible to apply [7.1, 7.2, 7.3 & 7.4 are not applicable for CPWD enlisted contractors of appropriate class. 7.5 is applicable for CPWD enlisted contractors also]:

- 7.1 Should have satisfactorily completed the works as mentioned below during the last Seven years ending last day of the month previous to the one in which tenders are invited:
- (i) Three similar works each costing not less than **Rs. 27.38 Crores** or two similar works each costing not less than **Rs. 41.07 Crores** or one similar work costing not less than **Rs. 54.76 Crores.**



“Similar Work” shall mean construction of minimum one multi-storeyed RCC/Composite framed structure building having eight storeys with minimum one basement or completing balance Construction work of one building (i/c structural work) minimum up to eight storey with minimum one basement.

**Note-1:** Machine room and mummy shall not be counted as a storey.

**Note-2:** For this purpose, each basement, stilt constructed in the building shall be considered as a storey.

**Note-3:** Components of work executed other than those included in definition of similar work shall be deducted while calculating cost of similar work.

**Note-4:** For the purpose, “Cost of work” shall mean gross value of the completed work including the cost of materials supplied by the Government/Client, but excluding those supplied free of cost. This should be certified by an officer not below the rank of Executive Engineer / Project Manager or equivalent.

**In case the certificate of work experience has been issued by any Pvt. Firm / Agency / Builder, the bidders will have to submit the documentary proof of the TDS (Form -26AS) with income tax department to ensure actual value of work done.**

**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 previous day of last date of receipt of applications for bids submission of tender.**

- 7.2** Should have had Average Annual Financial Turnover of Rs. **20.53** Crores on construction works during the last three years ending 31<sup>st</sup> March 2023 (Scanned copy of Certificate from CA with Unique Document Identification Number (UDIN) to be uploaded). The value of annual turnover figures shall be brought to the current value by enhancing the actual turnover figures at simple rate of 7% per annum.
- 7.3** Should not have incurred any loss (profit after tax should be positive) in more than two years during the available last five consecutive balance sheets (standalone financial statement), ending 31<sup>st</sup> March 2023.
- 7.4** Should have a Banker's Certificate from a commercial Bank for Rs. **27.38** Crores or Net Worth certificate from CA with Unique Document Identification Number (UDIN) of minimum 10 % amount of ECPT (Scanned copy of original to be uploaded).
- 7.5** Should have bidding capacity equal to or more than the estimated cost of the work put to tender. The bidding capacity shall be worked out by the following formula:

Bidding Capacity = {[AxNx1.5]-B} Where,

A = Maximum turnover in construction works executed in any one year during the last seven years taking into account the completed as well as works in progress. The value of

completed works shall be brought to current costing level by enhancing at a simple rate of 7% per annum.

N = Number of years prescribed for completion of work for which bids have been invited.

B = Value of existing commitments and ongoing works to be completed during the period of completion of work for which bids have been invited.

**Notes:**

- i. The bidder should submit bidding capacity as per Form 'C-2'.
- ii. Bidding capacity is applicable for all the contractors including CPWD enlisted contractors.
- iii. Bidding capacity formula, for CPWD contractors who are enlisted based on rule 6.1.7 of Enlistment Rules-2022 i.e. government retired engineer/ architect for three years from the date of issue of enlistment order, is as follows: -

$$\text{Bidding Capacity} = \{[AxNx1.5]-B\}$$

Where,

A = Banker certificate figure as submitted by applicant (i.e. government retired engineer/ architect) at the time of enlistment for first year of enlistment and subsequent fresh bankers certificate for second and third year respectively. Value of A for first year will be mentioned in the enlistment order by the member secretary of advisory committee for enlisting authority.

N = Number of years prescribed for completion of work for which bids have been invited.

B = Value of existing commitments and on-going works to be completed during the period of completion of work for which bids have been invited. This value is for newly enlisted entity.

Within three years from the date of issue of enlistment order, the newly enlisted entity has to develop its own bidding capacity and thereafter the general bidding capacity formula being used for other entities shall be bidding capacity. Newly enlisted entity may like to follow general bidding capacity formula even before period of three years if it so chooses.

- iv. Bidding capacity, for CPWD contractors who are enlisted based on rules 9.6.3 & 9.6.4 of Enlistment Rules-2022 i.e. new entity based on previously enlisted entity for three years from date of issue of enlistment order, is as follows:

Annual turnover of newly enlisted entity shall be in proportion to the shareholding of partners/directors in the original enlisted entity at the time of enlistment of the newly enlisted entity.

Within three years from the date of issue of enlistment order, the newly enlisted entity has to develop its own bidding capacity and thereafter the general bidding capacity formula being used for other entities shall be applicable to it for calculation of bidding capacity. Newly enlisted entity may like to follow general bidding capacity formula even before period of three years, if it so chooses.

Bidding Capacity for newly enlisted entity based on rules 9.6.3 & 9.6.4 enlistment rules -2022 shall be as follows: -

$$\text{Bidding Capacity} = \{[A \times N \times 1.5] - B\}$$

Where,

A' = Proportionate share of newly enlisted director/partner in originally enlisted company/firm multiplied by the factor A, as given below. Value of A' will be mentioned in the enlistment order by member secretary of Advisory committee for Enlistment Authority, it will remain same for three years.

A = Maximum turnover in construction works executed in any one year during the last seven years taking into account the completed as well as works in progress. The value of completed works shall be brought to current costing level by enhancing at a simple rate of 7% per annum. This value is of originally enlisted entity at the time of enlistment of newly enlisted entity.

N = Number of years prescribed for completion of work for which bids have been invited.

B = Value of existing commitments and ongoing works to be completed during the period of completion of work for which bids have been invited. This value is for newly enlisted entity.

- v. Enlisted entities based on rules 6.1.7, 9.6.3 or 9.6.4 of enlistment rules-2022 can submit MoU from agency having requisite experience for structural system technology if the enlisted entity does not have required experience.

## 8.0 Evaluation Criteria:

8.1 The details submitted by the bidder will be evaluated in the following manner.

- 8.1.1 The initial criteria prescribed in para 7.0 above in respect of experience of eligible similar works completed, loss, Banker's certificate, financial turnover and bidding capacity etc. will first be scrutinized and the bidder's eligibility for the work be determined.
- 8.1.2 The bidders qualifying the initial criteria as set out in Para 7.0 above will be evaluated for following criteria by scoring method on the basis of details furnished by them.

(a) Financial strength (Form 'A' & 'B')	Maximum	20	marks
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(b) Experience in eligible similar nature of work during last 7 years (Form 'C' & 'C-1')	Maximum	20	marks
(c) Performance on works (Form 'D') Time Over Run	Maximum	20	marks
(d) Performance on works (Form 'D-1')-Quality	Maximum	40	marks
		Completed works (25 Marks) and ongoing works (15 Marks)	
-----			
Total		100 marks	
-----			

To become eligible for short listing, the bidder must secure at least 50% (Fifty percent) marks in each (section a,b,c,&d) and 60% (Sixty percent) marks in aggregate.

The department, however reserves the right to restrict the list of such qualified bidders to any number deemed suitable by it.

Note: The average value of performance of works for time over run and quality shall be taken on the basis of performance report of the eligible similar works.

#### 8.1.3 Evaluation of Performance: -

Evaluation of the performance of contractor for eligibility shall be done by NIT approving authority or a committee constituted by him. All the eligible similar works executed and submitted by the bidder in support of eligibility and any one of the ongoing works, may be got inspected by a committee which may consists of client or any other authority as decided by NIT approving authority. The marks for the quality shall be given based on this inspection, if inspection is carried out.

**Scoring method of evaluation:-** The scoring for evaluation shall be done as given in Proforma – I.

9.0 **Financial Information:** Bidder should furnish the Annual financial statement for the last Five years in Form 'A'. banker's certificate in Form 'B' or Networth Certificate in Form 'B1'.

#### 10.0 Experiences in Works Highlighting Experience in Similar Works:

10.1 Bidder should furnish the list of eligible similar nature of works successfully completed during last seven years in Form 'C' and ongoing works as well (Form C-1).

10.2 Performance reports corresponding to work mentioned in (Form-C) and Form C-1 in Form-D. If needed, the bidder may attach a separate certificate in this regard from performance report issuing authority.

### **11.0 Organization Information:**

Bidder is required to submit the information in respect of his / her /their organization in Form- 'E'.

### **12.0 Letter of Transmittal:**

The Bidder should submit the letter of transmittal attached with the document.

**13.0 Opening of Price Bid:** After evaluation of applications, a list of short-listed agencies will be prepared. Thereafter the financial bids of only the qualified and technically acceptable bidders shall be opened at the notified time, date and place in the presence of the qualified bidders or their representatives.

### **14.0 Award criteria:**

14.1 The employer reserves the right, without being liable for any damages or obligation to inform the bidder to:

14.1.1 Amend the scope of work and value of contract.

14.1.2 Reject any or all the applications without assigning any reason.

14.2 Any effort on the part of the bidder or his agent to exercise influence or to pressurize the employer would result in rejection of his bid. Canvassing of any kind is prohibited.

**Criteria for Evaluation of the performance of contractors for Pre- Eligibility**

S.N.	Attributes	Marks	Evaluation	
<b>S E R I E S</b>	<b>(a)</b> Financial Strength	(20 Marks)		
	(i) Average annual turnover	16 Marks	(i) 60% marks for minimum eligibility criteria (ii) 100% marks for twice the minimum eligibility criteria or more. (iii) In between (i) & (ii)- on pro-rata basis	
	(ii) Banker's or Networth Certificate	04 Marks		
<b>(b)</b> Experience in similar class of work	(20 marks)	(i) 60% marks for minimum eligibility criteria (ii) 100% marks for twice the minimum eligibility criteria or more. (iii) In between (i) & (ii)- on pro-rata basis		
<b>E F F E C T I V E</b>	<b>(c)</b> Performance on works [Time Over run(TOR)]	(20 marks)		
	Parameter	Calculation for points	Score	Maximum Marks
	If TOR =		1.00   2.00   3.00   >3.50	20
	(i) Without levy of compensation		20   15   10   10	
	(ii) With levy of compensation		20   5   0   -5	
(iii) Levy of compensation not decided		20   10   0   0		
TOR = AT/ST, where AT =Actual Time; ST= Stipulated Time in the agreement plus (+) justified period of Extension of Time. Note: Marks for value in between the stages indicated above is to be determined by straight line variation basis.				
<b>C O N T R I B U T I O N</b>	<b>(d)</b> Performance of works (Quality) as per assessment in Form D-1	(40 Marks)		
	Completed works (max. 25 marks)	Ongoing works (max. 15 marks)	(Total Marks assessed)	

**Section-III**  
**LETTER OF TRANSMITTAL**

From:

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To

The Executive Engineer, CED-I,  
Civil Construction Unit (CCU), MoEF&CC,  
CGO Complex, Lodhi Road, Delhi-110003.  
**(email- eeced1ccu-mef@nic.in)**

Subject: Submission of Bid for the work of **Construction of New Building in the existing premises of Parivesh Bhawan, CPCB, Delhi.**

Sir,

Having examined details given in bid document for the above work, I/we hereby submit the relevant information.

1. I/We hereby certify that all the statements made and information supplied in the enclosed forms A to I and accompanying statement are true and correct.
2. I/we have furnished all information and details necessary for eligibility and have no further pertinent information to supply.
3. I/we submit the requisite certified Banker's/Networth certificate and authorize the Executive Engineer, CED-I, Civil Construction Unit (CCU), Ministry of Environment, Forest & Climate Change (MoEF&CC), CGO Complex, Lodhi Road, New Delhi -110003 to approach the Bank issuing the banker's/Networth certificate to confirm the correctness thereof. I/We also authorize the Executive Engineer, CED-I, Civil Construction Unit (CCU), Ministry of Environment, Forest & Climate Change (MoEF&CC), CGO Complex, Lodhi Road, New Delhi -110003 to approach individuals, employers, firms and corporation to verify our competence and general reputation.
4. I/we submit the following certificates in support of our suitability, technical knowledge and capability for having successfully completed the following eligible similar works:

S.No.	Name of Work	Certificate From

**Certificate:** It is certified that the information given in the enclosed eligibility 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 found to be incorrect.

Enclosures:  
Date of submission

Seal of bidder:  
Signature(s) of bidder(s)

**FORM 'A'**

**FINANCIAL INFORMATION**

Name of the firm / Bidder- .....

- I. Financial Analysis-Details to be furnished duly supported by figures in balance sheet/ profit & loss account for the last five financial years duly certified by the Chartered Accountant, as submitted by the applicant to the Income Tax Department (Copies to be attached).

Sl. No.	Particulars	Financial Years				
		2018-19	2019-20	2020-21	2021-22	2022-23
i)	Gross Annual Turnover on construction works					
ii)	Profit / Loss (standalone financial statement)					

- II. Financial arrangements for carrying out the proposed work.

Signature of Chartered Accountant with Seal

SIGNATURE OF BIDDER(S)



**BANKERS' CERTIFICATE FROM A COMMERCIAL BANK**

This is to certify that to the best of our knowledge and information that M/s./Shri..... having marginally noted address, ..... as a customer of our bank are / is respectable and can be treated as good for any engagement up to a limit of Rs ..... (Rupees.....).

This certificate is issued without any guarantee or responsibility on the bank or any of the officers.

(Signature)

For the bank

NOTE: (1) Banker's certificate should be on letter head of the Bank, addressed to the Executive Engineer, CED-I, Civil Construction Unit (CCU), Ministry of Environment, Forest & Climate Change (MoEF&CC), CGO Complex, Lodhi Road, New Delhi -110003 (email-[eed1ccu.mef@nic.in](mailto:eed1ccu.mef@nic.in))

(2) In case of partnership firm, certificate should include names of all partners as recorded with the Bank.

**FORM FOR CERTIFICATE OF NET WORTH FROM CHARTERED  
ACCOUNTANT**

"It is to certify that as per the audited balance sheet and profit & loss account during the financial year ....., the Net Worth of M/s ..... (Name & Registered Address of individual/firm/ company), as on ..... (the relevant date) is Rs..... after considering all liabilities. It is further certified that the Net Worth of the company has not eroded by more than 30 % in the last three years ending on (the relevant date)."

Unique Document Identification Number (UDIN) .....

Signature of Chartered Accountant

Name of Chartered Accountant

Membership No. of ICAI

Date and Seal

**FORM 'C'**

**DETAILS OF ELIGIBLE SIMILAR NATURE OF WORKS COMPLETED DURING THE LAST SEVEN YEARS ENDING LAST DAY OF THE MONTH PREVIOUS TO THE ONE IN WHICH TENDERS ARE INVITED**

Sl. No.	Name of work/ project and location	Owner or sponsoring organization	Cost of work in crores of rupees	Date of commencement as per contract	Stipulated date of completion	Actual date of completion	Litigation/ arbitration cases pending/ in progress with details*	Name and address / telephone number of officer to whom reference may be made	Whether the work was done on back to back basis Yes/No
1	2	3	4	5	6	7	8	9	10

\* Indicate gross amount claimed and amount awarded by the Arbitration Tribunal.

Signature of Bidder(s)

**FORM 'C-1'**

**PROJECTS UNDER EXECUTION**

Sl. No.	Name of work/ project and location	Owner or sponsor- ing organiza tion	Cost of work in crores of rupees	Date of commencement as per contract	Stipu- lated date of completion	Upto date percentage progress of works	Slow progress if any and reasons thereof	Name and address / telephone number of officer to whom reference may be	Remarks
1	2	3	4	5	6	7	8	9	10

Signature of Bidder(s)

**FORM 'C-2'**

**Calculation of Bidding Capacity**

**Details of existing commitments and ongoing works**

Sl. No.	Name of work/ project and location	Owner or sponsoring organization	Contract value in crores of rupees	Date of commencement as per contract	Stipulated date of completion	Upto date percentage progress of work	Remaining work in percentage (100-column 7)	Existing commitment (column 4 x column 8/100)	Name and address / telephone number of officer to whom reference may be made	Remarks
1	2	3	4	5	6	7	8	9	10	11

Total (B)=

Maximum Turnover in last seven years = Rs. ....

Updated value of turnover (A) = Rs. ....

No. of years (N) =.....

Bidders Capacity = {[AxNx1.5]-B} =

Certificate : I certify that all the awarded and ongoing works have been included in the above list.

Signature of Bidder(s)

**FORM 'D'**

**PERFORMANCE REPORT OF WORKS REFERRED TO IN FORMS 'C'**

1. Name of work/project & location :
2. Agreement no. :
3. Estimated cost :
4. Tendered cost :
5. Date of start :
6. Date of completion
- (i) Stipulated date of completion :
- (ii) Actual date of completion :
7. Amount of compensation levied for delayed Completion, if any
- (a) Whether case of levy of compensation for delay has been decided or not? : Yes / No
- (b) If decided, amount of compensation levied for delayed completion, if any. :
8. Amount of reduced rate items, if any :
9. Performance Report :
- (1) Quality of work : Outstanding/Very Good/Good/Poor
- (2) Financial soundness : Outstanding/Very Good/Good/Poor
- (3) Technical Proficiency : Outstanding/Very Good/Good/Poor
- (4) Resourcefulness : Outstanding/Very Good/Good/Poor
- (5) General Behavior : Outstanding/Very Good/Good/Poor

Dated:

Executive Engineer or Equivalent

**FORM 'D-1'**

**Assessment of Quality for Completed as well as on-going Works**

Name of work:

Date of inspection:

Date of submission of report:

<b>A.</b>	<b>General Observation &amp; Operational aspects</b>	<b>Yes/ No</b>
1.	Availability of approval from local bodies in case of construction of private buildings.	
2.	Availability of approved structural drawings	
3.	Observation on seepage/ leakage in the building	
4.	Whether line & level maintained	
5.	In case of basement, observation on seepage, if any	
6.	Any structural defects/ distress observed. If yes give details	
7.	Whether safety measures adopted at site as per CPWD Safety Code and or govt. guidelines are adequate or not	
8.	Whether the welfare facilities provided to labour as per clause 19 H of GCC for CPWD works/ and or govt. guidelines are adequate or not.	
9.	Whether AHU getting automatically switched off and fire dampers closed in case of fire signal	
10.	Whether thimbles used for termination of wires in DBs, EBDs & panels?	
<b>B.</b>	<b>Quality of work</b>	<b>Marks Assessed</b>
1.	Quality of plaster/ finishing	
2.	Quality of RCC/ CC work	
3.	Quality of flooring	
4.	Quality of wood work	
5.	Quality of steel work/ aluminum work	
6.	Quality of plumbing and sanitary installation	
7.	Quality of Workmanship	
8.	Quality of waterproofing	
9.	If cladding done, observation on efficiency/ quality of cladding/ brick work	
10.	Quality of internal electrification work	
11.	Quality of DBs, EBDs & panels?	
12.	Quality of E&M equipments, panels & feeder pillar	
13.	Quality of fire alarm system/ firefighting system	
14.	Quality of Air Conditioning work	

15.	Quality of Sub-station based on complete live diagram, capacitor panel, power factor, insulating Mat, cleanliness, cable termination, earthing pits, earthing of transformer / DG sets	
16.	Any other aspects (To be elaborated)	

Average marks (To be awarded out of 100 marks based on average of marks assessed on each attribute mentioned at B above).

**Note:**

1. All the above parameters may be considered for assessing the overall quality of work executed by the contractor. Each attribute shall be assessed on maximum marks of 10 under B above.
2. In case, any attribute is not applicable, the same may not be included in assessment and mentioned are not applicable (N/A)
3. The works as assessed above shall be converted on a scale of 25/15 marks for completed/ongoing works respectively.
4. In case of eligible completed works being more than one the average marks assigned for eligible completed works shall be considered for marking purpose. Only one ongoing work to be assessed.



**STRUCTURE & ORGANIZATION**

1.	Name & Address of the bidder	
2.	Telephone No. / Email id /Telex No./Fax No.	
3.	Legal status of the bidder (scan & upload copies of original document defining the legal status).	
	a) An Individual	
	b) A proprietary firm	
	c) A firm in partnership	
	d) A limited company or Corporation	
4.	Particulars of registration with various Government bodies (scan & upload attested photo-copy).	
	ORGANIZATION/PLACE OF REGISTRATION	REGISTRATION No.
	1.	
	2.	
	3.	
5.	Names and Titles of Directors & Officers with designation to be concerned with this work.	
6.	Designation of individuals authorized to act for the organization.	
7.	Has the bidder, or any constituent partner in case of partnership firm/ limited company/ joint venture, ever been convicted by the court of law? If so, give details.	
8.	In which field of Civil Engineering Construction, the bidder has specialization and interest?	
9.	Any other information considered necessary but not included above.	

Signature of bidder(s) with stamp

**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-I, CCU, MoEF&amp;CC, New Delhi</b> ) (Receipt No. .... / date.....)	
Name of work	: <b>Construction of New Building in the existing premises of Parivesh Bhawan, CPCB, Delhi.</b>
NIT No	: 14/2023-24/CE/CCU/CED-I/Delhi
Estimated Cost	: <b>Rs. 68,44,70,924/-</b>
Amount of Earnest Money Deposit	: Rs. 78,44,709/-
Last date of submission of bid	: 02.04.2024
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:

- |   |  |
|---|--|
| <ol style="list-style-type: none"> <li>1. Signature.....<br/>Name and address<br/>Designation</li> <li>2. Signature .....<br/>Name and address</li> </ol> | <p>Authorized signatory<br/>Name<br/>Staff code no.</p> <p>Bank seal</p> |
|---|--|

\*Date to be worked out on the basis of validity period of 180 days 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.

**UNDERTAKING FOR SIMILAR WORKS(S)**

I/We undertake and confirm that eligible similar works(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 bidding in CCU 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.

**(Note: Scanned copy of this affidavit to be uploaded by bidder(s) at the time of submission of bid.)**

Signature of bidder(s) with stamp

**PROFORMA OF AFFIDAVIT FOR NON - BLACK LISTING**

I/we undertake and confirm that our firm / partnership firm has not been blacklisted by any state /Central Departments /PSUs /Autonomous bodies during the last 7 years of its operations. Further that, if Such information comes to the notice of the department, then I / we shall be debarred for bidding in CCU in future forever. Also, if Such information comes to the notice of department on any day before date of start of work, the Engineer-in-charge shall be free to cancel the agreement and to forfeit the entire amount of Earnest Money Deposit/ Performance Guarantee **(Scanned copy of this notarized affidavit to be uploaded at the time of submission of bid)**

NOTE: Affidavit to be furnished on a 'non-judicial' stamp paper worth Rs.100/-

Signature of Bidder(s)  
or an authorized person of the firm with stamp

Signature of Notary with seal

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

**PERCENTAGE RATE BID AND CONTRACT FOR WORKS**

Tender for the work of “Construction of New Building in the existing premises of Parivesh Bhawan, CPCB, Delhi.”

- i) To be uploaded by..... hours on ..... to/upload at
- ii) To be opened in presence of tenderers who may be present at .....\*\* hours on .....\*\*  
in the office of in the office of the **Executive Engineer, CED-I, CCU, Delhi.**

\*\* To be filled by **EE, CED-I, CCU**

**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 **75 days** from the due date of its opening of technical 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 and 12.3 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.





**SCHEDULES (A to F)**  
**(For Civil & Electrical Component)**

**SCHEDULE ‘A’**

Schedule of work As per contract document

**SCHEDULE ‘D’**

Extra schedule for specific requirement/document for the work, if any. As per contract document

**SCHEDULE ‘E’**

Reference to : CPWD General Conditions of Contract, 2023 Construction work as amended / modified upto last date of submission of bid.  
General Conditions of contract

Name of Work : **Construction of New Building in the existing premises of Parivesh Bhawan, CPCB, Delhi.**

Estimated cost of work : **Rs. 68,44,70,924/-**

Earnest Money : **Rs. 78,44,709/-** (To be returned after receiving performance guarantee)

Performance Guarantee : 5 % of accepted tendered value

Security deposit : 2.5 % of accepted tendered value

**SCHEDULE ‘F’**

**GENERAL RULES & DIRECTIONS:**

Officer inviting tender	:	The Executive Engineer, CED-I, Civil Construction Unit (CCU), Ministry of Environment, Forest & Climate Change (MoEF&CC), CGO Complex, Lodhi Road, New Delhi -110003
Maximum percentage for quantity of items of work to be executed beyond which rates are to be determined in accordance with Clauses 12.2 & 12.3.	:	See Below

<b>Definitions:</b>			
2(vi)	Engineer-in-Charge	:	The Executive Engineer, CED-I, Civil Construction Unit (CCU), Ministry of Environment, Forest & Climate Change (MoEF&CC), CGO Complex, Lodhi Road, New Delhi -110003
2(viii)	Accepting Authority	:	The Chief Engineer, Civil Construction Unit (CCU), MoEF&CC
2(x)	Percentage on cost of materials and Labour to cover all overheads and profits	:	15%
2(x)a	Standard Schedule of Rates	:	DSR 2023 Corrected up to last date of submission of bid (for civil work volume I & II)  DAR 2023 Corrected up to last date of submission of bid (for civil work volume I & II)  DSR 2022 Corrected up to last date of submission of bid (for Elect. work)  Schedule of Rates, Analysis of Rates and Specifications (Horticulture & Landscaping)-2020 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 General Conditions of Contract, 2023 construction work amended / modified upto last date of submission of bid	:	CPWD-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.	:	<b>07 days</b>
(ii)	Maximum allowable	:	<b>03 days</b>

	extension with late fee @ 0.1 % per day of performance guarantee amount beyond the period provided in (i) above	
<b>Clause 2</b>		
Authority for fixing compensation under clause 2:	:	Superintending Engineer, Civil Construction Unit (CCU), MoEF&CC, or his legal successor or Assignee thereof.
<b>Clause 5</b>		
Time allowed for execution of work	:	24 Months
Numbers of days from date of issue of letter of acceptance for reckoning date of start	:	10 days

**TABLE OF MILE STONE (S)**

S.N.	Description of Milestone	Time Allowed in days (from stipulated date of start)	Amount to be with held in case of non achievement of mile stone
1.	Work done amounting to 5% of accepted tender amount (Civil + Electrical/ Mechanical + Horticulture/Landscape)	3 months	0.3 % of the Accepted tendered value.
2.	Work done amounting to 12.5% of accepted tender amount (Civil + Electrical/ Mechanical + Horticulture/Landscape) including one basement	6 months	0.4 % of the Accepted tendered value.
3.	Work done amounting to 25% of accepted tender amount (Civil + Electrical/ Mechanical + Horticulture/Landscape) including two basements	9 months	0.6 % of the Accepted tendered value.
4.	Work done amounting to 40% of accepted tender amount (Civil + Electrical/ Mechanical + Horticulture/Landscape)	12 months	0.7 % of the Accepted tendered value.
5.	Work done amounting to 55% of accepted tender amount (Civil + Electrical/Mechanical + Horticulture/Landscape)	15 months	0.7 % of the Accepted tendered value.
6.	Work done amounting to 70% of accepted tender amount (Civil + Electrical/Mechanical + Horticulture/Landscape)	18 months	0.7 % of the Accepted tendered value.
7.	Work done amounting to 85% of accepted tender amount (Civil + Electrical/ Mechanical +	21 months	0.8 % of the Accepted

	Horticulture/Landscape)		tendered value.
8.	All Civil, Electrical & Mechanical, Landscape, Horticulture work complete in all respect, obtaining NOC from Fire deptt & occupancy certificate from local bodies.  (100% complete in all respect)	24 months	0.8 % of the Accepted tendered value.

**Note:** - With held amount shall be released if and when subsequent milestone is achieved within respective time specified. However, in case milestones are not achieved by the Bidder for the work, the amount shown against milestone shall be withheld.

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		On commencement date or date of start of work by the Engineer-in-Charge.
Part B	Portions with encumbrances		NA
Part C	Portions dependent on work of other agencies		NA

<b>Schedule of issue of Designs</b>	:	As per approved programme chart submitted by contractor
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**Authority to decide :**

- (i) Authority to convey the decision of mile stone and extension of time : Executive Engineer, CED-I, Civil Construction Unit (CCU), Ministry of Environment, Forest & Climate Change (MoEF&CC), CGO Complex, Lodhi Road, New Delhi -110003 or his legal 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 legal 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 legal successor or Assignee thereof.

**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:	:	Rs. 2.35 Crores (civil) Rs. 0.5 Crores (electrical) <i>*Except for initial three running account bills &amp; Final Bill.</i>
<b>Clause -7A</b> Whether clause 7A shall be applicable		YES
<b>Clause -7B</b> Whether clause 7B shall be applicable		YES
<b>Clause -8A</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 legal successor or Assignee thereof
<b>Clause 10A</b>		
List of testing equipment to be provided by the contractor at site lab	:	(As per Table 1 given)
<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	:	Yes

**Clause 10CC**

**Applicable**

S.N.	Relevant component of Material /Labour for price escalation	Percentage of total value of work
1	Component of Cement	9%
2	Component of Labour	23%
3	Civil component of the other construction materials	35 %
4	Electrical and Mechanical (E&M) Component of Construction Materials	14%
5	Furniture	5%
6	Reinforcement steel bars/ TMT bars/Structural steel (including	14%

	strands and cables)	
	Total	100 %

### Clause 11

Specifications to be followed for execution of work (for civil work)	:	<ol style="list-style-type: none"> <li>1. <b>Civil work:</b> CPWD Specifications 2019 Volume- I &amp; II with up to the date corrections slips.</li> <li>2. MORTH Specifications for Roads and Bridge work.</li> </ol>
Specifications to be followed for execution of work (for <b>Electrical work</b> )	:	<p><b>Electrical &amp; Other works</b> (amended upto date):</p> <ol style="list-style-type: none"> <li>1. CPWD General Specification for Electrical Works Part I (Internal) &amp; Part II (External) –2023.</li> <li>2. General Specification for Electrical Works (Part III Lifts &amp; Escalators)-2003.</li> <li>3. CPWD General Specification for Electrical Works Part IV Substation-2013.</li> <li>4. CPWD General Specification for Electrical Works Part V Wet riser and sprinkler system-2020.</li> <li>5. CPWD General Specification for Electrical Works Part VI fire detection and alarm system- 2018.</li> <li>6. CPWD General Specification for Electrical Works Part VII DG Sets– 2013</li> <li>7. CPWD General Specification for Electrical Works Part VIII Gas Based Fire Extinguishing System–2013.</li> <li>8. General Specification for Heating Ventilation &amp; Air-Conditioning-2017.</li> <li>9. CPWD specification of Horticulture &amp; Landscaping – 2020.</li> <li>10. CPWD General Specification for Medical Gas Pipe System 2022</li> <li>11. CPWD General Specification for Modular operation Theater. 2022</li> <li>12. CPWD General Specification for Nurse Call System 2022</li> </ol>
Specifications to be followed for execution of work (for <b>Horticulture &amp; Landscaping work</b> )	:	Schedule of Rates, Analysis of Rates and Specifications (Horticulture & Landscaping)-2020 Corrected up to last date of submission of bid

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

**Clause 12 : Construction Works**

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

**Clause 19 C**

Penalty for each default : **Rs. 500/-**

**Clause 19 D**

Penalty for each default : **Rs. 500/-**

**Clause 19 G**

Penalty for each default : **Rs. 500/-**  
Enhanced penalty per day for continuous default : **Rs. 500/-**

**Clause 19 K**

Penalty for each default : **Rs. 500/-**

**Clause 25**

(i)	<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
(ii)	<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
(iii)	<b>Place of Arbitration</b>	:	<b>Delhi</b>

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

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	Electrical	<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
	Graduate Engineer Or Diploma Engineer	Electrical	<b>Project/Site Engineer</b>	5 or 10 respectively	1	Rs. 50000/- Per month
4	Graduate Engineer	Civil	<b>Quality Engineer</b>	8	1	Rs. 70000/- Per month
	Graduate Engineer	Electrical	<b>Quality Engineer</b>	8	1	Rs. 70000/- Per month



5	Diploma Engineer	Civil	<b>Surveyor</b>	8	1	Rs. 50000/- Per month
6	Graduate Engineer	Civil	<b>Project Planning/Billing</b>	6	1	Rs. 60000/- Per month
	Graduate Engineer	Electrical	<b>Project Planning/Billing</b>	6	1	Rs. 60000/- 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)	Schedule/statement for determining theoretical quantity of cement & bitumen on the basis of (for civil work)	:	Delhi Schedule of Rates 2023 printed by C.P.W.D. with upto date correction slip upto last date of bid submission.
		Schedule/statement for determining theoretical quantity of cement & bitumen on the basis of (for Electrical work)	:	Delhi Schedule of Rates 2022 printed by C.P.W.D. with upto date correction slip upto last date of bid submission.
(ii)		Variations permissible on theoretical quantities:		
	(a)	Cement	:	2% plus/minus.
	(b)	Bitumen All Works	:	2.5% plus only & nil on minus side.
	(c)	Steel Reinforcement and structural steel sections for each diameter, section and category	:	2% plus/minus variation
	(d)	All other materials.	:	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-I,  
Civil Construction Unit (CCU),  
Ministry of Environment, Forest & Climate Change (MoEF&CC),  
CGO Complex, Lodhi Road, New Delhi -110003

Table - 1

**Equipment's 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 of minimum size 25 feet X 15 feet 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.	100MT compression testing machine, electrical-cum-manually operated)	1
2.	Slump cone, steel plate, tamping rod, steel scale, scoop	3
3.	Pumps and pressure gauges for hydraulic testing of pipes	2
4.	Weighing scale platform type 100 Kg capacity	1
5.	Graduated glass measuring cylinder	As per requirement
6.	Sets of sieves of 450mm internal dia for coarse aggregate [100mm, 80mm, 40mm; 20mm; 12.5mm, 10mm; 4.75mm complete with lid and pan.	2
7.	Sets of sieves of 200mm internal dia for fine aggregate [4.75mm; 2.36mm; 1.18mm; 600 microns; 300 microns & 150 micron, with lid and pan]	2
8.	Sieve Brushes and sieve shaker capable of 200mm and 450 mm diasieves, manually operated with timing switch assembly	2
9.	Cube moulds size 70mmx70mmx70mm	18
10.	Cube moulds size 150mmx150mmx150mm	30
11.	Hot air oven temp. Range 50°C to 300°C- sensitivity 1 degree	1
12.	Electronic balance	2
13.	Physical balance weight upto 5 kg	1
14.	Air Content of concrete testing machine	As per requirement
15.	Measuring jars 100ml, 200ml, 500ml	3 nos. each size
16.	Spatula 100mm & 200mm with long blade wooden handle	3
17.	Digital Verniercalipers 150 mm , 200mm , 300 mm	1 each
18.	Digital PH meter	1
19.	Digital Micrometer	1
20.	Digital paint thickness meter for steel 500 micron Range	1
21.	GI tray 600x450x50mm, 450x300x40mm, 300x250x40mm	1 no. each
22.	Electric Motor mixer 0.25 cum capacity	1
23.	Digital rebound hammer	2
24.	Screw gauge 0.1mm-10mm, North count 0.05 mm	2

Sl. No.	Equipment	Numbers (Minimum)
25.	Water testing kit	2
26.	Motorized sieve shaker	1
27.	Extra Bottom plates for 15 cm cube mould	10
28.	Standard Vibration Table	1
29.	Concrete temperature measuring thermometer with Brass protection sheath 0- 100 degree centigrade	3
30.	Dial type spring balance preferable with zero correction knob capacity 100 kgs.reading to ½ kg.	1
31.	Counter scale capacity 1 kg and 10 kg	1
32.	Iron Weight of 5 kg, 2 kg, 1 kg, 500 gm, 200 gm, 100 gm	As per actual requirement.
33.	Brass Weight of 50 gm, 20 gm, 10 gm, 5 gm, 2 gm, 1 gm	
34.	Measuring cylinder TPX or Poly propylene capacity 100 ml, 500 ml, 250 ml	
35.	Set of box spanner ratchet	
36.	Hammer 1lb & 2lb	
37.	Hacksaw with 6 blades	
38.	Measuring tape 3 meter, 5 meter, 10 meter, 30 meter	
39.	Shovels & Spade	
40.	Steel plates 5 mm thick 75x75 cm	
41.	Plastic or G.I. Buckets 15 ltr, 10 ltr, 5 ltr	
42.	Vernier calipers	
43.	Micrometer screw 25 mm gauge	
44.	A good quality plumb bob	
45.	Spirit level, minimum 30 cms long with 3 bubbles for horizontal vertical	
46.	Wire gauge (circular type) disc	
47.	Foot rule	
48.	Long nylon thread	
49.	Rebound hammer for testing concrete	
50.	Dynamic penetrometer	
51.	Magnifying glass	
52.	Screw driver 30 cms long	
53.	Ball pin hammer, 100 gm	
54.	Plastic bags for taking samples	
55.	Moisture meter for timber	
56.	Any other equipment for site tests as outlined in BIS codes and as directed by the Engineer-in-charge.	

Table – 2

**PLANT AND EQUIPMENT REQUIRED TO BE OWNED / TAKEN ON LEASE BY THE CONTRACTOR**

Sl. No.	Equipment	Numbers
1.	Builders hoist	1
2.	Centralized concrete batch mix plant of capacity 30 cum per hour (fully automatic with computer control)	1
3.	Excavator cum loader (JCB 3D model or equivalent).	3
4.	Compressor machine minimum 20 CFM with rock Breaker.	1
5.	DG set of minimum capacities of 62.5 KVA.	As per requirement
6.	Transit mixers.	As per requirement
7.	Concrete pump	2
8.	Needle Vibrators.	10
9.	Screed leveller.	As per requirement
10.	Plate Vibrator	As per requirement
11.	Dumper/Tipper	As per requirement
12.	Reinforcement bending machine.	As per requirement
13.	Reinforcement cutting machine.	As per requirement
14.	Power driven earth rammer (Soil compactor).	As per requirement
15.	Total Station Machine.	2
16.	Water tanker (Minimum capacity of 5000 liters)	As per requirement
17.	Welding machine 400 Ampere	As per requirement
18.	Screener for coarse sand and fine sand	As per requirement
19.	Centrifugal mono block water pump minimum capacity 2 HP	As per requirement
20.	Road roller 8 to 10 tons	As per requirement
21.	Vibratory roller	As per requirement
22.	Drilling machine	As per requirement
23.	Double steel scaffolding and staging materials	As per requirement
24.	Air compressor	As per requirement
26.	Floor grinding/polishing machines	1 Nos.

27.	Granite cutting machine	3 Nos.
28.	Ceramic tile cutting machine	5 Nos.
29.	Granite polishing machine	1 Nos.
30.	Granite hand polishing machine	5 Nos.
31.	Mobile tower crane	1 Nos.
32.	Any other machinery required for completion of the work as per decision of Engineer-in-charge.	As per Actual requirement

Note: The above list is only indicative and not exhaustive. However, quantity may be optimised commensurate to progress of work with the approval of engineer in Charge.

## **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 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/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 or scope of work, provided that the same can be reasonably inferred. There may be several incidental works, which are not mentioned in the contract document but will be necessary to complete the item in all respect. All these incidental works / costs which are not mentioned in specifications/drawings/tender document but are necessary to complete the item shall be deemed to have been included in the rates quoted by the contractor. No adjustment of rates shall be made for any variation in quantum of incidental works due to variation / change in actual detailed working drawings. Also, no adjustment of rates shall 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 works in all respects) on account of the directions of Engineer-in-Charge. **Nothing shall be payable on the account of incidental works.**
- 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/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, to be issued by the Engineer-in-Charge. 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 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 6.0 meters in height, 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 plot 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 80 sqm area (as per layout plan approved by engineer-in-charge) i/c conference hall at location 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 light, fans, air conditioners, heaters, all office utilities, good quality projector in conference room etc. and complete wiring, water supply, sewerage and drainage 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 i/c 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 contractor shall arrange to maintain the site offices which includes watch and ward, day to day up keeping of the building and surroundings, periodic whitewashing/ color

washing of the building including utilities, payment of AMC charges, Electricity bill, water supply bills, RO/drinking water bills etc.

- iv) The cost of construction, cost of all furniture ((of 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) 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.
- (c) **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 Authority of the controlling body 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 immediate next 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/GHAR rating etc. and any other unforeseen but essential incidental works required to complete this work. Nothing extra shall be payable on this.
- 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 or any other activity which is necessary (for execution of work and as directed by Engineer-in-Charge), 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 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 Govt. 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 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.
- xviii. 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.
- xix. 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.**
- xx. 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 immediate next 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 20 digital photographs showing all the parts of construction site along with at least 10 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 immediate next 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 Chemical's materials 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 at the request from the 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) All incidental charges of any kind including cartage, storage and wastage and safe custody of material/chemical etc. shall be borne by the contractor and no claim, whatsoever, shall be entertained on this account.
- (xiv) 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. Testing charges shall be borne by the contractor.

#### **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 Agency 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**

- (a) 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.

- (b) The contractor shall take steps to protect trees or saplings identified for preservation within the construction site using tree guards of approved specification.
- (c) Contractor should limit all construction activity within the specified area as per the Construction Management Plan (CMP) approved by Engineer in Charge.
- (d) 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.
- (e) 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 / Lobby/ Corridor of minimum 10m length/ complete male, female, Handicap toilet unit, external development work 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**

- (i) The contractor shall engage specialized agency for carrying out specialized item such as Structural Glazing, Expansion Joint Works, Waterproofing and insulation work, Water supply & Plumbing work, Fire check Doors, Furniture Work, Anti-termites 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.

- (ii) 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 item/work. 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 agreement. 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.

- (iii) The main 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 main 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 agreement 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.
- (iv) 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.
- (v) Approval 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.
- (vi) It shall be the responsibility of main contractor to sort out any dispute / litigation with the

Specialized Agencies without any time & cost overrun to the Department. The main 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**

- a. 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.
- b. 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.

- c. 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.
- d. 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.
- e. Ready mix plaster shall be executed using pneumatic spray machine of reputed make.
- f. 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.
- g. The Aluminium door-windows-framework, lamination and Lipping on flush doors shall be factory made.
- h. 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.
- i. 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.
- j. Wall mounted door stoppers shall be provided to protect the wall where the door handle would run into it.
- k. 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. Nothing shall be paid extra on this account.
- l. Fall nets and scaffolding nets for protection from debris / dusts and noise etc. are to be provided during the construction period. Nothing extra shall be paid on this account.
- m. Wherever M.S. grill provided in window, weight of grill in each window should not be less than 12 kg/sqm.
- n. 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.
- o. Wherever the doors are required to be fixed to AAC block masonry, the frame shall be fixed in RCC band or concrete block masonry.
- p. 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.
- q. If details for any area/space w.r.t. finishing schedule, door & window schedule, sanitary fitting schedule, hardware schedule etc. are not mentioned in the particular

specification/schedules/ drawings, the details of area/space having similar functionality shall be followed.

**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.

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

The building shall confirm to Green Plus rating as per CPWD GHAR 2021 & 4-Star rating as per GRIHA.

### **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. Limit amount of fine particles (smaller than 0.075mm) to 10 -20%. Limit vehicular speed on site 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/GHAR**.
- 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/GHAR guidelines. **Contractor will be penalized @ 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 sites, either all waste is reused within the site or sent for recycling. Track the waste sent off the site to its final destination. 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. Contractor will be penalized @ Rs. 500 per day of delay on non-submission beyond due date which 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/GHAR).

**2.29** The 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.

**2.30 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 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.
- (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.

**2.31** 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.

**2.32** 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.

**2.33** 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.

- 2.34** 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.
- 2.35** 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.
- 2.36** Wherever required, Contractor shall meet and carry out all activities on site, supplement information, and submittals.

### **2.37 CONSTRUCTION WASTE**

- 2.37.1** 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.
- 2.37.2** 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.
- 2.37.3** 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.
- 2.37.4** 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.
- 2.37.5** 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.
- 2.37.6** 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.

- 2.37.7 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.
- 2.37.8 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.

## **2.38 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 GHAR/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 except for RCC work and Design Mix concrete. However, use of PPC cement for RCC work and design mix concrete may be allowed in case the concrete is produced in batch mix plant installed at site with no cost adjustment in the contract amount. Agency shall procure OPC conforming to IS: 8112 / 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 2000 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:

Size of bar	For consignment below 100ton	For consignment above 100ton
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 good for construction drawings.
- (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 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 to 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 as per the soil investigation report and structural design, if any recommended 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 ground 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 shall be provided 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, shall be done under floor.

### **3.0 Superstructure:**

- (i) Expansion joints/seismic separation joints shall be provided as per the approved structural drawing and 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 approved 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 drawings and site condition.

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

- 6.1** Design mix is to 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 shall install fully automatic Batch Mix Plant at site (if space is available and permitted by user department) or in nearby area wherever permissible. 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. Under special circumstances, Contractor will 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) At least **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, etc. 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 shall be used for splicing of reinforcement bars.
- 8.4 Reinforcement TMT bars, to be used for the work, shall be corrosion resistance TMT bars of

grade Fe 500D or more.

- 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 will be followed.

- 9.1** Adequate (of 300 mm width either side of joint) 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.
- 9.4** Fly ash brick masonry of class designation 7.5, with cement mortar 1:6 (1 cement: 6 coarse sand), shall be done in wet areas. FPS bricks of class designation 7.5 in cement mortar 1:6 (1 Cement: 6 Coarse Sand) shall be used in brick work in foundation upto plinth level and other masonry work shown in drawings. All the walls of corridors shall be of full brick thick wall or with 200mm thick AAC blocks.
- 9.5** 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 (of make pidilite, ardex endura, weber) mortar shall be provided @ 30 kg per cum. AAC Block confirming the IS Code – 2185 (Part-3) 1984 (Reaffirmed 2005) shall be used.
- 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 min. 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:  $X - 0.6 R >$  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 specification 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 these specification shall preferably be marked with information-
  - o The identification of the manufacture
  - o The grade and block density of the unit
  - o 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** Roller Blinds, wherever required, shall be provided of approved make and approved shades having 0.40mm thickness in 100% polyester material with 100% Degree of opacity & having Weight of 375gm/Sqm to 450gm/Sqm in all sizes and for all Heights complete as per the direction of Engineer in Charge.
- 10.7** 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 will be followed. Fire Check doors shall be provided in buildings wherever necessary and required as per National Building Code 2016, as per door & window schedule and as per architectural drawing. Unless otherwise specified elsewhere in tender document, all fire 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, which 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. Nothing extra shall be paid on this account.
- 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/brands 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 hardwares. 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 damage 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 preferred make list for materials in this contract agreement. 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) Aluminum sections to be used for various works shall be appropriate to meet technical, structural, functional and aesthetic considerations. Aluminum work for doors, windows,

ventilators and partitions etc. shall be with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS: 733 and IS: 1285 as applicable, 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. Aluminum sections shall be smooth, rust free, straight, mitered and jointed mechanically wherever required including cleat angle, Aluminum snap beading for glazing / paneling, C.P. brass / stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge. Polyester powder coated aluminum (minimum thickness of polyester powder coating 50 micron) section shall be used. Hinges/ pivots, provision for fixing of fittings, EPDM rubber / neoprene gasket shall be provided wherever required. The polyester powder coating shall be carried out in a factory / workshop approved by engineer-in-charge.

- (h) Glass in Windows/Ventilators: Glazing in windows, ventilators etc. shall be Double glazed hermetically sealed with 6 mm thick toughened glass both sides, having 12 mm air gap, including providing EPDM gasket, perforated aluminum spacers, desiccants, sealant (Both primary and secondary sealant) etc. as per specifications, drawings and direction of Engineer-in-charge complete. The DGU unit shall have visible Light transmittance (VLT) of minimum 65%, Light reflection internal - less than or equal to 23%, Light reflection external - less than or equal to 23 %, SHGC- less than or equal to 0.6 and U value - less than or equal to 2.5 W/m<sup>2</sup> degree K.
- (i) Fabrication: The factory for fabrication and coating of windows/doors/frameworks shall be got approved from Engineer-charge.
- (j) 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.
- (k) 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.
- (l) 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.
- (m) 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.
- (n) **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.

**(o) 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 contractor 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** Stones slabs shall have uniform thicknesses within the tolerance limits and linear items like treads, sills and jambs, coping, risers, urinal partitions, kitchen / 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. The protective layer shall be maintained throughout the execution of works and removed just before handing over of the site.
- 13.15** One piece Granite stone for treads / risers in staircase shall be used including rounding of nose.
- 13.16** 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.
- 13.17** 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.
- 13.18** 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.
- 13.19** 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.



- 13.20** 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.
- 13.21** 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.
- 13.22** 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 1 mm thick cement based wall putty, 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.
- 15.5** Water repellent coat: 2 to 3 coats of Silicone based water repellent, anti-algal paint of approved shade, complete as per manufacturer's specifications, shall be applied on stone cladding.

#### **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 Engineer-in-Charge and welding to 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 of make KRYTONE, PENETRON, XYPEX @ 0.80% (minimum) to the 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 product performance shall carry guarantee for 10 years against any leakage.

## **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. Irrespective of whether shown in drawings or mentioned in tender document, all 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 to 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 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. The laying of pipes shall be laid with all norms.
- 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 be not 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. Water closets with concealed dual flushing cistern shall be provided. Wash basin shall be over counter / wall hung as shown in drawings. 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.
- o) Piping and drainage works shall be tested as specified under the relevant clauses of the specifications. Tests shall be performed in presence of the Engineer in charge. Entire drainage system shall be tested for water tightness and smoke tightness during and after completion of the installation. No portion of the system shall remain untested. Contractor must have adequate number of expandable rubber bellow plugs, manometers, smoke testing machines, pipe and fitting work test benches and any other equipment necessary and required to conduct the tests. All materials and equipment found defective shall be replaced at contractor cost and whole work shall be tested to meet the requirements of the specifications. Contractor shall perform all such tests as may be necessary and required by the local authorities to meet municipal or other bye-laws in force. All water supply system shall be tested to hydrostatic pressure test of at least one and a half (1.5) times the maximum pressure but not less than 10Kg/Sq.cm for a period of not less than 8 hours. All leaks and defects in joints revealed during the testing shall be rectified and got approved at site by retest. Piping required subsequent to the above pressure test shall be retested in the same manner. System may be tested in sections and such sections shall be entirely retested on completion. In addition to the sectional testing carried out during the construction, contractor shall test the entire installation after connections to the overhead tanks or pumping system or mains. He shall rectify all leakages and shall replace all defective materials in the system. Any damage done due to carelessness, open or burst pipes or failure of fittings, to the building, furniture and fixtures shall be made good by the contractor during the defect liability period without any cost. After commissioning of the water supply system, contractor shall test each valve by closing and opening it a number of times to observe if it is working efficiently. Valves which do not effectively operate shall be replaced by new ones at no extra cost and the same shall be tested as above.
- p) Fittings shall conform to the same Indian Standard as for pipes. Pipes and fittings must be of matching IS Specification. Interchange of pipes of one standard with fittings on the other standard will not be permitted. Fittings shall be of the required degree of curvature with or without access door. Access door shall be made up with 3 mm thick insertion rubber washer and white lead. The bolts shall be lubricated with grease or white lead for easy removal later. The fixing shall be air and water tight. All vertical pipes shall be fixed by Galvanised clamps and galvanised angle brackets. Branch pipes shall be connected to the stack at the same angle as that of the fittings. No collars shall be used on vertical stacks. Each stack shall be terminated at top with a cowl (terminal guard). Horizontal pipes running along ceiling shall be fixed on

galvanised structural adjustable clamps of special design shown on the drawings or as directed by engineer-in-charge. Horizontal pipes shall be laid to uniform slope and the clamps adjusted to the proper levels so that the pipes fully rest on them.

- q) All pipe clamps, supports and hangers shall be galvanised. Factory made pre-fabricated clamps shall be preferred. Contactor may fabricate the clamps of special nature and galvanise them after fabrication but before installation. All nuts, bolts, washers and other fasteners shall be factory galvanised. Clamps shall be of approved designs and fabricated from GI flats (which shall be galvanised after fabrication) of thickness and sizes as per drawings or contractor's shop drawings. Clamps shall be fixed in accordance to manufacturer's details/shop drawings to be submitted by the contractors. When required to be fixed on RCC columns, walls or beam they shall be fixed with approved type of galvanised expansion anchor fasteners (Dash fasteners) of approved design and size according to load. Structural clamps e.g. trapeze or cluster hangers shall be fabricated by electro-welding from M.S. Structural members e.g. rods, angles, channels flats as per Contractors shop drawing shall be galvanised after fabrication. All nuts, bolts and washers shall be galvanised. Galvanised slotted angle/channel supports on walls shall be provided wherever shown on drawings. Angles/channels shall be of sizes shown on drawings or specified in scope of work. Angles/channels shall be fixed to brick walls with bolts embedded in cement concrete blocks and to RCC walls with anchor fasteners mentioned above. The spacing of support bolts on support members fixed horizontally shall not exceed 1 m.

**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, as per approved drawings.

- 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/Puff/sandwich Panels, 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 for this work.

### **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 shall strictly follow, at all stages of work, the stipulations contained in the Indian standard safety code and the provisions of the safety rules for ensuring safety of men and material. The successful bidder shall submit a safety plan for approval of the Employer. On approval of the same, the same shall be followed during the currency of the contract.
- g) 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.

- h) 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.
- i) 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.
- j) 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 openable 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 design shall incorporate 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 design 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  $1^\circ$  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 Employer'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 1/2" 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:** Drain water entering joints, condensation occurring in glazing channels, or route moisture occurring within the system to the exterior by a weep drainage network. Drained joint pressure equalised system which shall be 100% water-tight allowing no water to penetrate into the interior of the building. 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 tempering 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 this project, 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 grad Glazing tape for structural glazing shall be Norton or approved equivalent.
- 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, building I 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 Bureau 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, die 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.

- 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 SOURCES:** The contractor shall submit the name of the suppliers for the following items of work along with the shop drawings and samples.
- a. All components of the structural glazing system
  - b. Aluminium extrusions
  - c. Anodizing paint from manufacturer I authorized applicator
  - d. Sealant
  - e. Glass
  - f. Hardware
  - g. Gaskets
  - h. Fasteners
  - i. Anchorages
- 22.20 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
- 22.21 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.
- 22.22 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.
- 22.23 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 your works before delivery to site. The electrical connections from bolts which are to be supplied by you including the lightning protection devices, inspection openings for test lamps, etc.

**22.24 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.

**22.25 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 I agency I 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.

## 22.26 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

**22.27 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.

**22.28 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 during the guarantee period 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.

**22.29 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, labor and related terms necessary to complete the work indicated on drawing and specified here in.

**23.1 MATERIALS:**

a) **Plant materials:**

- (i) Plant materials shall be well formed and shaped true to type, and free from disease, insects and defects such as knots, windburn, injuries, abrasion or disfigurement.
- (ii) 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.
- (iii) All plants shall be hardy under climatic conditions similar to those in the locality of the project. Plants supplied shall conform to the names listed on both the plan and the plant list. No plant material will be accepted if branches are damaged or broken. All material must be protected from the sun and weather until planted.
- (iv) Any nursery stock shall have been inspected and approved by the Engineer-in-Charge.
- (v) 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:

- o 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:
  - o 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 x0.15m 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.

#### **24.0 BORED CAST-IN-SITU PILES:**

- 24.1** The definition of terminology shall be as per (IS-2911 Part I/Section 2 of latest edition).
- 24.2** The construction of bored cast-in-situ concrete piles shall be carried out in all respects as per the provision stipulated in the agreement, as per IS-2911 Part- I/Section-2 (latest edition) and as per direction of Engineer-in-Charge.
- 24.3** The piles shall be bored cast-in-situ concrete piles and shall carry a safe load as mentioned against the item for piling work in the schedule.
- 24.4** The permissible positional deviation from the true position of pile: -
- (i) No pile shall be more than 75 mm out of the true position as shown in the approved plan/drawing at the level of bottom of pile cap. In case the pile is displaced by more than 75 mm from its true position, the contractor shall be required to submit modified design based on actual displacement for approval of the Department. Any extra cost in the work involved on account of such modification shall be borne by the contractor.
- (ii) No error in verticality of the pile exceeding 1.5% (One decimal Five percent) from the true vertical shall be permitted. In case the deviation in verticality exceeds this limit, the pile shall be liable for rejection. The contractor in such case may be permitted to re-design the pile as a battered pile or he may provide extra pile/piles to satisfy structural requirements at his own risk and cost.
- 24.5** The contractor shall be responsible for any adverse effect due to providing such extra pile on other piles.
- 24.6** The distance between center to center of piles shall not normally be less than 2.75 to 3 times the diameter of the pile and 2.5 times under exceptional cases. In case different sizes of piles are used the diameter of biggest pile shall be the guiding factor.
- 24.7** A minimum length of one meter of temporary casing shall be inserted in each bored pile. Boring shall be done by rotary type drilling rigs/machine using direct mud circulation method. No auger or cutter boring will be permitted. Stabilization of edges shall be done by use of bentonite solution having specific gravity. 1.1 to 1.2 and conforming to Specification detailed in, Appendix A of IS 2911 (Part-I/Section-2) 1979 or latest edition. The specific gravity of the mud suspension near about the bottom of the hole shall whenever practicable be determined by suitable slurry sampler in a first few piles and at suitable intervals of piles and recorded. Consistency of the drilling mud suspension shall be controlled throughout the boring as well as concreting operation in order to keep the hole stabilized as well as to avoid concrete getting mixed up with thicker suspension of the mud. The bentonite solution shall be used at least from the level of subsoil water and hole shall then be always kept almost full

with bentonite solution, which shall preferably be kept in motion. Where the Engineer-in-Charge is satisfied that it is necessary to do so, he can permit the contractor to use a suitable casing, which may not be left, in place. Such permission shall be given only on the application of the contractor and after the other methods have failed to produce satisfactory results. No extra payment shall be made to the contractor for such alternate method. The bottom of the boreholes shall be cleaned of the spoils and sediments before placing of concrete and after placing of cage reinforcement so that the base of the pile shall be free from loose material.

**24.8** In case of boring with casing, the casing shall be used at least from the level of subsoil water. The casing shall be kept ahead of boring in case where there is danger of caving due to subsoil water entering into the borehole or where the soil is loose. While boring below subsoil water level, precaution shall be taken so that no boiling at the bottom of the hole occurs due to difference of hydrostatic head.

**24.9** Concreting: -

- (i) Concreting of boreholes shall start as soon as possible after its completion. Should a borehole, which is not cased, be left unconcreted for more than two hours, it shall be cleaned thoroughly before concreting. The concreting under water shall be done in one operation. Where concreting under water, a temporary casing should be installed to the full depth of the borehole or 2 metres into the non-collapsible stratum, so that fragments of ground cannot drop from the sides of the hole into the concrete as it is placed.
- (ii) Concrete shall be placed by means of a tremie pipe (Sec. IS 456-2000, Para 14-2-4a). It shall be ensured that concrete entering the tremie pipe does not get mixed up with the slurry. One of the methods of achieving this is by pouring  $\frac{1}{4}$  Kg, of granulated vermiculite in the tremie pipe before pouring concrete. The vermiculite granules will form a plug separating concrete from the fluid below. Any other approved method of plugging may also be adopted. The tremie pipe shall extend up to the bottom of the bore hole at the start and may be withdrawn in sections as the level of concrete rises in the bore holes, but the discharge end shall at all times be kept at a level below the top of concrete in the bore holes to a minimum depth of one metre. The placing of concrete should be continuous and the tremie pipe should be held concentric in the hole.

**24.10** Withdrawal of Casing: -

- (i) Extraction of casing (if used) shall be done in such a way that no knocking or shearing of the concrete in the shaft takes place. Care should be taken to ensure that water does not enter the tremie pipe. At all times, after concreting is started, the lower end of the casing pipe shall remain below the tremie pipe at least 60 cm, till concreting is completed.
- (ii) During the extraction of casing, slumping of concrete shall be observed and when required, additional quantity of concrete shall be poured so that the pile is formed, above the cut off level as per Clause 7.7 and 7.8 of IS – 2911 (Part-I/ Sec. 2) 1979 or latest edition for which nothing extra shall be paid. During extraction of the casing, special slump records shall be maintained. The slump in any case shall not exceed the permissible limit as laid down in IS-2911 (Part-I/Sec 2)/1979 with amendments or latest edition.

**24.11** Splicing of Reinforcement of Piles: -The longitudinal reinforcement and spiral/ rings of the piles should be provided in pile (as per drawing.) for entire length of piles. The splicing of longitudinal reinforcement should have full development length/bond length of  $46 \times d$ . where

“d” is the diameter of the bar or as shown in drawing.

- 24.12** Initial Load Test: -Contractor shall carry out such load test before execution of the main piling work outside the pile layout as per the direction of the Engineer-in-Charge. The rate for initial load test shall include the construction of test cap and cost of all items of works necessary for testing and dismantling the test cap after the test is completed.
- 24.13** Routine Load Test: - Routine load test shall be carried out on any particular pile or group of piles in the pile layout, selected by the Engineer-in-Charge. The rate of routine load test shall include construction of test cap and all items of works necessary for testing and dismantling the test cap after the test is completed.
- 24.14** All the records of load test data as per agreement item and quantities should be submitted to the Engineer-in-charge as soon as the tests are completed. The related structural drawings shall be released for execution in phased manner after 3 weeks from the date of respective tests reports i.e., pile layout details after receipt of initial load test reports and details of pile cap after receipt of routine load test reports. The time specified in clause-5 of schedule “F” for execution of work is inclusive of the aforesaid time schedule for issue of structural drawings.
- 24.15** The load test on pile/piles of standard length shall not be carried out earlier than 4(four) weeks from the time of casting of the piles. Initial load test and routine load test shall be carried out as per IS 2911 (Part-IV) of latest edition. For the purpose of load test, the pile shall be kept free from any lateral contact with the soil upto a depth of 2000 mm below the ground level/formation level i.e., approximately upto cut off level. The test cap for such tests shall be so constructed that even when the pile had settled fully under load test, the cap would not touch the ground surface below it. The Engineer-in-Charge will have the liberty to direct the contractor to conduct the load test at any stage of piling work.
- 24.16** Rate for testing shall include the extra length of pile required to be constructed for carrying out the tests and any other work considered necessary for that test and the Department will not incur any expenditure in this regard.
- 24.17** Before any load test is carried out the proposed apparatus and loading structure to be used for the load test shall be got approved by the Engineer-in- Charge. The dial gauges and pressure gauge shall be got calibrated through National Test House, Calcutta. The calibration certificate in original should be submitted to the Engineer-In-Charge which shall be returned after verification.
- 24.18** The contractor shall arrange the necessary kentledge and RSJ’s etc. for applying the load in the load test and shall remove the kentledge, RSJ and bags of ballast etc. from the site after the test is completed to the satisfaction of the Engineer- in-Charge. Rate quoted for testing shall include the cost of all the items of the work necessary for such test and submission of the test report as per the direction of Engineer- in-Charge.
- 24.19** Determination of safe load carrying capacity of piles shall be governed by the provision of IS 2911 (Part-IV) latest edition.
- 24.20** The contractor shall be paid for the load tests at his quoted rates. If the results of such tests are found to be erratic and inconclusive, the contractor will be required to carry out additional tests at his own cost to prove the satisfactory performance of the piles.
- 24.21** In case it becomes necessary to increase the length of the pile beyond the standard length, the

payment for the additional length shall be limited to a permissible increase of 10% of the standard length of the piles. The extra length of piles beyond the permissible limit of 10 percent shall be provided by the contractor at his own cost. For the variation within the permissible limit of ten percent, the payment shall be made at pro-rata basis of the quoted rates.

- 24.22** If it is found that the length of pile is to be installed at a lesser length than that of specified in the respective item of works, necessary deduction will be done on prorata basis from the quoted rates in the relevant item of works.
- 24.23** In case the piles which fail in the load test does not come upto the stipulated load capacity, the contractor shall submit his proposal for bringing up the load capacity of the foundation upto the required level by providing extra piles or other corrective measures which shall be provided by the contractor at his own risk and expense. For all such modifications for strengthening and corrective measure, the contractor shall obtain prior approval of the Engineer-in-Charge before execution.
- 24.24** If the safe load bearing capacity of the piles based on the load test data is found to be lower than the designated load capacity guaranteed in tender, the contractor shall modify the foundation system by increasing the length of the pile or by increasing the numbers of pile or by combination of both for which necessary load, moments etc., of the columns shall be supplied by the Engineer-in-charge. The additional payment on account of such strengthening due to revision of design shall be limited to the amount arrived at by multiplying the number of piles “N” (Where “N” is the number of piles required by providing piles of capacity guaranteed by tender) the permissible increase of ten percent in the length “L” specified in the description of the item in the contract at the rate “R” quoted for such type of pile. (That is the additional payment shall be limited to  $N \times L \times 1R/10$ )
- 24.25** Any extra cost over and above, the permissible increase shall be borne by the contractor and the Department shall not be required to pay for the same.
- 24.26** Testing of piles of different categories shall be done in presence of Engineer- in-Charge or his authorized representative.
- 24.27** The agency has to make the full arrangement for nondestructive integrity testing of piles (NDT) as per IS 14893:2001 and it shall be carried out on selected piles atleast on 5% of total piles or as decided by the Engineer-in-Charge, in case of doubt regarding soundness of cement concrete work (RCC work) on piles as per direction of Engineer-in-Charge and his dicision shall be final and binding. However, testing charges shall be born by the department provided test results meet the acceptance criteria otherwise payment for testing as well as cost of pile shall be born by the agency.
- 25.0 MISCELLANEOUS:** Following miscellaneous works shall be executed wherever required as per below mentioned specifications:
- 25.1** Anti-Termite Chemical Treatment: Post Constructional anti-termite treatment shall be with Chloropyriphos/ lindane emulsifiable concentrate 20% with 1% concentration as per CPWD specification.

**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	STEEL (TMT FE-500D)	TATA., RINL, JINDAL STEEL & POWER LTD, JSW STEEL LTD., SAIL
3	STRUCTURAL STEEL SECTIONS	TATA, JINDAL, SAIL, RINL
4	CEMENT [OPC/PPC]	ACC, AMBUJA, ULTRATECH, WONDER
5	PRECAST DUCTS/DRAINS/ DRAIN COVER/KERB CHANNEL	KK, NITCO, KERAKROME, TERRAFIRMA, FUJISILVERTECH
6	READY MIXED CEMENT CONCRETE	ACC, ULTRA TECH, AFCON, NDCON
7	WHITE CEMENT	BIRLA WHITE, J.K. WHITE, ULTRATECH
8	CC PAVERS	NITCO, UNISTONE, PAVIT, KK
9	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
10	CERAMIC GLAZED TILES	SOMANY, KAJARIA, RAK
11	WATER-PROOF CEMENT PAINT	SNOWCEM, ASIAN PAINT, SIKA, NEROLAC
12	SYNTHETIC ENAMEL PAINT	ASIAN PAINT, AKZONOBEL (DULUX), NEROLAC, ICI
13	PLASTIC EMULSION PAINT	ASIAN PAINT, NEROLAC, AKZONOBEL (DULUX),, ICI
14	DISTEMPER/ACRYLIC EMULSION PAINT	ASIAN PAINT, BERGER, NEROLAC, DULUX
15	TEXTURED PAINT	ASIAN, OIKAS, DULUX
16	STEEL PRIMER	NEROLAC, BERGER, ASIAN PAINTS
17	WOOD PRIMER	NEROLAC, BERGER, ASIAN PAINTS
18	EXTERIOR WATERPROOFING PAINT	RAINCOAT (DR. FIXIT), ASIAN, BERGER
19	WOOD FINISH (MELAMINE & PU POLISH)	ASIAN. ICI, JOTUN, NEROLAC
20	LAMINATE	MERINO, GREENLAM, CENTURY, DURO
21	PLY BOARD, PLYWOOD (PINE BOARD)	GREEN, MERINO, CENTURY, DURO
22	SELF LEVELLING COMPOUND	MAPAI, ARDEX ENDURA, BIZZAR
23	EPDM GASKET	HANU, ANAND, VICTOR
24	WOOD ADHESIVE	FEVICOL, 3M, ARALEDITE, SIKA
25	FLUSH DOOR (ALL FLUSH DOORS SHALL BE PROCURED FROM FULLY OWNED FACTORY OF THE MANUFACTURER AND NOT FROM JV / OUTSOURCED)	GREEN, MERINO, CENTURY, DURO

S. NO.	DETAILS OF MATERIALS	MANUFACTURERS NAME
26	WATER REPELLENT PAINT	ARDEX ADURA, WEBER, PIDILITE
27	FIRE SEALANT	HILTI, 3M, MCCOY
28	TILE ADHESIVE	PIDILITE, ARDEX ENDURA, WEBER, MAPEI
29	STONE ADHESIVE	PIDILITE, ARDEX ENDURA, WEBER
30	DASH, ANCHORING FASTENERS	HILTI, FISCHER, CANON
31	ALUMINIUM COMPOSITE PANEL	ALUCOBOND, REYNOBOND, ALPOLIC
32	EPOXY GROUTING COMPOUND	PIDILITE, ARDEX ENDURA, WEBER, MAPEI
33	READY MIX GYPSUM PLASTER	SAINT GOBAIN, USG BORAL, ULTRATECH
34	READY MIX CEMENT PLASTER	WEBER, ULTRATECH, BIRLA WHILTE
35	SILICON SEALANT	GE, DOW CORNING, PIDILITE
36	GYPSUM BOARD	USG BORAL, LAFAGE, SAINT GOBAIN, KNAUF DANOLINE
37	FLOAT GLASS	ASAHI, MODI GLASS, SAINT GOBAIN GLASS
38	MECHANICAL COUPERS	USHA MARTIN, DEXTRA, HALFEN
39	CRYSTALLIANE CEMENTITIOUS WATERPROOFING COMPOUND	XYPEX CONSTRUCTION CHEMICAL, KRYTONE, PENETRON
40	WATERPROOFING MEMBRANE (SBS/HDPE/POLYUREA/CEMENTITIOUS ETC.)	SIKA, GRACE, SOPREMA
41	WATERPROOFING CUM PU FOAM INSULATION	SIKA, GRACE, SOPREMA
42	VERMICULLITE TREATMENT	NEWKEM, GRACE, SOPREMA
43	HOLLOW METAL PRESSED DOORS (METAL DOORS)	NAVAIR, TATA PRAVESH, SHAKTI HORMANN
44	ROLLER BLIND	VISTA, MAC, HUNTER DOUGLUS
45	PRELAMINATED PARTICLE BOARD	MERINO, CENTURY PLY, GREENLAM
46	HYDRAULIC DOOR CLOSER, FLOOR SPRING, DOOR AUTOMATION	DORMA, GEZE, HAFELE, HORMANN
47	HARDWARES FOR FIRE RATED DOORS	HAFELE, DORMA, GEZE, HORMANN
48	HARDWARE FOR FURNITURE ITEMS	HETTICH, EBCO, HAFELE
49	STAINLESS STEEL FITTINGS/HARDWARE FOR WOODEN/METAL/GLAZED/STEEL DOOR & WINDOWS	HAFELE, DORMA, GEZE, HORMANN
50	WIRE MESH	STERLING ENTERPRISES, MICROMESH, HARVER STANDARD, INDIA WIRE MESH
51	ADHESIVE TAPE	3M, NORTON, BOPD, TESA
52	HIGH PERFORMANCE EPOXY BASED RESIN ANCHOR SYSTEM	FOSROC, CICO, SIKA
53	EPOXY MORTAR	FOSROC, SIKA, MYK LATICRETE, CICO
54	NUTS, BOLTS & SCREWS	GKW, KUNDAN, PRIYA, ATUL
55	ALUMINIUM SECTIONS FOR DOORS & WINDOWS ETC.	JINDAL, HINDALCO, BHORUKA

S. NO.	DETAILS OF MATERIALS	MANUFACTURERS NAME
56	HARDWARE FITTINGS FOR ALUMINIUM WINDOWS & DOORS	GEZE, HAFELE, DORMA
57	MS SECTIONS (PIPES, BOXES CHANNELS)	JINDAL HISAR, TATA, SURYA
58	S.S. MATERIAL/HADRAILS/RAILINGS	JINDAL STAINLESS STEEL LTD., TATA STEEL, SAIL
59	WALL PUTTY	JK, BIRLA, ASAIN PAINT
60	FLOOR HARDENER	PIDILITE, FOSROC, SIKA, CICO
61	POLYSULPHIDE SEALANT	PIDILITE, ARDEX ENDURA, WEBER, BASF.
62	EXPANSION JOINT	MIGUA, CS, CAMEO,
63	WATERPROOFING COMPOUND	FOSROC, SIKA, PIDILITE
64	ADMIXTURES/CURING COUMPOUND	FOSROC, SIKA, ATPL, KUNALCOM CHEM, ASIAN PAINT, PIDILITE
65	REFLECTIVE GLASS, TINTED GLASS, HIGH PERFORMANCE GLASS, LACQUERED GLASS	SAINT GOBAIN, ASAHI (INDIA), PILKINGTON
66	LOOKING GLASS / MIRROR	ATUL, MODI GUARD, GOLDEN FISH
67	HIGH PERFORMANCE GLASS	SAINT GOBAIN, ASAHI, PILKINGTON
68	METAL/ALUMINUM FALSE CEILING	SAINT GOBAIN, HUNTER DOUGLUS, ARMSTRONG
69	AAC BLOCK	AEROCON, JINDAL BLOCK, MODCRETE, FINECRETE
70	AAC BLOCK ADHESIVE_	ARDEX ENDURA, PIDILITE, WEBER
71	HIGH PRESSURE LAMINATE INTERIOR/EXTERIOR GRADE	MERINO, FUNDERMAX, GREENLAM
72	UPVC WINDOWS	FENESTA, ALUPLAST, KOENMERLING
73	WALL GUARD, HAND RAIL, CORNER GUARD	CONSTRUCTION SPECIALITIES / GRADUS INPROCORP INDIA PVT. LTD./WINDOWTECH
74	SOLID ACRYLIC SURFACE	MERINO, LG, GRANIAM, SAMSUNG- STARON
75	VINYL / CONDUCTIVE FLOORING, DADO SKIRTING	FORBO, TARAKETT, ARMSTRONG, GERFLOOR
76	CALCIUM SILICATE TILES FALSE CEILING	AEROLITE, RAMCO, HILUX
77	FIRE CHECK DOORS (METAL/ROLLING/GLAZED)	NAVAIR, TATA PRAVESH, SHAKTI HORMANN
78	FIRE CURTAIN	ORIENT, PACIFIC, KENT, NECO
79	LEAD LINED DOOR	NAVAIR, SHAKTI HORMANN, METAFLEX, RESPONSIVE
80	FIRE RESISTANT GLASS	SAINT GOBAIN, ASAHI, PILKINGTON
81	ALUMINIUM GLAZED DOORS/WINDOWS	HINDALCO, SHAKTI HORMANN, GLAZE TECHNO, SARLA
82	POLYESTER POWDER COATING/ PVDF COATING	JOTUN, AKZONOBEL, ASIAN PPG, NIPPON

S. NO.	DETAILS OF MATERIALS	MANUFACTURERS NAME
83	GLASS PROCESSOR FOR MAKING DGU/TOUGHENING	AIS, ART N GLASS, GSC, KAENAL GLASS, SAINT GOBAIN
84	PVB/ SGP LAMINATE FILM, SENTRY FILM	DUPONT, SAFLEX, EASTMAN, LG, 3M
85	ACOUSTIC SEAL / DOOR SEAL	LORIENT, RAVEN, DORMA, 3M, HAFELE
86	PAINT AND PRIMER FOR FIRE CHECK DOOR.	VIPER, BERGER, NULLIFIRE
87	INTUMESCENT FIRE / SMOKESEAL	ASTRO FLAME, RAVEN, SEALZ, LORIENT
88	CALCIUM SILICATE BOARD FOR FIRE DOOR	PROMOTECH, PROMINA, RAMCO
89	FRP DOOR & FRAMES	FIBREWAYS, JAISHREE, FIBRE TECHNO, BHATT FRP, JAYNA
90	FLY ASH BRICKS	POWERBRICKS, PAUBHARA, YBW
91	INSULATION	UP TWIGA, LLOYD, ROXUL ROCKWOOL, ROCKWOOLINDIA
92	ANTI BACTERIAL PAINT	JOTUN/LIQUIDE PLASTIC /CONSTRUCTION SPECIALITY
93	GRAPHIC FILM	3M, AVERY DENNISON
94	GRC/ FRP	BIRLA WHITE, UNISTONE, SANDERSON, SHENISHA CORPORATION
95	PLASTER OF PARIS	JK, BIRLA, SAKARNI, ULTRATECH
96	MR BOARD	SAINT GOBAIN, USG BORAL, ARMSTRONG
97	MINERAL FIBRE SUSPENDED CEILING SYSTEM	SAINT GOBAIN, USG BORAL, ARMSTRONG, KNAUF AMF
98	CURTAIN TRACK AND CURTAIN FABRIC	WINDOWTECH, DECOREX, MEDFRESHE, RESPONSIVE
99	POLYMER MODIFIED ADHESIVE	ULTRATECH, BALL ENDURA, PIDILITE, WEVER
100	ANTI BACTERIAL AND ANTI SKID VITRIFIED TILES	SOMANY, SIMPOLO, KAJARIA, JOHNSON, RAK
101	POLYCARBONATE SHEET	DANPALON, SOLALITE, DPI SYSTEM, EVERLITE, CPI
102	GI PIPES	JINDAL, PRAKASH SURYA
103	GI FITTINGS	UNIK, KS, ICS
104	CPVC PIPES	ASTRAL, PRINCE, SFMC
105	HDPE PIPES	SUPREME, FINOLEX, ASTRAL, RELIANCE, SMARTFLOW
106	CC (SPUN) IRON PIPE	NECO, SKF, HIF
107	CCI SOIL, WASTE, VENT PIPES & FITTINGS	NECO, SKF, HIF
108	C.P. BRASS FITTING	JAQUAR, ROCA, KOHLER
109	SS SINK	NILKANTH, NIRALI, JAYNA
110	C.P. BRASS BATHROOM ACCESSORIES / FITTINGS	JAQUAR, ROCA, KOHLER
111	GLASS SHOWER PARTITION	DORMA, HAFELE, GEZE



S. NO.	DETAILS OF MATERIALS	MANUFACTURERS NAME
112	SANITARY WARE (URINAL, WASH BASIN, WC ETC.)	JAQUAR, GROHE, KOHLER
113	GLASS MOSAIC TILE	ITALIA, CORAL, KAJARIA
114	LIQUID SOAP DISPENSER	EURONICS, TOSHI, UTEC, DOLPHY
115	HAND DRIER	EURONICS, TOSHI, UTEC, DOLPHY
116	AROMA DISPENSER	EURONICS, TOSHI, UTEC, DOLPHY
117	SHOE SHINNING MACHINE	EURONICS, TOSHI, UTEC, DOLPHY
118	TISSUE DISPENSER WITH TRASH	EURONICS, TOSHI, UTEC, DOLPHY
119	HAND TOWEL DISPENSER	EURONICS, TOSHI, UTEC, DOLPHY
120	NITRILE RUBBER INSULATION	ARMACELL, K-FLEX, A-FLEX, SUPREME
121	FAÇADE AND WINDOW SYSTEM	SCHUCO, ALUK, REYNAERS, GUTMANN
122	FIRE STOP IN CURTAIN WALL SYSTEM	HILTI, 3M, FISCHER, LORIENT
123	POP OUT VENT FOR FAÇADE AND SYSTEM WINDOW HARDWARE	COTSWOLD, SCHUCO, ALUK, REYNAERS
124	ALUMINIUM OPERABLE LOUVER	TECHNAL, DOMAL, YOGI GLAZE, SCHUCO
125	AIR TRANSFER GRILL	RUSKIN, SYSTEM AIR, TROX, TREMCO
126	POLYURETHANE CONCRETE FLOORING, EPOXY FLOORING, SELF-LEVELLING FLOORING	ARDEX ENDURA, SIKA, MAPEI, SAINT GOBAIN - WEBER
127	ENGINEERED WOODEN FLOORING AND SKIRTING	MIKASA (GREENLAM), TARKETT, HAVWOODS, PARADOR (HIL), PERGO, KAHRS
128	RAISED/ FALSE ACCESS FLOORING SYSTEM	LINDNER, UNIFLOOR, TANKARIA, FLEXI FLOOR
129	SOLID SURFACE (CORIAN)	DUPONT, LG, STARON-SAMSUNG, LUXOR (DURLAX)
130	CAR DECK FLOORING SYSTEM	MAPEI, SAINT GOBAIN – WEBER, MYK ARMENT
131	ENGINEERED MARBLE	HR JOHNSON, KALINGA STONE, NITCO, QUASTONE
132	RUBBERISED PAVERS	SUNFLEX, FLOOR GUARD, BORON RUBBERS
133	COLOUR HARDENER	SIKA, FOSROC, PIDILITE
134	IPE WOOD	HKS FLOORING, INDIANA, RESHAWOOD
135	SYNTHETIC THATCH ROOFING	PALMEX, WINROYAL, SYNTHETIC THATCH
136	ASPHALT CEMENT SHINGLES	TAPCO, CERTAINTEED, MALARKEY
137	STRETCH MEMBRANE / TENSILE FABRIC	SERGE FERRARI, CHUKOH, MEHLER, VERSAIDAG

S. NO.	DETAILS OF MATERIALS	MANUFACTURERS NAME
138	STAMP CONCRETE PIGMENT / APPLICATOR	UNITED FLOORING, CONCRETE BY DESIGN, FLEX STONE
139	SS TACTILE	EMINENT, FERROTECH, SUNDARAM, JINDAL
140	BAMBOO DECKING, ROOFING & CLADDING	ECO GREEN FLOORING, EPITOME BAMBOOWOOD, LAMIWOOD
141	OUTDOOR SIGNAGES	3M, AVERY DENNISON, VEDAAANSHI SIGNS
142	ACOUSTIC PANELS	ARMSTRONG, USG BORAL, ANUTONE, ROCKWORTH,
143	C&D WASTE PRECAST ELEMENT	GM CONCRETE, ILFS
144	THERMOPLASTIC PAINT/ROAD MARKING PAINT	NEROLAC, ASIAN, SHALIMAR, BERGER, STP LTD
145	WEATHER/STRUCTURE SILICON SEALANT	WACKER, MCCOY, DOW CORNING
146	BACKER ROD	SUPREME/SYSTRANS
147	POLYSTRENE BOARD	SUPREME, DOW CORNING, TEXAS, PIDILITE
148	DUCTILE IRON PIPES	ELECTROSTEEL, KESORAM, TISCO
149	STAINLESS STEEL PIPES AND FITTINGS	VIEGA, JINDAL STAINLESS STEEL, J-PRESS
150	SLUICE VALVES	SANT, ADVANCE, AUDCO, ZOLOTO, KIRLOSKAR, LEADER
151	GATE / BALL VALVES	SANT, LEADER, ZOLOTO
152	ELECTROMAGNETIC FLOWMETER	ENDRESS HAUSER, KROHNE MARSHALL, NEXTENG ENVIRO PVT LTD, SEIMENS, ABB
153	CI/DI MANHOLE COVER	NECO, SKF, RIF, BIC
154	DWC PIPES	NOBLE POLYTEC, ALOM POLY EXTRUSIONS LTD., ASTRAL, ANEK INDUSTRIAL PLASTICS
155	DRAIN CHANNEL WITH SS SLOTTED GRATING	ACO, KESSEL, PRUTHA
156	WATER BASED MELAMINE POLISH	ASIAN, PIDILITE, DULUX
157	ALL FURNITURE ITEMS (CHAIRS / WORKSTATIONS/BEDS, STORAGE UNITS ETC.)	ROCKWORTH / STEELCASE / HERMAN MILLER/ HAWORTH
158	CARPET	SUPINOE/ MILLIKAN/ SHAW
159	IRRIGATION FITTINGS, VALVES AND OTHER ACCESSORIES	RAIN BIRD / NETAFIM / BERMAD / HUNTER / TORO
160	IRRIGATION PUMPS	LUBI / RAIN BIRD / GRUNDFOS

**Note: - The articles / materials which are not mentioned in the above said list shall be approved by the Engineer-in-Charge 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. ....

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# Schedule of Quantity for Civil Work

## SCHEDE OF QUANTITY

**Name of work: Construction of New Building in the existing premises of Parivesh Bhawan,  
CPCB, Delhi.**

S. No.	Description	Qty	Unit	Rate (Rs.)	Amount (Rs.)
<b>1</b>	<b>EARTH WORK</b>				
1.1	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.				
1.1.1	All kinds of soil	50000.00	cum	136.35	68,17,500.00
1.2	Excavating trenches by mechanical / 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 :				
1.2.1	All kinds of soil				
1.2.1.1	Pipes, cables etc. exceeding 80 mm dia. but not exceeding 300 mm dia	450.00	metre	307.45	1,38,353.00
1.3	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 m and for all lift.	10000.00	cum	200.00	20,00,000.00
1.4	Supplying and filling in plinth with sand under floors, including watering, ramming, consolidating and dressing complete.	2253.00	cum	1769.35	39,86,346.00
	<b>SUBHEAD 1 TOTAL</b>				<b>1,29,42,199.00</b>
<b>2</b>	<b>CEMENT CONCRETE</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 cement : 5 manufactured sand derived from Recycled Concrete Aggregate (RCA) : 10 graded stone aggregate 40 mm nominal size Recycled Aggregate (RA) )	572.00	Cum	4837.45	27,67,021.00
2.2	Centering and shuttering including strutting, propping etc. and removal of form work for :				
2.2.1	Foundations, footings, bases for columns	89.00	Sqm	366.40	32,610.00
	<b>SUBHEAD 2 TOTAL</b>				<b>27,99,631.00</b>

<b>3</b>	<b>REINFORCED CEMENT CONCRETE</b>				
3.1	Centering and shuttering including strutting, propping etc. and removal of form for				
3.1.1	Foundations, footings, bases of columns, etc. for mass concrete	577.00	sqm	366.40	2,11,413.00
3.1.2	Walls (any thickness) including attached pilasters, buttresses, plinth and string courses etc.	8168.00	sqm	834.45	68,15,788.00
3.1.3	Suspended floors, roofs, landings, balconies and access platform	12204.00	sqm	905.80	1,10,54,383.00
3.1.4	Shelves (Cast in situ)	23.00	sqm	905.80	20,833.00
3.1.5	Columns, Pillars, Piers, Abutments, Posts and Struts	6188.00	sqm	908.40	56,21,179.00
3.1.6	Stairs, (excluding landings) except spiral-staircases	416.00	sqm	1030.00	4,28,480.00
3.1.7	Lintels, beams, plinth beams, girders, bressumers and cantilevers with water proof ply 12 mm thick	11098.00	sqm	803.55	89,17,798.00
3.2	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).				
3.2.1	Suspended floors, roofs, landing, beams and balconies (Plan area to be measured)	12204.00	Sqm	385.65	47,06,473.00
3.3	Steel reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete in foundation & super structure for all height .				
3.3.1	Corrosion Resistant Thermo-Mechanically Treated bars of grade Fe-500D or more.	1420517.00	kg	105.85	15,03,61,724.00
3.4	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 / Ordinary Portland /Portland Slag cement, 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. Note: 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.				
3.4.1	All works upto plinth level				
3.4.1.1	Concrete of M40 grade with minimum cement content of 390 kg /cum	7659.00	Cum	12241.95	9,37,61,095.00
3.4.2	All works above plinth level upto floor V level				
3.4.2.1	Concrete of M35 grade with minimum cement content of 370 kg /cum	3084.00	Cum	12379.55	3,81,78,532.00
3.5	Add for using extra cement in the items of design mix over and above the specified cement content therein.	4190.00	quintal	744.05	31,17,570.00
3.6	Extra for R.C.C./ B.M.C/ R.M.C. work above floor V level for each four floors or part thereof.	1603.00	Cum	298.35	4,78,255.05
3.7	Providing & fixing of floor to floor/corner expansion joint system for the 350 mm Expansion Joints with aluminum covers profiles, having a hard wearing, maintenance Free, long-lasting design. The exposed surface of the expansion joint covers should have ninety-degree pan to take straight cut stone as infill. The profile shall be free of all gaskets. The extruded system shall adhere to ASTM 6063 T66 standards. The design of the central pan shall be such that it can take stone upto a thickness of 30 mm and the edges of the stone shall be cut ninety degrees. The design of the expansion joint cover system should be such that it should have extruded aluminium side profile which can take baker rod with sealant. The sides should be sleek and the sealant infill should be 15-20 mm. The expansion joint cover should have a semitic and articulated telescope design so as to accommodate the movements in 3 directions. The total horizontal movement should be 350 mm (+/- 175 mm). It should also accommodate a vertical movement of 10 mm. The surface of the system should be in the Mill finish. The total visible width on each side shall be 22mm (maximum) & the installation height shall be 45-50 mm. Each extruded length shall have a connecting pin to keep the alignment of each extruded length straight. The system shall be tested as per cyclic movement test as per ASTM 1399E Class IV. Test reports shall be provided. The center plate should be 5 to 6mm thick. All the screws to be counter sunk in the pan. The system shall be capable to withstand standard rolling loads of 1-2 cars or cart wheel loads if required. For precise transitions, the factory supplied				

	slid-in connection pins should be used during the installation of the cover system. The expansion joint covers/profile shall be supplied in 3 meter cut length. The item includes supply & installation of moisture / water proofing of the expansion joint by the way of sealing the joint with the additional membrane with epoxy sealing agent and shall have 2-hour UL listed fire barrier (with cyclic movement test) installed in the expansion joint gap, as per the manufacturer's instruction.				
3.7.1	Floor Joint of 350 mm gap	210.00	Meter	19758.00	41,49,180.00
3.8	Providing & fixing of wall to wall/corner expansion joints cover system made up of all aluminium covers for 350 mm Expansion Joints. The design will be all solid steel, hard wearing and long lasting. It shall be easy to install with optimized design which allows safe installation of the centering bar. The system will adhere to ASTM6063 T66 standards. Each extruded profile shall be connected with a connecting pin. It shall have a 3-dimensional movement absorption. The total movement should be 100%, that is 350mm (+/- 175 mm). It should have a visibly width of minimum 550 mm. It shall confirm to the cyclic test requirement of ASTM 1399E Class IV and test report shall be submitted. It shall not require any recess in wall or support construction. The system shall include the moisture barrier and shall have 2-hour UL listed fire barrier (with cyclic movement test) installed in the expansion joint gap, as per the manufacturer's instructions.				
3.8.1	Wall Joint of 350 mm gap	94.00	Meter	14154.00	13,30,476.00
3.9	Providing & fixing of roof to roof/corner expansion joint system made up of all aluminium cover profiles. The design shall be all solid steel, hard wearing and long lasting. It shall be easy to install with optimized design which allows safe installation of the centering bar. The system shall adhere to ASTM6063 T66 standards. Each extruded profile shall be connected with a connecting pin. The total movement should be 100%, that is 350mm (+/- 175 mm). It should have a visibly width of 550-600 mm. It shall confirm to the cyclic test requirement of ASTM 1399E Class IV and test report shall be submitted. The system shall include the moisture barrier and shall have 2-hour UL listed fire barrier (with cyclic movement test) installed				

	in the expansion joint gap, as per the manufacturer's instructions.				
3.9.1	Roof Joint of 350 mm gap	35.00	Meter	9235.00	3,23,225.00
	<b>SUBHEAD 3 TOTAL</b>				<b>32,94,76,404.05</b>
<b>4</b>	<b>MASONRY 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)	50.00	Cum	9344.15	4,67,207.50
4.2	Extra for brick work / AAC block masonry / Tile brick masonry in superstructure above floor V level, for each four floors or part thereof by mechanical means.	562.00	Cum	211.40	1,18,806.80
4.3	Brick work with clay flyash F.P.S. (non modular) brick of class designation 7.5 in superstructure above plinth level up to floor five level in :				
4.3.1	Cement mortar 1 : 6 (1 cement : 6 coarse sand)	1330.00	cum	9271.90	1,23,31,627.00
4.4	Providing and laying Autoclaved Aerated concrete blocks (AAC) masonry 150mm 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).	95.00	cum	7921.90	7,52,581.00
	<b>SUBHEAD 4 TOTAL</b>				<b>1,36,70,222.30</b>
<b>5</b>	<b>CLADDING WORK</b>				
5.1	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 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.				
5.1.1	Granite stone slab of colour black, Cherry/Ruby red				
5.1.1.1	Area of slab upto 0.50 sqm	20.00	sqm	4548.75	90,975.00
5.1.1.2	Area of slab over 0.50 sqm	62.00	sqm	3889.30	2,41,137.00

5.2	Extra for fixing marble /granite stone, over and above corresponding basic item, in facia and drops of width upto 150 mm with epoxy resin based adhesive, including cleaning etc. complete.	21.00	Metre	588.55	12,359.55
5.3	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	60.00	each	1000.35	60,021.00
5.4	Extra for pre finished nosing in treads of steps of granite work	1248.00	meter	734.90	9,17,155.20
	<b>SUBHEAD 5 TOTAL</b>				<b>13,21,647.75</b>
<b>6</b>	<b>WOOD AND P. V. C. WORK</b>				
6.1	<p>Providing and fixing factory made uPVC glazed/wire mesh windows/doors comprising of lead free uPVC multi-chambered frame, sash and mullion/coupler (where ever required) extruded profiles having minimum wall thickness of 1.70 mm for Series R1 and R2 profiles and 2.10 mm for Series R3 and R4 profiles conforming to EN: 12608 in any shape, colour and design duly reinforced with galvanized mild steel section made of required shape &amp; size as per CPWD Specification, uPVC extruded glazing beads, interlocks and Inline sash adaptor (where ever required) of appropriate dimension, EPDM gasket, hardware, SS 304 grade fasteners of minimum 8 mm dia with countersunk head, comprising of matching polyamide PA6 grade sleeve for fixing frame to finished wall as per IS 1367 : Part 1 to 14, plastic packers, plastic caps and necessary stainless steel screws etc. Profile of frame, sash &amp; mullion (if required) shall be mitred cut and fusion welded/mechanically jointed duly sealed at all corners, including drilling of holes for fixing hardware and drainage of water etc. 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 approved drawing conforming to CPWD specification &amp; direction of Engineer-in-Charge. Section of steel reinforcement and cross sections of uPVC profiles to be as per design approved by Engineer-in-Charge.</p> <p>Wire mesh / Glazing of plain/ toughened/ laminated/ double glass unit with / without high performance coatings as per design requirements and conforming to IS: 3548 &amp;</p>				

	IS: 16231 shall be paid separately. Note- Structural Design proof checked from a Government Engineering Institute, to be provided by the manufacturer for : (i) Sites with basis wind speed > 45 m/sec as per IS 875 - Part 3 (ii) Sites with structure height more than 20m for all wind speeds				
6.1.1	Three track three panels sliding window with Aluminium channel for roller track, wool pile, nylon rollers with SS 304 body.				
6.1.1.1	Using R3 series with frame (98mm & above) x (40mm & above) & sash (30mm & above) x (55mm & above) with zinc alloy (zamak) powder coated handle on two end panels along with multi-point locking system (Height upto 1.8 metre).	351.00	Sqm	7943.45	27,88,150.95
6.1.2	Fixed window/ ventilator with mullion/transom.				
6.1.2.1	Using R2 series with frame (39mm & above ) x (39mm & above) & Mullion (39mm & above ) x (60mm & above). (Height upto 1.2 metre)	6.00	Sqm	8047.30	48,283.80
6.2	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 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	32.00	Each	47992.65	15,35,765.00

	<p>occupancy indicators, coat hooks with door stopper, U channel, top rail with corner connector, adjustable foot/pedestal, Rubber noise deafening tape, screw &amp; wall plugs) shall be approved by Engineer-in-Charge. All screw will be of 304 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.</p>				
6.3	<p>Providing and fixing of Standard duty Hollow metal doors confirming to IS 16074 &amp; IS 4351 made of pressed galvanized steel confirming to IS 277 with the following specification. Doors shall be manufactured in ISO 9001: 2015 certified company for quality management. Doors shall be with vision glass and louver as a part of complete assembly. Price are inclusive of 3 no.s Hinges Per Leaf &amp; Fasteners. Door frame shall be single rebate grooved profile of size 125 x 55 mm made out of minimum 1.2 mm thick galvanized steel sheet. Frames shall be mitered and field assembled with self-tabs. Frames shall have inbuilt grooved sealing system and shall be site fitted with PVC seal. 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 non-fire rated puff and the gaps shall be filled with backer rod &amp; silicon sealant. Door frame shall be finished with pure polyester powder coating (minimum 50 micron) and should have passed minimum 500 hours of salt spray test. Door leaf shall be of 46 mm thick fully flush double skin door, with or without vision panel. Door leaf shall be manufactured from minimum 1.2 mm thick galvanized steel sheet. Internal construction of the door should be rigid reinforcement pads type for receiving appropriate hardware. Infill material shall be resin bonded honeycomb core &amp; all doors shall be factory prepared for receiving appropriate hardware and provided with necessary reinforcement for hinges, locks, and door closers. Edges should be interlocked with a bending radius of 1.4 mm. For pair of doors integrated astragals has to be provided on the meeting stile for</p>	349.00	Sqm	9209.60	3214150.40

	both active and inactive leaf. Vision panel wherever applicable should be provided as per manufacturers recommendation with a clip-on arrangement. Door Shutter shall be finished with pure polyester powder coating (minimum 50 micron) and shall have passed minimum 500 hours of salt spray test.				
6.4	Providing and fixing Surface door closer, Medium duty EN 2-4 with standard arm, Silver finish with necessary accessories and screws etc. complete.	186.00	Each	2071.35	385271.10
6.5	Providing & Fixing of Lever Handle with screws in SSS with necessary accessories and screws etc. Complete.	186.00	Each	1241.70	230956.20
6.6	Providing & Fixing Mortice sash lock, 55mm BS/20mm sq. forend, in SSS with necessary accessories and screws etc. complete.	186.00	Each	3186.70	592726.20
6.7	Providing & Fixing 300mm Long Tower Bolt with necessary accessories and screws etc. complete.	186.00	Each	432.50	80445.00
6.8	Providing and fixing of ISI marked medium duty hollow metal fire rated doors as per IS 3614: 2021, for 120 min integrity & 30 min. insulation made of pressed galvanized steel conforming 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	268.00	Sqm	19353.55	5186751.40

	<p>vision panel. Door leaf shall be manufactured from 1.2 mm minimum thick galvanized 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 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.</p>				
6.9	<p>Providing and fixing Ball bearing butt hinge, SS304, of size 100 x 75 x 3mm in SSS with necessary accessories and screws etc. complete.</p>	312.00	Nos	254.95	79,544.40
6.10	<p>Providing &amp; 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. 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.</p>	104.00	Nos	7557.05	7,85,933.20
6.11	<p>Providing &amp; 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.</p>	30.00	Nos	7591.20	2,27,736.00
6.12	<p>Providing &amp; Fixing External lever handle, with locking arrangement, Silver finish with necessary accessories and screws etc. complete</p>	50.00	Nos	4324.80	2,16,240.00
6.13	<p>Providing &amp; Fixing Fire rated Gasket of 4mm x 13mm, Black colour Complete</p>	50.00	Meter	149.10	7,455.00
6.14	<p>Providing &amp; Fixing Fire and smoke seal</p>	50.00	Meter	160.45	8,022.50



	black colour Complete				
6.15	Providing & Fixing Fire door intumescent seal, of size 15x1.5mm, self-adhesive, Black colour complete	50.00	Meter	187.80	9,390.00
6.16	Providing & Fixing 6 mm thick Clear fire rated glass, 120min integrity, of size 200 x 300mm for Vision Panel with necessary accessories and screws etc. complete	25.00	Nos	1889.25	47,231.25
6.17	Providing & Fixing Gravity Door coordinator /sequencer for the double leaf doors (Make – Dorma SR390, Hormann, Geze 013525, and Hafele) with necessary accessories and screws etc. complete	30.00	Nos	1707.15	51,214.50
6.18	Providing & Fixing ADB Seal of required thickness as per manufacturer specification etc. complete	50.00	Meter	3556.60	1,77,830.00
6.19	Providing & Filling Puff in Door Frame of required thickness as per manufacturer specification etc. complete	50.00	Meter	466.60	23,330.00
6.20	Providing and fixing 12 mm thick frameless toughened glass door of approved brand and manufacture, including making provision for all fittings by making necessary hole etc. for fixing required patch fittings etc. all complete as per direction of Engineer-in-charge. Cost of all S.S/ aluminum fittings, Floor Spring, Patch Fitting and 25mm x 450 long S.S. door handle used shall be paid for separately.	79.00	Sqm	3395.75	2,68,264.25
6.21	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.	42.00	Nos	9144.35	3,84,062.70
6.22	Providing and fixing pull Handle (in pair) or equivalent back-to-back with 350mm CTC, adjustable fixing for glass, wood and metal doors in satin stainless steel. The pull handles should have supporting washer with raised bevelling on the outer surface. Length =450mm, 25mm dia, -SS316 etc. complete as per the direction of Engineer-in-charge.	42.00	Nos	4078.00	1,71,276.00
6.23	Providing and fixing Satin SS Universal Corner Lock Patch with LKP & EPC and Strike Plate of (Model US10 STD, F700 or Equivalent) conforming to IS : 6315, having brand logo embossed on the body etc. complete as per the direction of Engineer-in-charge.	42.00	Nos	6098.45	2,56,134.90

6.24	Providing and fixing Top Pivot Patch of approved Make to 12 mm thick frameless toughened glass door.	42.00	Nos	3102.05	1,30,286.10
6.25	Providing and fixing Bottom Pivot Patch of approved Make to 12 mm thick frameless toughened glass door.	42.00	Nos	3102.05	1,30,286.10
6.26	Providing and fixing PT 24 DI Top Pivot 3 mm with fixing plate of approved Make to 12 mm thick frameless toughened glass door.	42.00	Nos	901.25	37,852.50
6.27	Providing and fixing 12 mm thick frameless toughened glass partition system of approved brand and manufacture, including fine edge polish, all fittings & silicon sealant as along with necessary holes etc. for fixing required door/patch/partition fittings etc. all complete as per direction of Engineer-in-charge. All fittings, fixing arrangements (in SS base rail, wall connector, clamps, EPDM Gasket, screws etc.) and installation, materials, making holes, dash fasteners etc are included in this item.	505.00	Sqm	5285.40	26,69,127.00
6.28	Providing and fixing 1mm thick M.S. sheet door with frame of 40x40x6 mm angle iron and 3 mm M.S. gusset plates at the junctions and corners, all necessary fittings complete, including applying a priming coat of approved steel primer.				
6.28.1	Using M.S. angels 40x40x6 mm for diagonal braces	180.00	Sqm	5775.10	10,39,518.00
6.29	Providing and fixing frosted film of 3 M Crystal or equivalent make having shading coefficient 0.93%, visible light reflection 12%, visible light transmittance 72%, solar heat reflectance 10%, solar heat transmittance 64% and solar heat absorbance 26% all complete in required pattern as per manufacturer's specification and as per direction of Engineer-in-charge.	585.00	Sqm	1683.85	9,85,052.00
6.30	Providing and fixing 6mm thick High Pressure Interior Compact Laminate made out of thermosetting resin treated Kraft as core material and design paper as a finish surface on both sides of required colour, pattern and shade in wall lining fixed over alluminium tube of size 15x10mm @600mm c/c with rivets color matching with laminate, adhesive and metal dash fasteners as per site requirement and directions of Engineer-In-Charge . Compact laminates will be resistance to water immersion through permissible increase on thickness and mass <0.60% and board should have density >1.35kg/cm <sup>3</sup> . Compact should be flame retardant fulfilled the criteria of under BS-476/97	85.00	Sqm	4948.20	4,20,597.00

	and EN438-6 with classification of BS1D0 standard property with Anti-Viral, Anti-bacterial & Anti-termite (under JIS Z2801:2000 certification), Chemical resistance, Scratch resistant ,flame resistance, weather & climatic shock resistance. (Note: the contractor will provide10 years warranty certificate on any manufacturing and moisture related defects.& fulfilled the criteria of Green Guard Gold certification and manufactured under EN438-2&3:2005 standards). The rate includes cost of laminate, aluminum frame work and all fixing items complete as per site requirement.				
6.31	Providing and fixing double glazed hermetically sealed glazing in aluminum windows, ventilators and partition etc. with 6 mm thick clear float glass both side, having 12 mm air gap, including providing EPDM gasket, perforated aluminum spacers, desiccants, sealant (Both primary and secondary sealant) etc. as per specifications, drawings and direction of Engineer-in-charge complete.	380.00	Sqm	3845.80	14,61,404.00
	<b>SUBHEAD 6 TOTAL</b>				<b>2,36,50,287.45</b>
<b>7</b>	<b>STEEL WORK</b>				
7.1	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.				
7.1.1	Hot finished welded type tubes	12416.00	kg	174.10	21,61,625.60
7.2	Providing and fixing stainless steel (Grade 316) 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.).	3281.00	kg	652.50	21,40,853.00
	<b>SUBHEAD 7 TOTAL</b>				<b>43,02,478.60</b>
<b>8</b>	<b>FLOORING</b>				

8.1	Kota stone slab flooring over 20 mm (average) thick base laid over and jointed with grey cement slurry mixed with pigment to match the shade of the slab, including rubbing and polishing complete with base of cement mortar 1 : 4 (1 cement : 4 coarse sand) :				
8.1.1	25 mm thick	134.00	sqm	2117.00	2,83,678.00
8.2	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 cement: 4 coarse sand) jointing with grey cement slurry @3.3 kg/sqm including 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.				
8.2.1	Glazed vitrified floor tiles polished finish of size				
8.2.1.1	Size of Tile 800 x 1600 mm	4185.00	sqm	1667.80	69,79,743.00
8.3	Deduct for not using 20 mm thick cement mortar 1:4 (1 cement : 4 coarse sand) bedding in laying of floor tiles and jointing with grey cement slurry @ 3.3 kg/ sqm.	4375.00	sqm	-913.25	(39,95,469.00)
8.4	Fixing glazed/ Ceramic/ Vitrified floor tiles with cement based high polymer modified quick-set tile adhesive (Water based) conforming to IS: 15477, in average 3mm thickness.	4375.00	sqm	768.25	33,61,094.00
8.5	Providing and laying Vitrified tiles in different sizes (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 cement: 3 coarse sand), jointing with grey cement slurry @ 3.3 kg/ sqm including grouting the joint with white cement & matching pigments etc. Complete				
8.5.1	Glazed vitrified tile polished finish of size				
8.5.1.1	Size of Tile 800 X 1600 mm	162.00	sqm	1548.70	2,50,889.00

8.6	Providing and fixing Ist quality ceramic glazed wall tiles conforming to IS: 15622 (thickness to be specified by the manufacturer), of approved make, in all colours, shades of any size as approved by Engineer-in-Charge, in skirting, risers of steps and dados, over 12 mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand) and jointing with grey cement slurry @ 3.3kg per sqm, including pointing in white cement mixed with pigment of matching shade complete. Size of Tile 300x600 mm Digital printed wall tile of make KAJARIA (Impression - series ) or equivalent series of EURO /NITCO make.	836.00	sqm	1551.90	12,97,388.00
8.7	Grouting the joints of flooring tiles having joints of 3 mm width, using epoxy grout mix of 0.70 kg of organic coated filler of desired shade (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.				
8.7.1	Size of Tile 800 X 1600 mm	4537.00	sqm	212.90	9,65,927.00
8.8	Providing and laying Polished Granite stone flooring 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 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 colour of Black, Cherry/Ruby Red or equivalent	2846.00	sqm	3051.65	86,84,996.00
8.9	Providing and laying polished Granite stone slabs 18 mm thick of in risers of steps, skirting, dado and pillars laid on 20 mm (average) thick cement mortar 1:3 (1 cement: 3 coarse sand) and jointed with grey cement slurry mixed with pigment to match the shade of the slabs, with copper pins 7.5 cm long, 6 mm diameter for securing adjacent stones in stone wall lining, including rubbing and polishing complete.				
8.9.1	Polished Granite stone slab colour of Black, Cherry/Ruby Red or equivalent	1089.00	sqm	4346.40	47,33,230.00
	<b>SUBHEAD 8 TOTAL</b>				<b>2,14,59,128.00</b>
<b>9</b>	<b>ROOFING</b>				

9.1	Providing and fixing 10 mm thick twinwall polycarbonate sheet with cross bracing of approved make and brand in all shades and colours with required ASTM standards in required profile/ curvature at all heights in roofing over existing steel structural framework. The Sheet shall be fixed as per design/ drawing duly approved by the Engineer-in-charge. The Sheet section shall be properly fixed to supporting steel framework alongwith the sheet with self tapping, self-drilling atleast 50mm long steel screws fixed at 150 mm c/c maximum. The open end edges of polycarbonate sheet shall be provided with suitable aluminum channel end cap with self-taping screws. The joints of the structure shall be properly sealed with silicon-sealants wherever required to make the structure water proof. The rates shall include cost of all materials and labour required to cut, fabricate and fix the structure, T&P, scaffolding and safety precautions etc. complete as per direction of Engineer-in-charge. Nothing extra shall be paid for any items, if required to fulfill the technical requirement/ functional requirement of fixing of polycarbonate sheet roofing. The installation shall be fully leak proof/ water-proof. Finished curved area shall be measured for the purpose of payment. Cost of supporting steel structural framework shall be paid for separately.	280.00	sqm	1922.10	538188.00
9.2	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 x1 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.	11.00	each	328.00	3,608.00
9.3	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.				
9.3.1	110 mm diameter	377.00	metre	356.40	1,34,363.00
9.4	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.				
9.4.1	Coupler				

9.4.1.1	110 mm	11.00	each	272.45	2,997.00
9.4.2	Bend 87.5°				
9.4.2.1	110 mm bend	11.00	each	152.35	1,676.00
9.4.3	Shoe (Plain)				
9.4.3.1	110 mm Shoe	11.00	each	152.35	1,676.00
9.5	Providing and fixing to the inlet mouth of rain water pipe cast iron grating 15 cm diameter and weighing not less than 440 grams.	11.00	each	72.95	802.00
9.6	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 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 & 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:				
9.6.1	10 mm thick Calcium Silicate Board made with Calcareous & Siliceous materials reinforced with cellulose fiber manufactured through autoclaving process.	190.00	Sqm	1659.40	3,15,286.00
9.7	Providing and fixing false ceiling at all heights with integral densified calcium silicate reinforced with fibre and natural filler false ceiling tiles of Size 595x595 mm of approved texture, design and patterns having NRC (Noise Reduction coefficient) of 0.50 (minimum) as per IS 8225:1987, Light reflectance of 85% (minimum). Non combustible as per BS:476 (part-4), fire performance as per BS:476 (part 6 &7), humidity resistance of 100%, thermal conductivity < 0.043 W/m K as per ASTM 518:1991, in true horizontal level suspended on inter- locking metal powder coated T-Grid of hot dipped galvanized iron section of 0.40 mm thick on Silhouette profile, rotary stitched double webbed white with 6mm reveal profile (white/black), comprising of main-T runners of size 15x42mm of length 3000 mm, cross - T of size 15x42 mm of length 1200 mm and secondary intermediate cross-T of size 15x42 mm of length 600mm to form grid module of size 600 x 600 mm, suspended from ceiling using galvanized mild steel items (galvanizing @ 80 grams per Sqm) i.e. 50 mm long, 8 mm outer diameter M-6 dash fasteners, 6 mm dia fully threaded hanger rod upto 1000 mm length and L-shape level adjuster of size 85x25x2 mm. Galvanized iron perimeter wall angle of size 22x19x0.40 mm of length 3000 mm to be fixed on periphery wall / partition with the help of plastic rawl plugs at 450 mm center to center and 40mm long dry wall S.S screws. The work shall be carried out as per specifications, drawing and as per directions of the Engineer-in-Charge				
9.7.1	With 15 mm thick integral densified micro edge light weight calcium silicate false ceiling tiles	4515.00	Sqm	2445.75	1,10,42,561.25
	<b>SUBHEAD 9 TOTAL</b>				<b>1,20,41,157.25</b>
<b>10</b>	<b>FINISHING</b>				
10.1	12 mm cement plaster of mix :				
10.1.1	1:6 (1 cement: 6 coarse sand)	8241.00	sqm	373.35	30,76,777.00



10.2	15 mm cement plaster on rough side of single or half brick wall of mix:				
10.2.1	1:6 (1 cement: 6 coarse sand)	6882.00	Sqm	430.50	29,62,701.00
10.3	Providing and applying plaster of paris putty of 2 mm thickness over plastered surface to prepare the surface even and smooth complete.	8241.00	sqm	265.00	21,83,865.00
10.4	Finishing walls with textured exterior paint of required shade :				
10.4.1	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	1858.26	sqm	252.95	4,70,048.00
10.5	Finishing walls with Acrylic Smooth exterior paint of required shade :				
10.5.1	New work (Two or more coat applied @ 1.67 ltr/10 sqm over and including priming coat of exterior primer applied @ 0.90 ltr./10 sqm)	5023.74	sqm	172.60	8,67,097.00
10.6	Painting with synthetic enamel paint of approved brand and manufacture of required colour to give an even shade :				
10.6.1	Two or more coats on new work over an under coat of suitable shade with ordinary paint of approved brand and manufacturer.	340.40	sqm	242.80	82,649.00
10.7	Wall painting with premium acrylic emulsion paint of interior grade, having VOC (Volatile Organic Compound) content less than 50 grams/ litre of approved brand and manufacture, including applying additional coats wherever required to achieve even shade and colour.				
10.7.1	Two coats	8241.00	sqm	143.25	11,80,523.00
10.8	Providing and applying white cement based putty of average thickness 1 mm, of approved brand and manufacturer, over the plastered wall surface to prepare the surface even and smooth complete.	6882.00	Sqm	148.80	10,24,041.60
	<b>SUBHEAD 10 TOTAL</b>				<b>1,18,47,701.60</b>
<b>11</b>	<b>ROAD WORK</b>				
11.1	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.	900.00	Sqm	220.70	1,98,630.00
11.2	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.				

11.2.1	Providing & filling in position rubberized bitumen hot sealing compound for sealing of expansion joint in roads/ pavements all complete as per direction of the Engineer-in-Charge.	2250.00	per cm	12.25	27,562.50
11.3	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 for payment). (Precast C.C. kerb stone shall be approved by Engineer-in-charge).	24.00	Cum	9329.20	2,23,900.80
11.4	Providing and laying C.C. pavement of mix M-25 with ready mixed concrete from batching plant. The ready mixed concrete shall be laid and finished with screed board vibrator , vacuum dewatering process and finally finished by floating, brooming with wire brush etc. complete as per specifications and directions of Engineer-in- charge. (The panel shuttering work shall be paid for separately). (Note:- Cement content considered in this item is @ 330 kg/cum. Excess/less cement used as per design mix is payable/ recoverable separately).	134.00	Cum	12097.55	16,21,071.70
11.5	Construction of dry lean cement concrete sub base over a prepared sub-grade with coarse and fine aggregate conforming to IS:383, the size of coarse aggregate not exceeding 25 mm, aggregate cement ratio not to exceed 15:1, aggregate gradation after blending to be as per specifications, cement content not to be less than 150 Kg/cum, optimum moisture content to be determined during trial length construction, concrete strength not to be less than 10 Mpa at 7 days, mixed in a batching plant, transported to site, for all leads & lifts, laid with a mechanical paver, compacting with 8-10 tonne vibratory roller, finishing and curing etc. complete as per direction of Engineerin- charge.	90.00	Cum	4647.70	4,18,293.00
11.6	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.				
11.6.1	With material conforming to Grade-II (size range 53 mm to 0.075 mm ) having CBR Value-25	134.00	Cum	3062.80	4,10,415.20
11.7	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 cement : 4 coarse sand) in all shapes & patterns including grouting the joints with white cement mixed with matching pigments etc. complete as per direction of Engineer-in-Charge.	90.00	Sqm	2143.40	1,92,906.00
11.8	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.				
11.8.1	60mm thick cement concrete paver block of M-35 grade with approved colour, design & pattern.	360.00	Sqm	1266.95	4,56,102.00
11.9	Making groove of required size 10x50mm in Cement concrete/ RCC pavement by diamond cutter in proper shape and size including filling bitumen hot sealing compound (Using grade 'A' sealing compound) in joints etc. removing left over material (cement concrete etc) complete , as per direction of Engineer in charge.				
11.9.1	Size of groove 50 X 10 mm	350.00	Metre	128.30	44,905.00
	<b>SUBHEAD 10 TOTAL</b>				<b>35,93,786.20</b>
<b>12</b>	<b>Sanitary Installation</b>				
12.1	Providing and fixing Stainless Steel A ISI 304 (18/8) kitchen sink as perIS : 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 :				
12.1.1	Kitchen Sink Without drain Board				
12.1.1.1	610x510mm bowl depth 200 mm	7.00	Each	5748.10	40,236.70
12.2	Providing and fixing wash basin with 32 mm C.P. brass waste of standard pattern <b>(Model K-31460IN-0+K-45432IN-CP of Kohler, SLS-WHT-6801+ALD-705L130 of Jaquar or equivalent make of Roca model no. RS325394460 )</b> and pillar faucet Make Kohler Model no.K-27484IN-4-CP, Make -Jaquar Model. No. OPP-15001PM or equivalent model of Roca with C.I. brackets, including painting of fittings and brackets, cutting and making good the walls wherever require:				
12.2.1	White Vitreous China Wash basin	45.00	Each	3985.00	1,79,325.00
12.3	Providing and fixing P.V.C. waste pipe for sink or wash basin including P.V.C. waste fittings complete.				
12.3.1	Semi rigid pipe				
12.3.1.1	40 mm dia	45.00	Each	115.40	5,193.00
12.4	Providing and fixing CP Brass 32mm size Bottle Trap <b>(Model no. K-16407IN-CP of Kohler, Model no. ALD-CHR-769L250X190 of Jaquar or equivalent model no. RF9066A1 of Roca)</b> of approved quality & make and as per the direction of Engineer-in-charge.	118.00	Each	1629.75	1,92,310.50
12.5	Providing and fixing toilet paper holder <b>(Model no.: K-25070IN-CP of Kohler, Model no. HS-1551 of Jaquar, or equivalent model no. RA816662001 of Roca)</b>				
12.5.1	C.P. brass	52.00	Each	1537.35	79,942.20
12.6	Providing and fixing white vitreous china extended wall mounting water closet of <b>(Model no. K-26994IN-0 of Kohler, Model no. ACS-WHT-87953BIUFMSM of Jaquar, or equivalent model no. RS3460NL460 +RA801C4200U of Roca)</b> including providing & fixing white vitreous china cistern <b>(Model no. K-26351IN-P-NA of Kohler, Model no. JCS-WHT-2400S of Jaquar, or equivalent model no. RE890010200 of Roca)</b> with dual flush fitting ( model no. K--28476IN-M-CP of Kohler, Model no. JCP-CHR-152415 of Jaquar, or equivalent model no. RE890196001 of Roca) of flushing capacity 3 litre/ 6 litre (adjustable to 4 litre/ 8 litres), including seat cover , and cistern fittings, nuts, bolts and gasket etc complete.	52.00	Each	29015.35	15,08,798.20

12.7	Providing and fixing white vitreous china battery based infrared sensor operated urinal (of model no. K- 26475IN-ER-0+K-24199IN-C01-CP of Kohler, Model no. URS-WHT-13263+NR-STL-51093N of Jaquar, or equivalent model no. RS35945J460 + RT525165103 + RT5A8102E0N of Roca) 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 manufacturers specification and direction of Engineer-in-charge.	28.00	Each	22706.55	6,35,783.40
12.8	Providing and fixing stainless steel grating (of Chilly/ Camry or equivalent) approved quality and colour.				
12.8.1	125 mm dia.	52.00	Each	1071.00	55,692.00
12.9	Providing and fixing Over Counter Wash basin ( Model no. K-31459 IN-0+K-20746IN-CP of make Kohler, Model no. LAS-WHT-91903+ALD-705L130 of Jaquar, or model no. RS3275L000C of Roca), 32 mm bottle trap (Model no. K-16407IN-CP of Kohler, Model no. ALD-CHR-769L250X190 of Jaquar or equivalent model of Roca) all complete.	45.00	Each	6825.00	3,07,125.00
12.10	Providing and fixing 15mm C.P brass Single Lever Basin Mixer Make Kohler Model no.K-27481IN-4ND-CP+K-25150IN-NA, Make -Jaquar Model. No. SOL-6233NK+LD-233NPSO or model of Roca RT5A424FCA1 for Wash Basin Including cutting and making good the walls wherever required etc. all complete.	52.00	Each	1856.00	96,512.00
12.11	Providing and fixing 15mm C.P. copper connecting pipe 450mm long with C.P. brass nuts, washers complete in all respects. Model no. Jaquar Cat No. ALD 803AB or model of Roca all complete.	104.00	Each	292.00	30,368.00
12.12	Providing and fixing C.P. brass 15 mm nominal bore two way bib cock Make Kohler K-25432IN-4-CP Jaquar Cat. No. KUP-CHR-35041PM or model no. RT5A934FCA1 of Roca RT5A934FCA1 all complete	52.00	Each	2242.00	1,16,584.00
12.13	Providing and fixing C.P. cast brass twin coat hooks fixed to PVC rawl plug with SS screws Model no K-5635IN-CP of Kohler/Make- Jaquar Cat. No. AKP-CHR-35791P or model no. RA816070121 of Roca all complete.	52.00	Each	1037.00	53,924.00
12.14	Providing and fixing health faucet with 1 m long flexible tube and wall hook including all fittings Make Modle no. K-12925IN-CP of kohler/ Jaquar Cat. No. ALD-CHR-577/ model of Roca all complete.	52.00	Each	1479.00	76,908.00

12.15	Providing and fixing 15mm C.P brass Sink Mixer <b>Model no K--20591IN-4-CP of Kohler/ Jaquar Model. No. DRC-CHR-37165 or model no. RT5A764FCA1 of Roca</b> for kitchen sink with swinging spout complete. Including cutting and making good the walls wherever required etc. all complete.	7.00	Each	4572.00	32,004.00
12.16	Providing and fixing liquid soap dispenser including all fittings complete. of Jaquar, Euronix, or equivalent make all complete..	32.00	Each	1547.00	49,504.00
12.17	Providing & fixing SS Grab Bar of Make Euronics Model No. EGR (S02) & SS Grab Rail Euronics Model No. EGR 01 or equivalent model of Jaquar or Roca, Including cutting and making good the walls wherever required etc. all complete..	7.00	Each	6532.00	45,724.00
12.18	Providing and fixing Air Purifier Make <b>Euronics</b> Model-EA 34 or equivalent model of Jaquar or Roca including all fittings complete in all respect.	28.00	Each	1965.00	55,020.00
12.19	Providing and fixing 150 litre/ hr. cooling and storage capacity, fully stainless steel electric storage type water cooler Make-Blue Star model No.SS SDLX 150150 or equivalent) / MAKE VOLTAS, model no.SS FSS-150, or equivalent model as approved by engineer in charge with inlet hose connection inbuilt float valve. 2 Nos. outlet foucet, drain tray with waste and pipe up to flloor trap heavy compressor and wire up to socket, 3 pin plug etc complete in all respect.	8.00	Each	47136.00	3,77,088.00
12.20	Providing and Fixing of MS body in SS finish Hand Dryer with voltage supply of 220V,with touch free infra red sensor.(For Director Room), Make <b>Jaquar</b> HDR-SSF-AK2803D,Make <b>Eurionics</b> , model no-EH210N or equivalent model of Roca all complete.	28.00	Each	7362.00	2,06,136.00
12.21	Providing and Fixing of Hand Dryer, SS 304 grade, total power 1000W,Hot & cold switch with a air speed of 110m/s, noise level upto 75 DB,Energy efficient.(For Banquet common toilet)Make <b>Jaquar</b> HDR-SSF-AK2803D/Make Eurionics, model no-EH24S or equivalent make of Roca all complete.	4.00	Each	7362.00	29,448.00
12.22	Providing and fixing to the inlet mouth of rain water pipe cast iron grating 15 cm diameter and weighing not less than 440 grams.	11.00	Each	72.95	802.45
12.23	Supply, Installation, Testing and Commissioning of soil, waste, rain water and vent pipe mineral filled 3 layered (PP/PP mineral filled/PP) Polypropylene low noise pipes and fittings of min. density				

	1.9 gm/cm <sup>3</sup> , pipes of 40 mm – 200 mm including all fittings & accessories such as coupler, elbow, tee, Y, reducer, access door, end cap, cowls, etc. for soil, waste and vent purpose in floors, ceiling suspended, or on walls, with leak proof joints etc. Joining pipes & fittings with rubber sealing rings as per approved manufacturer recommendation. Wall chasing, holes, supporting, clamping, covering back with chicken mesh & plaster and making the wall good as per approved shop drawing. Sound level of less than 19 to 22 dB(A) at flow rate of 4 L/s according to DIN 4109. Should have D-s2, d0 fire classification as per EN 13501 or B2 as per DIN 4102, short term hot water resistance upto 95°C and long term upto 90°C, chemical resistance of pH 2 to pH12 - Should have IAPMO and Green certification.				
12.23.1	110 mm OD	404.00	Metre	474.00	1,91,496.00
12.24	Supply, Installation, Testing and Commissioning of soil, waste, rain water and vent pipe mineral filled 3 layered (PP/PP mineral filled/PP) Polypropylene low noise pipes and fittings of min. density 1.9 gm/cm <sup>3</sup> , pipes of 40 mm – 200 mm including all fittings & accessories such as coupler, elbow, tee, Y, reducer, access door, end cap, cowls, etc. for soil, waste and vent purpose in floors, ceiling suspended, or on walls, with leak proof joints etc. Joining pipes & fittings with rubber sealing rings as per approved manufacturer recommendation. Wall chasing, holes, supporting, clamping, covering back with chicken mesh & plaster and making the wall good as per approved shop drawing. Sound level of less than 19 to 22 dB(A) at flow rate of 4 L/s according to DIN 4109. Should have D-s2, d0 fire classification as per EN 13501 or B2 as per DIN 4102, short term hot water resistance upto 95°C and long term upto 90°C, chemical resistance of pH 2 to pH12 - Should have IAPMO and Green certification.				
12.24.1	40 mm OD	128.00	Metre	123.00	15,744.00
12.24.2	50 mm OD	85.00	Metre	152.00	12,920.00
12.25	Providing and fixing 100 mm dia PP inlet fitting/ Extension Piece with 2 or 3 inlets of 32 to 50 mmdia, fixed to uPVC trap with Sealent and set in cement concrete as per drawing complete.	52.00	Each	311.00	16,172.00

12.26	Providing and fixing PP trap of self cleansing design with grating with or without vent arm complete, including cost of cutting and making good the walls and floors :	45.00	Each	1505.00	67,725.00
12.27	Providing and fixing in position 110x63 mm dia PP floor Drain including fix to floor with cement mortar.	24.00	Each	713.00	17,112.00
12.28	Providing and fixing in position 110 mm dia Clean out plug complete in all respects	44.00	Each	88.00	3,872.00
12.29	Providing and fixing in position 110 mm dia Vent Cowl complete in all respects				
12.29.1	110 mm OD	17.00	Each	90.00	1,530.00
	<b>SUBHEAD 12 TOTAL</b>				<b>45,00,999.45</b>
<b>13</b>	<b>Water Supply System</b>				
13.1	Providing and fixing C.P. brass bib cock (Model no. K-16093IN-4-CP of Kohler, Model no. KUP-CHR-35037PM of Jaquar or equivalent model no. of Roca) of approved quality conforming to IS:8931 :				
13.1.1	15 mm nominal bore	52.00	Each	1896.30	98,607.60
13.2	Providing and fixing C.P. brass long body bib cock (Kohler, Jaquar or Roca) of approved quality conforming to IS standards and weighing not less than 690 gms.				
13.2.1	15 mm nominal bore	7.00	Each	4315.45	30,208.15
13.3	Providing and fixing C.P. brass angle valve (Model no. K-25431IN-4-CP of Kohler, Model no. OPP-15053PM of Jaquar or equivalent model no. of Roca) for basin mixer and geyser points of approved quality conforming to IS:8931				
13.3.1	15 mm nominal bore	156.00	Each	1030.35	1,60,734.60
13.4	Providing and fixing C.P. Brass extension nipple (size 15mmx50mm) of approved make and quality as per direction of Engineer-in-charge.	215.00	Each	68.75	14,781.25
13.5	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				
13.5.1	15 mm outer dia pipe	246.00	Metre	656.35	1,61,462.10



13.5.2	22 mm outer dia pipe	309.00	Metre	945.40	2,92,128.60
13.5.3	28 mm outer dia pipe	112.00	Metre	1167.70	1,30,782.40
13.6	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				
13.6.1	15 mm outer dia pipe	466.00	Metre	871.80	4,06,258.80
13.6.2	22 mm outer dia pipe	137.00	Metre	1160.85	1,59,036.45
13.7	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. Coupling/Socket				
13.7.1	For 15 mm outer dia pipe	233.00	Each	307.30	71,600.90
13.7.2	For 22 mm outer dia pipe	65.00	Each	384.10	24,966.50
13.7.3	For 28 mm outer dia pipe	92.00	Each	448.15	41,229.80
13.8	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. Reducer				
13.8.1	For 22mm x 15 mm outer dia pipe	145.00	Each	364.90	52,910.50
13.8.2	For 28 mm x 15 mm outer dia pipe	59.00	Each	441.75	26,063.25
13.8.3	For 28 mm x 22 mm outer dia pipe	36.00	Each	537.75	19,359.00
13.9	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. Sleeve/Slip Coupling/ Socket				
13.9.1	For 15 mm outer dia pipe	2.00	Each	537.75	1,075.50

13.9.2	For 22 mm outer dia pipe	2.00	Each	640.20	1,280.40
13.9.3	For 28 mm outer dia pipe	2.00	Each	742.60	1,485.20
13.10	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.				
	Elbow 90°				
13.10.1	For 15 mm outer dia pipe	963.00	Each	435.35	4,19,242.05
13.10.2	For 22 mm outer dia pipe	533.00	Each	614.60	3,27,581.80
13.10.3	For 28 mm outer dia pipe	120.00	Each	819.45	98,334.00
13.11	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				
13.11.1	For 15 mm outer dia pipe	192.00	Each	717.00	1,37,664.00
13.11.2	For 22 mm outer dia pipe	71.00	Each	838.65	59,544.15
13.12	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				
13.12.1	For 22mm x 15 mm outer dia pipe	286.00	Each	819.45	2,34,362.70
13.12.2	For 28 mm x 15 mm outer dia pipe	115.00	Each	1017.90	1,17,058.50
13.12.3	For 28 mm x 22 mm outer dia pipe	70.00	Each	1024.30	71,701.00
13.13	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.				
	Male Thread Connector/ Adapter				
13.13.1	For 15 mm outer dia x 1/2" nominal dia threaded	535.00	Each	576.15	3,08,240.25
13.13.2	For 22mm outer dia x 1/2" nominal dia threaded	198.00	Each	685.00	1,35,630.00
13.13.3	For 22mm outer dia x 3/4" nominal dia threaded	53.00	Each	723.40	38,340.20

13.13.4	For 28 mm outer dia x 1" nominal dia threaded	31.00	Each	947.45	29,370.95
13.14	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.				
	Female Threaded Elbow 90°				
13.14.1	For 15 mm outer dia x 1/2" nominal dia threaded	722.00	Each	915.45	6,60,954.90
13.15	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.				
	Cap				
13.15.1	For 15 mm outer dia pipe	2.00	Each	454.55	909.10
13.15.2	For 22 mm outer dia pipe	2.00	Each	588.95	1,177.90
13.15.3	For 28 mm outer dia pipe	2.00	Each	736.20	1,472.40
13.16	Providing and fixing required Stainless Steel Fitting of press fit design of grade 316L as per IS 6911:2017 and conforming to EN-10317 standards with V-profile and with O-ring sealing gasket of EPDM material of required dia as per direction of Engineer-in-charge.				
	Pipe Bridge				
13.16.1	For 15 mm outer dia pipe	157.00	Each	588.95	92,465.15
13.17	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.				
	Male Union				
13.17.1	For 22mm outer dia x 1/2" nominal dia threaded	99.00	Each	1280.35	1,26,754.65
13.17.2	For 22mm outer dia x 3/4" nominal dia threaded	54.00	Each	1466.05	79,166.70
13.17.3	For 28mm outer dia X 1" nominal dia threaded	36.00	Each	2586.35	93,108.60
13.18	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				
13.18.1	20 mm dia nominal bore	30.00	Metre	534.45	16,033.50

13.18.2	25 mm dia nominal bore	45.00	Metre	685.70	30,856.50
13.18.3	32 mm dia nominal bore	50.00	Metre	835.20	41,760.00
13.18.4	40 mm dia nominal bore	45.00	Metre	1000.45	45,020.25
13.18.5	50 mm dia nominal bore	150.00	Metre	1277.65	1,91,647.50
13.18.6	65 mm dia nominal bore	85.00	Metre	1361.95	1,15,765.75
13.18.7	80 mm dia nominal bore	100.00	Metre	1631.90	1,63,190.00
13.19	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 cement concrete slab 1:2:4 mix (1 cement : 2 coarse sand : 4 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) 12mm thick, finished with a floating coat of neat cement complete as per standard design :				
13.19.1	With common burnt clay F.P.S.(non modular) bricks of class designation 7.5	6.00	Each	2332.35	13,994.10
13.20	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 100 mm top diameter, 160 mm bottom diameter and 180 mm deep (inside) with chained lid and RCC top slab 1:2:4 mix (1 cement : 2 coarse sand : 4 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 :				
13.20.1	With common burnt clay F.P.S.(non modular) bricks of class designation 7.5	4.00	Each	13604.05	54,416.20
13.21	Painting G.I. pipes and fittings with synthetic enamel white paint with two coats over a ready mixed priming coat, both of approved quality for new work :				
13.21.1	20 mm dia nominal bore	30.00	Metre	24.60	738.00
13.21.2	25 mm dia nominal bore	45.00	Metre	32.00	1,440.00
13.21.3	32 mm dia nominal bore	50.00	Metre	38.45	1,922.50
13.21.4	40 mm dia nominal bore	45.00	Metre	45.10	2,029.50
13.21.5	50 mm dia nominal bore	150.00	Metre	53.95	8,092.50

13.21.6	65 mm dia. nominal bore	85.00	Metre	77.00	6,545.00
13.21.7	80 mm dia. nominal bore	100.00	Metre	91.00	9,100.00
13.22	Providing and fixing G.I. Union in G.I. pipe including cutting and threading the pipe and making long screws etc. complete (New work) :				
13.22.1	20 mm dia nominal bore	2.00	Each	865.20	1,730.40
13.22.2	25 mm dia nominal bore	4.00	Each	948.40	3,793.60
13.22.3	32 mm dia nominal bore	4.00	Each	993.20	3,972.80
13.22.4	40 mm dia nominal bore	4.00	Each	1121.25	4,485.00
13.22.5	50 mm dia nominal bore	6.00	Each	1495.30	8,971.80
13.22.6	65 mm dia. nominal bore	2.00	Each	1776.95	3,553.90
13.22.7	80 mm dia. nominal bore	4.00	Each	1841.00	7,364.00
13.23	Cutting holes up to 15x15 cm in R.C.C. floors and roofs for passing drain pipe etc. and repairing the hole after insertion of drain pipe etc. with cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size), including finishing complete so as to make it leak proof.	104.00	Each	467.80	48,651.20
13.24	Making epoxy coating in all the core cuttings , including finishing complete so as to make it leak proof.	104.00	Each	146.00	15,184.00
13.25	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				
13.25.1	65 mm dia	1.00	Each	4656.00	4,656.00
13.25.2	80 mm dia	4.00	Each	5450.00	21,800.00
13.26	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 :				
13.26.1	80 mm dia	3.00	Each	8205.00	24,615.00
13.27	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.				
13.27.1	15 mm nominal bore	14.00	Each	402.00	5,628.00
13.27.2	20 mm nominal bore	76.00	Each	537.00	40,812.00
13.27.3	25 mm nominal bore	20.00	Each	828.00	16,560.00
13.27.4	32 mm nominal bore	17.00	Each	1315.00	22,355.00

13.27.5	40 mm nominal bore	19.00	Each	1981.00	37,639.00
13.27.6	50 mm nominal bore	4.00	Each	2816.00	11,264.00
13.28	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.				
13.28.1	For 20 mm dia Pipe 6 mm thick (Concealed Pipes)	545.00	Metre	65.00	35,425.00
13.29	Providing and fixing forged brass single acting air release valve with screwed inlet 25 mm dia.	6.00	Each	973.00	5,838.00
13.30	Providing and fixing of Single phase electrical actuator operated wafer type rubber lined butterfly valve with by pass arrangement as per drawing attached including level controller, 3 nos. normal butter fly valves,necessary control and Power cables (Maximum 10 M. Length of each type) and control panel installed on OH tank filling line near the tanks complete in all respects.				
13.30.1	32 mm dia.	2.00	Each	22266.00	44,532.00
13.31	Providing and fixing threaded end brass digital water meter complete in all respect.				
13.31.1	40 mm dia.	2.00	Each	11204.00	22,408.00
13.32	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 recommondation etc. complete including necessary earth excavation for trenching & refilling. (For Irrigation System.)				
13.32.1	25 mm OD	12.00	Metre	235.00	2,820.00
13.32.2	32 mm OD	10.00	Metre	270.00	2,700.00
13.32.3	40 mm OD	355.00	Metre	336.00	1,19,280.00
	<b>SUBHEAD 13 TOTAL</b>				<b>59,45,640.00</b>
<b>14</b>	<b>Drainage</b>				
14.1	Providing and laying cement concrete 1:5:10 (1 cement : 5 coarse sand : 10 graded stone aggregate 40mm nominal size) all round S.W. pipes including bed concrete as per standard design.				
14.1.1	150 mm diameter	10.00	Metre	1635.45	16,354.50
14.1.2	250 mm diameter	225.00	Metre	2204.70	4,96,057.50

14.2	Providing and laying cement concrete 1:5:10 (1 cement : 5 coarse sand : 10 graded stone aggregate 40mm nominal size) up to haunches of S.W/RCC pipes including bed concrete as per standard design.				
14.2.1	250 mm diameter	275.00	Metre	1409.60	3,87,640.00
14.2.2	300 mm diameter	60.00	Metre	1626.45	97,587.00
14.3	Providing and fixing square-mouth S.W. gully trap class SP-1 complete with C.I. grating brick masonry chamber with water tight C.I. cover with frame of 300 x300 mm size (inside) the weight of cover to be not less than 4.50 kg and frame to be not less than 2.70 kg as per standard design :				
14.3.1	180x150 mm size P type				
14.3.2	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	2.00	Each	2821.75	5,643.50
14.4	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 cement : 2 fine sand) including testing of joints etc. complete :				
14.4.1	250 mm dia. R.C.C. pipe	275.00	Metre	1212.65	3,33,478.75
14.4.2	300 mm dia. R.C.C. pipe	60.00	Metre	1208.80	72,528.00
14.5	Constructing brick masonry manhole in cement mortar 1:4 (1 cement : 4 coarse sand ) with R.C.C. top slab with 1:2:4 mix (1 cement : 2 coarse sand : 4 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 :				
14.5.1	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) :				
14.5.1.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	2.00	Each	15600.50	31,201.00
14.6	Extra for depth for manholes :				
14.6.1	Size 90x80 cm				
14.6.1.1	With Sewer bricks conforming to IS : 4885	1.00	Metre	8916.80	8,916.80

14.7	Inside size 120x90 cm and 90 cm deep including C.I. cover with frame (heavy duty) 560 mm internal diameter, total weight of cover and frame to be not less than 208 kg (weight of cover 108 kg and weight of frame 100 kg) :				
14.7.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	14.00	Each	35965.75	5,03,520.50
14.8	Extra depth for Manholes:				
14.8.1	Size 120x90 cm				
14.8.1.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	5.00	Metre	14986.00	74,930.00
14.9	Providing orange colour safety foot rest of minimum 6 mm thick plastic encapsulated as per IS : 10910 on 12mm dia steel bar conforming to IS : 1786 having minimum cross section as 23 mmx25mm and over all minimum length 263 mm and width as 165mm 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.	62.00	Each	565.35	35,051.70
14.10	Constructing bricks 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 :				
14.10.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	26.00	Each	7182.25	1,86,738.50
14.11	Extra for depth beyond 45 cm of brick masonry chamber				
14.11.1	For 455x610 mm size				
14.11.1.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	2.00	Metre	8712.45	17,424.90
14.12	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.				
14.12.1	160 mm OD	10.00	Metre	543.00	5,430.00



14.12.2	200 mm OD	10.00	Metre	802.00	8,020.00
14.12.3	250 mm OD	225.00	Metre	1276.00	2,87,100.00
	<b>SUBHEAD 14 TOTAL</b>				<b>25,67,622.65</b>
<b>15</b>	<b>Pile work ( Shoring )</b>				
15.1	Boring, providing and installation of bored cast-in-situ reinforced cement concrete touch/shoring piles of grade M-25 (or more as per design) of specified diameter and length below runner/tie beam, to carry a safe lateral load not less than specified, excluding the cost of steel reinforcement but including the cost of boring with bentonite solution and temporary casing of appropriate length (not less than 5m - 6 m) for setting out and removal of same and the length of pile to be embedded in the runner/tie beam etc. by Crawler mounted, telescopic boom hydraulic piling Rig all complete, including removal of excavated earth and mud with all its lifts and leads i/c disposing to nearest Muncipal dumping ground (Length of pile for payment shall be measured up to bottom of runner/tie beam) as per CPWD specifications and as per the directions of Engineer-In-Charge.	6353.00	Metre	6244.60	3,96,71,944.00
15.1.1	750 mm dia piles				
15.2	Add for using extra cement in the items of design mix over and above the specified cement content therein.	1964.00	Quintal	744.05	14,61,314.20
	<b>SUBHEAD 15 TOTAL</b>				<b>4,11,33,258.20</b>
<b>16</b>	<b>WATER PROOFING</b>				
16.1	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				
16.1.1	Serrated with central bulb (225 mm wide, 8-11 mm thick)	200.00	Meter	265.55	53,110.00
16.2	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 (GRACE, SIKA, SOPREMA) made from best quality Portland cement, properly selected & graded aggregates additives & acrylic emulsion polymer as a binder. The product consumption shall be at least @ 2kg/sqm.	215.00	Sqm	635.80	1,36,697.00

	<p>The coating system must have the following characteristics: i) Powder to Liquid Ratio 2:1, ii) Bond Strength with concrete &gt; 2 Mpa, iii) Elongation &gt; 200% 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.</p>				
16.3	<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 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.</p>	32659.00	Kg	314.30	1,02,64,723.70
16.4	<p>Supplying &amp; installing minimum 4.5mm thick, pre applied, flexible, fully bonded sheet membrane of approved brand (Colphene BSW Unilay HP of SOPREMA / Proofex Engage of FOSROC / Sikaproof A+ 12 of SIKA) before casting of the base RCC slab (below Raft/Footing/Foundation of Retaining wall etc.). Fully bonded sheet membrane can be installed on wet/damp PCC free from ponded water. Fully bonded sheet membrane shall be chemically resistant in all types of soil or water shall be</p>	4081.00	sqm	2018.10	82,35,866.00

	<p>unaffected by ground settlement beneath slabs. The fully bonded sheet membrane shall consist of a multi-layer composite film which consists of high performance SBS and polyester reinforcement and a trafficable weather resistant carbon crystals layer. The fully bonded sheet waterproofing membrane shall have following typical properties: 1) Peel Adhesion to Concrete &gt;3500 N/M (per ASTM D 903) ; 2) Tear Strength MD &gt;600 N (as per ASTM D 5147); 3) Resistance to Hydrostatic Head &gt; 110M (as per ASTM D 5385); 4) Lateral Water Migration Resistance &gt; 110M (as per ASTM D 5385); 5) Puncture Resistance &gt; 1650 N (as per ASTM E 154). Fully bonded sheet membrane shall have 120mm duo selvedge, one self-adhesive &amp; other using heat gun. Fully bonded sheet membrane shall be laid over the entire area and returned on to a vertical slab formwork. Membrane should be supplied with original manufacturer's Material Test Certificate (MTC) &amp; CE marking. Third party test report from NABL accredited approved laboratory 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.</p>				
16.5	<p>Supplying and installing post applied SBS based self-adhesive waterproofing membrane having minimum thickness of 1.5 mm of approved brand (SIKA, Grace, Soprema or equivalent) 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. The self-adhesive membrane shall have following minimum properties: (i)Tensile strength (ASTM D</p>	3488.00	sqm	1203.20	41,96,761.60

	<p>412) : &gt; 5 N/mm<sup>2</sup> , (ii) Resistance to Hydrostatic Head (ASTM D 5385) : &gt; 70 m, (iii) Tear Resistance (ASTM D 624) : &gt; 30 N/mm<sup>2</sup> , (iv) Puncture Resistance (ASTM E 154) : &gt; 350 N/mm<sup>2</sup>, (v) Lap adhesion (ASTM D 1876) : &gt; 2000 N/mm.</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.</p>				
16.6	<p><b>Water proofing on terrace with insulation work consisting of following:</b><b>A(Surface Preparation):</b> Mechanically grinding of substrate so as to achieve surface free of dust, loose particles.All cracks to be treated by cutting a groove and sealing cracks with Polymer modified cement mortar. Making coving with 1:3 cement mortar modified with 10% SBR polymer. Providing and laying reinforcing mesh on all horizontal and vertical members of termination points and cracks.<b>B) (Waterproofing Membrane) :</b> Supplying and installing spray/ roller applied a high performance, low odour, one-part, fast curing, high solids, cold applied polyurethane elastomer waterproof membrane over uniform surface. The material shall be pure polyurethane with DFT of 1.5mm and consumption of 2.2 - 2.4 Kg/Sqm. It should not contain bitumen or tar and should not bleed or stain and should have following minimum properties:i) Solid % Vol: &gt; 85ii) Tensile Strength &gt; 2 Mpa iii) Elongation &gt; 500%iv) Tear Strength &gt; 12 N/mmshall be applied as per manufacturer specification.<b>C) SPRAY APPLIED INSULATION (PUF ) :</b> Providing &amp; supplying instant setting spray applied two component Rigid Polyurethane</p>	862.00	Sqm	4337.40	37,38,839.00

	<p>Foam Insulation avg 50mm thick on the terrace having density 45-50 kg/m<sup>3</sup>, Thermal conductivity 0.020-0.030 W/mK, closed cell content of &gt;90%, Fire resistance conforming to Class - B2 to be applied as per the manufacturer's recommendations applied over the RCC slab and on the vertical surfaces on the parapet walls upto 300mm above FFL, etc. complete. D) <b>PU Sealer coat over PUF</b> : Supplying and installing spray/ roller applied a high performance, low odour, one-part, fast curing, high solids, cold applied polyurethane elastomer waterproof membrane over uniform surface. The material shall be pure polyurethane with consumption of 1.5 Kg/Sqm. It should not contain bitumen or tar and should not bleed or stain and should have following minimum properties:i) Solid % Vol: &gt; 85ii) Tensile Strength &gt; 2 Mpa iii) Elongation &gt; 500%iv) Tear Strength &gt; 12 N/mm shall be applied as per manufacturer specification. E) <b>Protection Geotextile Membrane</b> : Providing and laying geotextile membrane of 200 GSM as a separation layer. Geotextile membrane shall be overlapped by 50mm and spot bonded. F) <b>Protection screed</b> : Providing &amp; laying avg 100mm protective screed of M20 grade with slope 1:100 containing 100% virgin polypropylene fibers @ 0.9 Kg per Cum with a broom finish, well compacted, curing for 7 days etc. complete. The screed shall be laid in panels with 10mm wide construction joint and filling the panel joints with PU Sealant.</p>				
16.7	<p>Providing and installing the waterproofing treatment over the slab (having earth filling). It includes the following components and stages. 1.Surface Preparation: it involves mechanically grinding of substrate so as to achieve a flat and smooth surface free of dust, loose particles. All cracks shall be treated by cutting a groove and sealing cracks with Polymer modified cement mortar. It also includes additionally applying a coat of PU membrane followed by bonding a reinforcement mesh to the substrate with PU membrane. Coving shall be made with 1:3 cement mortar modified with 10% SBR polymer. Reinforcing mesh on all horizontal and vertical members of termination points and cracks shall be provided and applied. Such geotextile shall be adhered to substrate with waterproofing</p>	2741.00	Sqm	4427.05	1,21,34,544.00

	<p>membrane.</p> <p>2. Supplying and installation of waterproofing membrane: It involves supplying and installing spray applied two component, 100% solids, instant setting polyurea waterproofing membrane (GRACE / SOPREMA / SIKA) suitable for waterproofing over suitable primer to entire surface. The material shall be applied with DFT of 1.5mm and consumption of 1.6 Kg/Sqm. It should not contain bitumen or tar and should not bleed or stain and should have following minimum properties: i) Solid % Vol: &gt; 100; ii) Tensile Strength &gt;12 Mpa; iii) Elongation &gt; 500 %; iv) Tear Strength &gt; 50 N/mm.</p> <p>3. Laying of Protection Geotextile Membrane: It includes providing and laying geotextile membrane (of make DELTA / TEXSA / SOPREMA) of 200 GSM as a separation layer. Geotextile membrane shall be overlapped by 50mm and spot bonded.</p> <p>4. Providing &amp; Laying of Protection screed: It includes providing and laying protective screed of M20 grade with slope 1:100 with a broom finish, well compacted, including curing etc. complete.</p> <p>5. Dimple board with geotextile for Landscape area: It includes providing and installation of Rolled Matrix Soil Filter cum surface drainage System as per manufacturers specifications. Polypropylene geotextile laminated dimpled board having minimum 10mm thickness, of compressive strength not less than 400kN/m<sup>2</sup> shall be used. This geotextile fabric composite allows passage of moisture through fabric while preventing fine soil from entering to drainage channel bonded to a high strength polypropylene geotextile fabric. This geotextile fabric composite allows passage of moisture through fabric while preventing fine soil from entering to drainage channel.</p>				
16.8	<p>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 &amp; 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</p>				

	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.				
16.8.1	For vertical surface two coats @ 0.70 kg per sqm per coat.	117.00	Sqm	433.00	50,661.00
16.8.1	For horizontal surface one coat @1.10 kg per sqm.	34.00	Sqm	331.00	11,254.00
	<b>SUBHEAD 16 TOTAL</b>				<b>3,88,22,456.30</b>
<b>17</b>	<b>Rain Water Harvesting System</b>				
17.1	Providing orange colour safety foot rest of minimum 6 mm thick plastic encapsulated as per IS : 10910 on 12mm dia steel bar conforming to IS : 1786 having minimum cross section as 23 mmx25mm and over all minimum length 263 mm and width as 165mm 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.	42.00	Each	565.35	23,744.70
17.2	Providing and fixing in position precast RCC manhole cover and frame of required shape and approved quality.				
17.2.1	HD-20				
17.2.1.1	circular shape 560 mm internal diameter.	4.00	Each	1503.45	6,013.80
17.3	Boring/drilling bore well of required dia for casing/ strainer pipe, by suitable method prescribed in IS: 2800 (part I), including collecting samples from different strata, preparing and submitting strata chart/bore log, including hire & running charges of all equipments, tools, plants & machineries required for the job, all complete as per direction of Engineer –in-charge, upto 90				

	metre depth below ground level.				
17.3.1	All types of soil				
17.3.1.1	400 mm dia.	60.00	Metre	902.95	54,177.00
17.4	Supplying, assembling, lowering and fixing in vertical position in bore well, unplasticized PVC medium well casing (CM) pipe of required dia, conforming to IS: 12818, including required hire and labour charges, fittings & accessories etc. all complete, for all depths, as per direction of Engineer –in-charge.				
17.4.1	200 mm nominal size dia.	50.00	Metre	1003.30	50,165.00
17.5	Supplying, assembling, lowering and fixing in vertical position in bore well unplasticized PVC medium well screen (RMS) pipes with ribs, conforming to IS: 12818, including hire & labour charges, fittings & accessories etc. all complete, for all depths, as per direction of Engineer-in-charge.				
17.5.1	200 mm nominal size dia.	55.00	Metre	1131.45	62,229.75
17.6	Supplying, filling, spreading & levelling stone boulders of size range 5 cm to 20 cm, in recharge pit, in the required thickness, for all leads & lifts, all complete as per direction of Engineer-in-charge.	7.00	Cum	1390.85	9,735.95
17.7	Supplying, filling, spreading & levelling gravels of size range 5 mm to 10 mm, in the recharge pit, over the existing layer of boulders, in required thickness, for all leads & lifts, all complete as per direction of Engineer-in-charge.	7.00	Cum	1416.45	9,915.15
17.8	Supplying, filling, spreading & levelling coarse sand of size range 1.5 mm to 2 mm in recharge pit, in required thickness over gravel layer, for all leads & lifts, all complete as per direction of Engineer –in-charge.	7.00	Cum	1416.45	9,915.15
17.9	Gravel packing in tubewell construction in accordance with IS: 4097, including providing gravel fine/ medium/ coarse, in required grading & sizes as per actual requirement, all complete as per direction of Engineer-in-charge.	6.00	Cum	1533.90	9,203.40
17.10	Development of tube well in accordance with IS : 2800 (part I) and IS: 11189, to establish maximum rate of usable water yield without sand content (beyond permissible limit), with required capacity air compressor, running the compressor for required time till well is fully developed,	50.00	Hours	1000.70	50,035.00



	measuring yield of well by "V" notch method or any other approved method, measuring static level & draw down etc. by step draw down method, collecting water samples & getting tested in approved laboratory, i/c disinfection of tubewell, all complete, including hire & labour charges of air compressor, tools & accessories etc., all as per requirement and direction of Engineer-in-charge.				
17.11	Providing and fixing suitable size threaded mild steel cap or spot welded plate to the top of bore well housing/ casing pipe, removable as per requirement, all complete for borewell of:				
17.11.1	200 mm dia	1.00	Each	309.20	309.20
17.12	Providing and fixing M.S. clamp of required dia to the top of casing/ housing pipe of tubewell as per IS: 2800 (part I), including necessary bolts & nuts of required size complete.				
17.12.1	200 mm clamp.	1.00	Each	2197.35	2,197.35
	<b>SUBHEAD 17 TOTAL</b>				<b>2,87,641.45</b>
<b>18</b>	<b>STRUCTURAL GLAZING</b>				
18.1	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.	1539.00	Kg	495.75	7,62,959.25

18.2	<p>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:</p> <p>(a) Structural analysis &amp; 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 &amp; drainage and protection against fire hazard including:</p> <p>(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 Dimensional 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 separator to prevent bimetallic contacts with nuts and washers etc. of stainless steel grade 316, of the required capacity and in required numbers.</p> <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</p>	220.00	Sqm	3672.90	8,08,038.00
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	<p>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 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> <p>Note:- 1. 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>Note:-2. 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. Performance Testing of Structural glazing system Tests to be conducted in the NABL accredited lab or any other accreditation body which operates in accordance with</p>				
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	<p>ISO/ IEC 17011 and accredits labs as per ISO/IEC 17025</p> <ol style="list-style-type: none"> <li>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</li> <li>2. Static Water Penetration Test. (50pa to 1500pa) as per ASTM E- 331-09 testing method for a range up to 2000 ml.</li> <li>3. Dynamic Water Penetration (50pa to 1500pa) as per AAMA 501.01- 05 testing method for a range upto 2000 ml</li> <li>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</li> <li>5. Seismic Movement Test (upto 30 mm) as per AAMA 501.4-09 testing method for Qualitative test, Tests to be conducted on site.</li> <li>6. Onsite Test for Water Leakage for a pressure range 50 kpa to 240 kpa (35psi) upto 2000 ml</li> </ol>				
18.3	<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</p>	201.00	Sqm	5233.00	10,51,833.00

	make having properties as visible Light transmittance (VLT) of 45 to 50 %, Light reflection internal 15 to 20%, light reflection external 10 to 20%, shading coefficient (0.25- 0.28) and U value of 1.6 to 2.0 W/ m2 degree K etc. The properties of performance glass shall be decided by technical sanctioning authority as per the site requirement.				
18.4	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.	22.00	Sqm	4216.45	92,761.90
18.5	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.	19.00	Sqm	2046.70	38,887.30
18.6	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	19.00	Sqm	3491.25	66,333.75

	excluding the area of grooves 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/m2 K etc. . The properties of performance glass shall be decided by technical sanctioning authority as per the site requirement.				
	<b>SUBHEAD 18 TOTAL</b>				<b>28,20,813.20</b>
<b>19</b>	<b>HORTICULTURE</b>				
19.1	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).	254.00	Cum	789.35	2,00,494.90
19.2	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) :				
19.2.1	Screened through sieve of I.S. designation 20 mm	15.00	Cum	379.50	5,692.50
19.2.2	Screened through sieve of I.S. designation 16 mm	15.00	Cum	446.65	6,699.75
19.2.3	Screened through sieve of I.S. designation 4.75 mm	15.00	Cum	473.75	7,106.25
19.3	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).	20.00	Cum	74.95	1,499.00
19.4	Mixing earth and sludge or manure in the required proportion specified or directed by the Officer-in-charge	25.00	Cum	52.35	1,308.75
19.5	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)				

19.5.1	Holes 60 cm dia, and 60 cm deep	100.00	Each	67.60	6,760.00
19.5.1	Holes 45 cm dia, and 45 cm deep	120.00	Each	28.75	3,450.00
19.6	Providing & laying 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	800.00	Per Sqm	131.00	1,04,800.00
19.7	Plantation of Trees, Shrubs, and Hedge at site i/c watering and removal of unserveiceable material's as per direction of officer in charge (excluding cast of plant & water)				
19.7.1	Trees Plant	170.00	Each	10.45	1,776.50
19.7.2	Shrubs Plant	1000.00	Each	5.25	5,250.00
19.7.3	Hedge Plant	1000.00	Each	3.50	3,500.00
19.8	Providing 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 as per direction of the officer-incharge.	20.00	Each	1778.30	35,566.00
19.9	Providing and stacking of Bottle palm of ht. 210-240 cm bottom girth 30-35 cm well developed in big HDPE bags.	10.00	Each	711.30	7,113.00
19.10	Providing and stacking of Cassia fistula (Amaltash) of height 120-135 cm. in big poly bags of size 25 cm as per direction of the officer-in-charge.	10.00	Each	135.15	1,351.50
19.11	Providing and stacking of Delonix regia (Gulmohar) of height 150-165 cm. in big poly bags of size 25 cm as per direction of the officer-in-charge.	10.00	Each	128.05	1,280.50
19.12	Providing and stacking of Ficus benjamina (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.	10.00	Each	355.65	3,556.50
19.13	Providing and stacking of Grevillea robusta (Silver Oak) of height 150-165 cm. in big poly bags of size 25 cm as per direction of the officer-in-charge.	10.00	Each	113.80	1,138.00
19.14	Providing and stacking of Michelia champa (Golden Champa) of height 90- 105 cm. in earthen pots of size 25 cm as per direction of the officer-in-charge.	5.00	Each	213.40	1,067.00
19.15	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.	150.00	Each	71.15	10,672.50

19.16	Providing and stacking Vernonia elaeagnifolia (curtain creeper) plant of height 30 cm to 45 cm. in 20 cm size of Earthen pots / Plastic pots & as per direction of the officer-in-charge.	150.00	Each	64.00	9,600.00
	<b>SUBHEAD 19 TOTAL</b>				<b>4,19,682.65</b>
<b>20</b>	<b>FURNITURE</b>				
20.1	Providing & Placing Office Table with side unit, having overall size of 2800mm(L1) x 2400mm(L2) x 1000mm(D1) x 600-650mm(D2) x 740-760mm(H). It shall have top made of 60-70mm thick E1 grade MDF (Environmentally Friendly) with 0.4mm thick Veneer Finish, With Key board tray & Leatherite pad on the main table. Size of leatherite shall be 900-1200 (W)x 460-560(D) mm with edge banding. The closed wiring tray shall be made of steel sheet of thickness 1.2 mm with Epoxy powder coated, baked at temperature 200° C. Below the access flap/ axial box ( 2-3 nos socket/Switch), Top supported on one side suspended combo storage & One side Three drawer unit of size 560(W)x 670(D)x 680(H) mm with dummy box which is fixed with modesty panel. Drawer & Modesty are made of 19mm thick E1 grade MDF Board (Environmental Friendly) with 0.4mm thick Veneer Finish, Drawer unit & side combo storage connecting with 19mm thick MDF modesty panel with matching finish cover Edge banding (PVC) E1 grade Veneer MDF for better in-house quality. Side Combo Storage: Body of storages shall be made out of 19 mm thick (E1 Grade) MDF board with 0.4 mm veneer with PVC edge banding. Side Combo Storage is combination of 2nos swing shutter & Open space, E1 grade MDF for better in-house quality. The storage should have extruded aluminum handle. Storages should be provided with adjustable levelers. Door Lock should be of three-way lock mechanism. The hinged doors can be locked at once. Door should be provided with Hinge-damping mechanism to enable soft closing of doors. Product should be BIFMA gold rated SCSglobal certified for in-house air quality and with 05 years warranty and complete as per the approved sample and as per the direction of Engineer-In-Charge.	3.00	Each	250655.00	7,51,965.00
20.2	Providing, supplying and placing an open display book case of size 1000(L) x 450(D)	18.00	Each	38642.00	6,95,556.00



	<p>x 2100(H) mm. Body panels shall be made of 18 mm thick Melamine Chip Board. All the exposed edges are edge banded with 0.8 mm thick PVC edge banding. Door shall be made of 18 mm thick Melamine Chip Board with all the exposed edges are edge banded with 0.8 mm thick PVC edge banding. Side panel are made of 18 mm thick Melamine Chip Board with all the exposed edges are edge banded with 0.8 mm thick PVC edge banding and with imported H.D.F. foil wrapped decorative trim fixed on to it. Bookcase shall have two solid shutters on bottom &amp; two glass shutter on top. Drawer components are made of 18 mm thick Melamine Chip Board. All the exposed edges are edge banded with 0.8 mm thick PVC edge banding. Body back and drawer bottom are made of 9 mm thick Pre-laminated particle board. Top cornice is made of imported H.D.F. foil wrapped decorative Trim. Mirror used on the door 4 mm thick. The high quality hardware shall be used like Roller slides, Hinges, mini-fix, wooden dowels. Lock used for main door is 3 way lock and lock used for drawer is cam lock Construction: Knock Down construction. Product should be BIFMA gold rated SCSglobal certified for in-house air quality and with 05 years warranty and complete as per the approved sample and as per the direction of Engineer-In-Charge.</p>				
20.3	<p>Providing &amp; Placing office table with side unit having overall size 2650(L1) mm X 2250 (L2) mm X 740(H) mm, Main Table size as 2650(L) mm X 1050(D) mm X 740(H) mm and size of side Table as 1200(L) mm X 600(D)mm X 600(H)mm. Top is made of 48-52mm thick E1 grade MDF (Environmental Friendly) with 0.4mm thick Veneer Finish, with key board tray &amp; leatherite pad on the main table, size of leatherite is 900-1200(W)x 460-560(D)mm, with edge banding of E1 grade MDF for better in-house quality. This should comply with (EN 120-1992). The closed wiring tray is made of steel sheet thickness 1.2mm epoxy powder coated spray color, baked at temperature 200° C. Below the access flap/ axial box ( 2-3 nos socket/switch), top supported on one side combo storage &amp; One side three drawer unit of size 560(W)x 670(D)x 680(H) mm with dummy Box which is fixed with modesty panel. Drawer &amp; Modesty shall be made of 19mm thick E1 grade MDF Board (Environmental Friendly) with 0.4mm thick veneer finish,</p>	6.00	Each	147134.00	8,82,804.00

	<p>Drawer unit &amp; side combo storage connecting with 19mm thick MDF modesty panel with matching finish cover Edge banding (PVC). This should comply with (EN 120-1992). Body of side combo storages shall be made out 19 mm thick (E1 Grade) MDF board with 0.4 mm veneer with PVC edge-banding. Side Combo Storage is combination with 2nos openable shutters &amp; Open space. This should comply with (EN 120-1992). The storage should have extruded aluminum handle. Storages should be provided with adjustable levelers. Door Lock should be of three-way lock mechanism. Door should be provided with Hinge-damping mechanism to enable soft closing of doors. Product should be BIFMA gold rated SCSglobal certified for in-house air quality and with 05 years warranty and complete as per the approved sample and as per the direction of Engineer-In-Charge.</p>				
20.4	<p>Providing &amp; Placing office table with side unit having overall size 2100(L1) mm X 1950( L2) mm X 740(H) mm. Main Table size as 2100(L) mm X 900(D) mm X 740(H) mm and size of Side Table as 1050(L) mm X 600(D)mm X 600(H)mm . Top is made of 48-52mm thick E1 grade MDF (Environmental Friendly) with 0.4mm thick Veneer Finish, with key board tray &amp; leatherite pad on the main table, size of leatherite is 900-1200(W)x 460-560(D) mm, with edge banding of E1 grade MDF for better in-house quality. This should comply with (EN 120-1992). The closed wiring tray is made of steel sheet thickness 1.2mm epoxy powder coated spray color, baked at temperature 200° C. Below the access flap/ axial box ( 2-3 nos socket/switch), top supported on one side combo storage &amp; One side three drawer unit of size 560(W)x 670(D)x 680(H) mm with dummy Box which is fixed with modesty panel. Drawer &amp; Modesty shall be made of 19mm thick E1 grade MDF Board (Environmental Friendly) with 0.4mm thick veneer finish, Drawer unit &amp; side combo storage connecting with 19mm thick MDF modesty panel with matching finish cover Edge banding (PVC). This should comply with (EN 120-1992). Body of side combo storages shall be made out 19 mm thick (E1 Grade) MDF board with 0.4 mm veneer with PVC edge-banding. Side Combo Storage is combination with 2nos openable shutters &amp; Open space. This should comply with (EN 120-1992). The storage should</p>	6.00	Each	141009.00	8,46,054.00

	<p>have extruded aluminum handle. Storages should be provided with adjustable levelers. Door Lock should be of three-way lock mechanism. Door should be provided with Hinge-damping mechanism to enable soft closing of doors. Product should be BIFMA gold rated SCSglobal certified for in-house air quality and with 05 years warranty and complete as per the approved sample and as per the direction of Engineer-In-Charge.</p>				
20.5	<p>Providing, assembling &amp; placing of table with side unit of overall size 1950 (L1) mm x 1950(L2) mm, Main Table shall be of size of 1950(L) mm X 900(D) mm X 740 (H) mm and Side Table shall be of size 1050(L) mm X 450(D) mm X 740(H) mm. Table top and legs are made of 38 mm thick MDF (E-1 Grade), finishes with matched 2 mm PVC edge-banding. E1 grade laminate for better in-house quality. This should comply with (EN 120-1992). The modesty panel is made up of 18mm thick E-1 grade particle board wood (Environmental Friendly) cover of MDF with Edge-Banding (PVC) 2 mm. Also, legs are made of MDF Grade E-1 (Environmental Friendly) having thickness 38 mm. Drawer Unit : 3 drawer Metal pedestal of overall dimensions internal and external dimensions 380-430 mm (W) x 430-480 mm (D) x 600-620 mm ( H). Drawer body should be made of CRCA of thickness 0.7-0.8 mm duly powder coated with 60 micron (minimum). Each pedestal should be provided with pencil tray of 40-45 mm(H) x 110-120 mm (D) x 300-310 mm (W). Each pedestal should have 5 Nos castor fitted to it where in one castor will be fitted to lower most drawer to provide extra stability. Product should be BIFMA gold rated SCSglobal certified for in-house air quality and with 05 years warranty and complete as per the approved sample and as per the direction of Engineer-In-Charge.</p>	21.00	Each	104445.00	21,93,345.00
20.6	<p>Providing &amp; placing low height storage of size of 1200(L) mm x 450(D) mm &amp; 740(H) mm. Body of storages shall be made out 18 mm thick particle board (E-1 grade), melamine finishes, with 2 mm PVC edge-banding, E1 grade laminate for better in-house quality. This should comply with (EN 120-1992). Front of storages should be made out of 16 mm thick particle board (E-1 grade), melamine finish, with 2 mm pvc edge-banding fitted with extruded aluminum handle. Storages should be provided with adjustable levelers. Door</p>	21.00	Each	27911.00	5,86,131.00

	lock should be of three-way lock mechanism. Door should be provided with hinge-damping mechanism to enable soft closing of doors. Product should be BIFMA gold rated SCSglobal certified for in-house air quality and with 05 years warranty and complete as per the approved sample and as per the direction of Engineer-In-Charge.				
20.7	Providing and placing 16 seater conference table of overall size 6000(L) mm (w) x 2400(D) mm. Two seater module shall be of size 1350(L) mm x 600(D) mm, whose top and legs are made of 38mm, thick particle board (E-1 grade), melamine finishes, with matched 2 mm pvc edge-banding. E1 grade laminate with for better in-house quality. This should comply with (EN 120-1992). The modesty is made of E-1 grade particle board wood (environmental friendly) thickness 25 mm, cover with melamine edge-banding (PVC) 2 mm. Legs are made of E-1 grade particle board (environmental friendly) thickness 38 mm cover with melamine finish. Wiring tray shall be made from ms sheet 2.0 mm, flange structure epoxy powder 60 microns (minimum) coated spray color, baked at temperature 200° C with vertical wire uptake from floor via middle leg having removable cover one side and wire separator for data and wire separation, segregates to horizontal cable tray below wooden flipper. Product should be BIFMA gold rated SCSglobal certified for in-house air quality and with 05 years warranty and complete as per the approved sample and as per the direction of Engineer-In-Charge.	2.00	Each	197169.00	3,94,338.00
20.8	Providing and placing 3 Seater Conference Room Staff Table of overall size of 2400(L)mm x 600(D)mm, whose top and legs are made of 25mm thick Particle Board (E-1 Grade), E1 grade melamine impregnated laminate finishes, with matched 2 mm PVC edge-banding. This should comply with (EN 120-1992). The Modesty is Particle board wood of Grade E-1 (Environmental Friendly) thickness 25 mm, cover with Melamine Edge-Banding of (PVC) 2 mm. Also legs are made of Particle board of Grade E-1 (Environmental Friendly) having thickness of 38 mm cover with melamine finish. Wiring tray shall be made from 2.0mm thick MS sheet flange structure epoxy powder coating of 60 microns (minimum) coated spray color, baked at temperature 200° C with vertical	4.00	Each	34888.00	1,39,552.00

	wire uptake from floor via middle leg having removable cover one side and wire separator for data and wire separation, segregates to horizontal cable tray below wooden flipper. Product should be BIFMA gold rated SCSglobal certified for in-house air quality and with 05 years warranty and complete as per the approved sample and as per the direction of Engineer-In-Charge.				
20.9	<p>Providing &amp; Placing Desk with Seat of size 2 Seater Rectangular Table:- 1200(L) mm x 450(D) mm x 750(H) mm with following details and specifications : Worktop &amp; Modesty is made of 25mm thick E-1 grade particle board with E1 grade melamine impregnated laminate finish and the exposed edge of worktop secured with 2mm thick PVC edge banding tape of approved colour. The height of Worktop shall be 740-760 mm from floor level. The particle board should be E-1 Grade with PVC edge banding in a curved profile as per site dimensions. Understructure shall be top supported on square legs of Size - 38mm x 38mm of 1.2 mm MS sheet thickness with grouting post for fixing. MS sheet shall be epoxy powder coated spray paint, baked at temperature 200° C coated of 60 micron (minimum) thickness. Powder coating should be scratch resistance. Framework: The table shall be of tubular frame cantilever type &amp; made of 27mm - 32mm X 15mm - 20mm thick MS powder coated 60 microns (minimum) fitted with 4 nos. twin wheel castors. The table &amp; chair should be finished / completed as per above mentioned specifications including providing and fixing of other related materials including hardware's, etc, with suitable levellers, complete or as directed by the Engineer-in- Charge. Chair: Seat and Backrest should be made by cutting and moulded foam covered by acrylic fabric. The shell should be made up of plywood cover of termite and fire resistant plywood. Seat should be with buffering mechanism to enable soft closing of seat when it is folded and all hole on seat shelf should be noise absorbing. Armrest of chairs should be of fixed type made out of wood. Legs of chairs should be made with cold rolled cold annealed steel duly powder coated with 60 micron (minimum) thickness to provide smooth and clean surface. Seat should be foldable to enable comfortable seating, maintenance. Seat and Back should be wrapped with Fabric of colour decided as</p>	63.00	Each	34342.00	21,63,546.00

	per Engineer-In charge with zero formaldehyde glue. E1 Grade laminate shall be used for better in-house quality. This should comply with (EN 120-1892).Product should be BIFMA gold rated SCSglobal certified for in-house air quality and with 05 years warranty and complete as per the approved sample and as per the direction of Engineer-In-Charge.				
20.10	<p>Providing, assembling &amp; placing of Workstation. Panel Based workstation shall be size – 1200(L)mm X 600(D) mm x 1190-1200(H) mm. Frame Work, Partition and Cable management : Frame work shall consist of main spine and return spine of aluminium extruded section of minimum thickness of 1.2 mm. The overall thickness of Panel base System should be minimum 60-70 mm &amp; minimum 25-28 mm thick for return spine. The panel will be hollow inside to accommodate wiring for electrical/data and outer frame of panel should be made of extruded aluminium. The panel shall be made up of 3 mm thick MDF both sides of the wooden frame to create the hollow for the wire management. The panel outer aluminium frame is designed in such a way that it can easily slide in to the columns/Connectors by means of stacking one over the other. Horizontal race way should be 150-170 mm height aluminium profile. There shall be complete cable management arrangement with openable raceway above/ below worktop with provision for fitting electrical/data switches and holes for passing cable. Panel Finishes : Finishes of panel above the worktop can be fabric pinup/fabric/laminate + Glass/metal writable marker board or single finish tile with raceway on main spine. Finishes of main spine panel below the worktop the hollow panel should be made of MDF tile and 0.5mm thick steel sheet pasted on MDF which is powder coated with finish 60 microns (minimum) for durability on the inside as well on the outside. Raceway can be provided above/below the worktop.</p> <p>Connectors/ Brackets:  End post: Aluminium 60-70 mm width – 1180-1220 mm height.  Two way post: Aluminium 30-70 mm width –1180-1220 mm height.  Three way post: Aluminium 30-70 mm width –1180-1220 mm height.  Four way post: Aluminium 30-70 mm width – 1180-1220 mm height.  Brackets: Table top supported with 50-</p>				

	<p>60mm powder coated steel bracket. Table top to table top connector: 150-170 mm Width x 120-140 mm Depth width connector.</p> <p>Worktop : Worktop shall be made of 25mm thick E-1 grade particle board finished with 2mm ABS edge banding. E1 grade laminate shall be used for better in-house air quality. This should comply with (EN 120- 1992). The exposed edge of worktop shall be secured with 2mm thick PVC edge banding tape of approved colour. The height of Worktop shall be 740-760 mm from ground level. The particle board should be E-1 Grade with PVC edge banding.</p> <p>Drawer Unit : 3 drawer Wooden pedestal have overall dimensions internal and external dimensions 420 mm (W) x 450 mm (D) x 600 mm ( H). Drawer body should be made of 18mm thick melamine impregnated laminate finish. Each pedestal should be provided with pencil tray of 40-45 mm(H) x 110-120 mm (D) x 300-310 mm (W). Each pedestal should have 5 Nos castor fitted to it where in one castor will be fitted to lower most drawer to provide extra stability. Product should be BIFMA gold rated SCSglobal certified for in-house air quality and with 05 years warranty and complete as per the approved sample and as per the direction of Engineer-In-Charge.</p>				
20.10.1	Rectangular workstation of size:-1000mm (W) x 600mm (D) x 1190mm (H)	6.00	Each	43008.00	2,58,048.00
20.10.2	Rectangular workstation of size:-1200mm (W) x 600mm (D) x 1190mm (H)	123.00	Each	50315.00	61,88,745.00
20.10.3	Pentagonal workstation of size:- 1450mm (W1) x 1450mm (W2) x 600mm (D) x 1190mm (H)	78.00	Each	74682.00	58,25,196.00
20.11	<p>Providing, assembling and placing 4 Seater Cafe table. Overall Table shall have of sizes 1200(L) mm x 900(D) mm x 740(H) mm. Worktop shall be made out of 25mm thick E-1 grade (Environmental Friendly) particle board cover with laminate and all the edges of worktop shall be provided with machine pressed 1.5-2 mm thick ABS edge banding glued with hot melt EVA glue. E1 grade laminate shall be used for better in-house air quality. This should comply with (EN 120-1992). The understructure is made of 2mm thick Steel square pipe of dimension 50 X 50 mm with Epoxy powder coated spray paint, baked at temperature 200° C coated of 60-micron (minimum) thickness. Powder coating should be scratch resistant. Product should be BIFMA gold rated SCSglobal certified for in-house air quality</p>	28.00	Each	37597.00	10,52,716.00

	and with 05 years warranty and complete as per the approved sample and as per the direction of Engineer-In-Charge.				
20.12	<p>Providing&amp; Placing of Three-Seater Sofa having overall size of 1860(L) mm x 760-790(D) mm x 660-690(H) mm with wooden structure fabricated using hardwood of approved quality, duly seasoned and anti-termite treated with approved chemical and methodology. The wooden base frame of the sofa shall be provided with M.S. helical spring along with high quality elastic belt 70-80mm, sides &amp; back with 40-60mm elastic belt, seat &amp; back covered with jute &amp; foam covered with Poly-fill &amp; finished with thick marking cloth before doing final finish with leatherette material The component specification shall be as follows:  Seat –minimum 48 Kg/cum density PU Foam and 100mm thick, Back – minimum 32Kg/cum density PU foam and 50mm thick, Sides (inside) - minimum 32 Kg/cum density PU Foam and 50 mm thick, Sides (outside) - 32 Kg/cum density PU Foam and minimum 12 mm thick, back (back side) - minimum 32 Kg/cum density PU foam and minimum 12 mm thick. Seat shell rest on MS Powder Coated / Chrome Finish Legs supported solid wooden section of height 40-50mm. All Wooden work should be in White Ash / Teak wood polish with melamine polish /PU coat. Base of sofa should be infilled with suitable wooden sections so as to give proper support to the seat height of the base of sofa. Finished width of arm shall be 100 - 120mm (Approx) after upholstery work. Sofa to be fully upholstered using leatherette material of approved quality and shade &amp; price shall not be less the Rs. 1000 per meter, duly embossed including providing &amp; fixing of all other required materials and hardware etc. all complete as directed by the Engineer in charge. Product should be BIFMA gold rated SCSglobal certified for in-house air quality and with 05 years warranty and complete as per the direction of Engineer-In-Charge</p>	9.00	Each	62663.00	5,63,967.00
20.13	<p>Providing&amp; Placing of Three-Seater Sofa having overall size of 1460(L) mm x 760-790(D) mm x 660-690(H) mm with wooden structure fabricated using hardwood of approved quality, duly seasoned and anti-termite treated with approved chemical and methodology. The wooden base frame of the sofa shall be provided with M.S. helical spring along with high quality elastic belt</p>	2.00	Each	41777.00	83,554.00



	70-80mm, sides & back with 40-60mm elastic belt, seat & back covered with jute & foam covered with Poly-fill & finished with thick marking cloth before doing final finish with leatherette material The component specification shall be as follows: Seat –minimum 48 Kg/cum density PU Foam and 100mm thick, Back – minimum 32Kg/cum density PU foam and 50mm thick, Sides (inside) - minimum 32 Kg/cum density PU Foam and 50 mm thick, Sides (outside) - 32 Kg/cum density PU Foam and minimum 12 mm thick, back (back side) - minimum 32 Kg/cum density PU foam and minimum 12 mm thick. Seat shell rest on MS Powder Coated / Chrome Finish Legs supported solid wooden section of height 40-50mm. All Wooden work should be in White Ash / Teak wood polish with melamine polish /PU coat. Base of sofa should be infilled with suitable wooden sections so as to give proper support to the seat height of the base of sofa. Finished width of arm shall be 100 - 120mm (Approx) after upholstery work. Sofa to be fully upholstered using leatherette material of approved quality and shade & price shall not be less the Rs. 1000 per meter, duly embossed including providing & fixing of all other required materials and hardware etc. all complete as directed by the Engineer in charge. Product should be BIFMA gold rated SCSglobal certified for in-house air quality and with 05 years warranty and complete as per the direction of Engineer-In-Charge.				
20.14	Providing and fixing Center Table having overall Size of 1100(W) mm x 500(D) mm x 365(H) mm whose top is made of Grade E-1 Particle board wood (Environmentally Friendly), thickness 19mm cover with Melamine, Edge banding (PVC) 2mm. E1 grade laminate shall be used for better in-house quality. This should comply with (EN 120-1992). The understructure is made of SS base. Product should be BIFMA gold rated SCSglobal certified for in-house air quality and with 05 years warranty and complete as per the approved sample and as per the direction of Engineer-In-Charge.	8.00	Each	41777.00	3,34,216.00
20.15	Providing and fixing Side Table having overall Size of 500(W) mm x 500(D) mm x 365(H) mm whose top is made of Particle board wood of Grade E-1(Environmental Friendly) having thickness 19mm, cover with Melamine, Edge banding (PVC) 2mm. E1 grade laminate shall be used for better	7.00	Each	21478.00	1,50,346.00

	in-house quality. This should comply with (EN 120-1992). The understructure is made of SS BASE. Product should be BIFMA gold rated SCSglobal certified for in-house air quality and with 05 years warranty and complete as per the approved sample and as per the direction of Engineer-In-Charge.				
20.16	<p>Providing &amp; Placing 3 seater sofa having overall size of 1970(W) mm x 820-860(D) mm x 780-820(H) mm, seat shall have size 1670(W) x 530(D) x 400(H) mm, with wooden structure fabricated using hardwood of approved quality, duly seasoned and anti-termite treated with approved chemical and methodology. The wooden base frame of the sofa shall be provided with M.S. helical spring along with high quality elastic belt 70-80mm, sides &amp; back with 40-60mm elastic belt, seat &amp; back covered with jute &amp; foam covered with Polyfilla &amp; finished with thick marking cloth before doing final finish with leatherette material. The component specification shall be as follows: Seat - minimum 48 Kg/cum density PU Foam and 100mm thick, Back – minimum 32 Kg/cum density PU foam and 50mm thick, Sides (inside) – 50 mm thickness minimum 32 Kg/cum density PU Foam and 11mm thick Sides (outside) &amp; back (back side) – minimum 32 Kg/cum density PU foam and 13mm thick. Seat shell rest on Wooden Legs supported solid wooden section of height 50-180mm. All Wooden work should be in White Ash / Teak wood polish with melamine &amp; PU coat. Base of sofa should be infilled with suitable wooden sections so as to give proper support to the seat height of the base of sofa. Finished width of arm shall be 100 - 180mm (Approx) after upholstery work. Sofa shall be fully upholstered using leatherette material of approved quality and shade &amp; price shall not be less Rs. 1000 per meter, duly embossed including providing &amp; fixing of all other required materials and hardware etc. all complete as directed by the Engineer in charge. Product should be BIFMA gold rated SCSglobal certified for in-house air quality and with 05 years warranty and complete as per the approved sample and as per the direction of Engineer-In-Charge.</p>	3.00	Each	125327.00	3,75,981.00

20.17	<p>Providing and placing High Back chairs. The seat, backrest &amp; arm shall be made up of 12mm thick hot pressed plywood &amp; upholstered with leather and moulded medium density foam. Chair shall have width 660-710 mm, Depth 650-700mm, Height 1200-1300mm as measured till pedestal. The back shall be designed with contoured lumber support for extra comfort. Size of back shall be of 500 mm (W) x 715(H) mm &amp; size of seat shall be 500 mm (W) x 450 mm (D) x 470-530 (H) mm. Medium density foam should be used in making seat &amp; back which shall be moulded with minimum density 48 kg/m<sup>3</sup> and hardness load 16kgf. The seat and back should be arrested together with spine made of 8mm thick HR steel and should be powder coated in black with 60 micron (minimum). The mechanism of the chair shall have following features: STG mechanism, 360 degree swivel type, Knee Tilt mechanism, Seat &amp; back tilting ration of 1:1.5, front pivot for tilt with feet resting on ground ensuring more comfort, multiple locking position. Gas lift allows 10mm of height adjustment. The pedestal shall be made of die-cast aluminium base. It shall be fitted with 5 nos twin wheel castor. The size of the pedestal shall be 670mm pitch-centre-dia 700-720mm with castors). The twin wheel castors shall be made of Nylon injection moulded in black color. Product should be BIFMA gold rated SCSglobal certified for in-house air quality and with 05 years warranty and complete as per the approved sample and as per the direction of Engineer-In-Charge.</p>	3.00	Each	43864.00	1,31,592.00
20.18	<p>Providing and placing Mid Back chairs. The seat, backrest &amp; arm shall be made up of 12mm thick hot pressed plywood &amp; upholstered with leather and moulded medium density foam. Chair shall have width 660-710 mm, Depth 650-700mm, Height 950-1050mm as measured till pedestal. The back shall be designed with contoured lumber support for extra comfort. Size of back shall be of 500mm (W) x 530-550 (H) mm &amp; size of seat shall be 500 mm (W) x 450 mm (D) x 470-530 (H) mm. Medium density foam should be used in making seat &amp; back which shall be moulded with minimum density 48 kg/m<sup>3</sup> and hardness load 16kgf. The seat and back should be arrested together with spine made of 8mm thick HR steel and should be powder coated in black with 60 micron</p>	9.00	Each	37597.00	3,38,373.00

	<p>(minimum). The mechanism of the chair shall have following features : STG mechanism, 360 degree swivel type, Knee Tilt mechanism, Seat &amp; back tilting ration of 1: 1.5, Front pivot for tilt with feet resting on ground ensuring more comfort, multiple locking position. Gas lift allows 10mm of height adjustment. The pedestal shall be made of die-cast aluminium base. It shall be fitted with 5 nos twin wheel castor. The size of the pedestal shall be 670mm pitch-centre-dia 700-720mm with castors). The twin wheel castors shall be made of Nylon injection moulded in black color. Product should be BIFMA gold rated SCSglobal certified for in-house air quality and with 05 years warranty and complete as per the approved sample and as per the direction of Engineer-In-Charge.</p>				
20.19	<p>Providing and placing Chair having overall size of 700(W) mm x 700(D) mm x 1060-1150(H) mm. Chair seat shall be made up of insert moulded polyurethane foam upholstered with foam laminated mesh fabric, insert moulded foam assembled over a load bearing plastic seat cover, back is made up of two-piece injection moulded frame, inner frame upholstered with mesh fabric and mounted on the main assembly, back adjustable lumbar support for achieving comfortable seating posture. Seat size shall have 44.5 - 52.5 cm depth (approx.), 46.4 - 51.0 cm width (approx.), sub assembly back size of 55.5 cm- 62 cm height (approx.), effective back height from Seat - 57 cm (approx.), polyurethane foam for seat having minimum density 64 kg/m<sup>3</sup>, armrest top injection moulded in polyurethane and mounted on the injection moulded height adjustable type armrest, armrest height adjustable up to 4.5 cm (approx) in 3 steps &amp; width movement adjustable, 360 degree revolving type mechanism, single point control for seat and back adjustment, front pivot for tilt, tilt adjustment for back in 3position locking with antishock feature, pneumatic height adjustment of 8.5 cm spine bracket made of aluminum die cast piece connecting to back with mechanism, pedestal made of die cast aluminium fitted with 5 nos. twin wheel castors (castor wheel dia. 6.0 cm approx.), base pedestal dia 65.0cm (approx.) and pitch center dia. 71.0 cm with castors, twin wheel castors injection moulded in Nylon etc. Product should be BIFMA gold rated SCSglobal certified for in-house air quality</p>	12.00	Each	32162.00	3,85,944.00

	and with 05 years warranty and complete as per the approved sample and as per the direction of Engineer-In-Charge.				
20.20	Providing and placing chair of size 700mm (W) x 700mm (D) x 945-1035mm (H). Seat shall be made up of insert moulded Polyurethane Foam upholstered with foam laminated mesh fabric, insert moulded foam assembled over a load bearing plastic seat cover, back is made up of two-piece injection moulded frame, inner frame upholstered with mesh fabric and mounted on the main assembly, back adjustable lumbar support for achieving comfortable seating posture. Seat size shall have 44.5 - 52.5 cm depth (approx.), 46.4 - 51.0 cm width (approx.), sub assembly back size 55.5 cm- 62 cm height. (approx.), effective back height from Seat - 57 cm (approx.), polyurethane foam for seat having minimum density 64 kg/m <sup>3</sup> , armrest top injection moulded in polyurethane and mounted on the injection moulded height adjustable type armrest, armrest height adjustable up to 4.5 cm (approx) in 3 steps & width movement adjustable, 360 degree revolving type. mechanism, single point control for seat and back adjustment, front pivot for tilt, tilt adjustment for back in 3 position locking with antishock feature, pneumatic height adjustment of 8.5 cm spine bracket made of aluminum die cast piece connecting to back with mechanism, pedestal made of die cast aluminium fitted with 5 nos. twin wheel castors (castor wheel dia. 6.0 cm approx.), base pedestal dia 65.0cm (approx.) and pitch center dia. 71.0 cm with castors, twin wheel castors injection moulded in Nylon etc. Product should be BIFMA gold rated SCSglobal certified for in-house air quality and with 05 years warranty and complete as per the approved sample and as per the direction of Engineer-In-Charge.	36.00	Each	26710.00	9,61,560.00
20.21	Providing and placing High Back chairs. Chair seat shall be made up of insert moulded Polyurethane Foam upholstered with foam laminated mesh fabric, insert moulded foam assembled over a load bearing plastic seat cover, back shall be made up of two piece injection moulded frame, inner frame upholstered with mesh fabric and mounted on the main assembly, back adjustable lumbar support for achieving comfortable seating posture, Chair overall size of W63.0 -67.0cms , D 63.0-67.0cm , H112.5.0-121.5cm, seat size	21.00	Each	22976.00	4,82,496.00

	<p>44.5 - 52.5 cm depth (approx.), 46.4 - 51.0 cm width (approx.), sub assembly back size 55.5 cm- 62 cm height. (approx.), effective back height from Seat - 57 cm (approx.), polyurethane foam for seat having minimum density 64 kg/m<sup>3</sup>, armrest top injection moulded in polyurethane and mounted on the injection moulded height adjustable type armrest, armrest height adjustable up to 4.5 cm (approx) in 3 steps &amp; width movement adjustable, 360 degree revolving type mechanism, single point control for seat and back adjustment, front pivot for tilt, tilt adjustment for back in 3 position locking with antishock feature, pneumatic height adjustment of 8.5 cm spine bracket made of aluminum die cast piece connecting to back with mechanism, The pedestal shall be made of nylon base. it shall be fitted with 5 nos twin wheel castor. The size of the pedestal shall be 670mm pitch-centre-dia 700-720mm with castors). The twin wheel castors shall be made of Nylon injection moulded in black color. Product should be BIFMA gold rated SCS global certified for in-house air quality and with 05 years warranty and complete as per the approved sample and as per the direction of Engineer-In-Charge.</p>				
20.22	<p>Providing &amp; placing medium back revolving chairs. Chair seat shall be made up of insert moulded Polyurethane Foam upholstered with foam laminated mesh fabric, insert moulded foam assembled over a load bearing plastic seat cover, back is made up of two piece injection moulded frame, inner frame upholstered with mesh fabric and mounted on the main assembly, back adjustable lumbar support for achieving comfortable seating posture. Armrests should be adjustable with 120-160 mm adjustability with PU pad. Base shall have black nylon base with 5 nos. nylon castors. Chair should be of 360 degree swivel Posture Control with multi pointer locking and synchro tilt mechanism and hydraulic gas lift gas lift to allows 90-100 mm of height adjustment. Seat shall have 440 - 550 mm depth, width of 530-550 mm, height of 420-510mm with hydraulic height adjustability of 90-100mm. Sub assembly back size 550 - 620 mm height. Effective back height from Seat - 570mm, polyurethane foam for seat shall have minimum density of 64 kg/m<sup>3</sup>. Pedestal shall be made of nylon base fitted with 5 nos. twin wheel castors (castor wheel dia.</p>	42.00	Each	20365.00	8,55,330.00

	60-70 cm), base pedestal dia 60-70 mm and pitch center dia. 700-720mm with castors, twin wheel castors injection moulded in Nylon etc. Product should be BIFMA gold rated SCSglobal certified for in-house air quality and with 05 years warranty and complete as per the approved sample and as per the direction of Engineer-In-Charge.				
20.23	Providing and placing high back chairs. Overall size of chair shall be 680(W) x 680(D) x 1125-1215(H) mm. Chair seat shall be made up of insert moulded polyurethane foam upholstered with foam laminated mesh fabric, insert moulded foam assembled over a load bearing plastic seat cover, back is made up of two-piece injection moulded frame, inner frame upholstered with mesh fabric and mounted on the main assembly, back adjustable lumbar support for achieving comfortable seating posture. Seat shall have 450 - 460 mm depth (approx.), 490 - 500 mm width (approx.), sub assembly back size 540 mm-620 mm height. (approx.), effective back height from Seat - 560-570 mm (approx.). Polyurethane foam for seat shall have minimum density 64 kg/m <sup>3</sup> , armrest top injection moulded in polyurethane and mounted on the injection moulded height adjustable type armrest, armrest height adjustable up to 4.5 cm (approx) in 3 steps & width movement adjustable, 360 degree revolving type. mechanism, single point control for seat and back adjustment, front pivot for tilt, tilt adjustment for back in 3 position locking with antishock feature, pneumatic height adjustment of 8.5 cm spine bracket made of aluminum die cast piece connecting to back with mechanism, pedestal made of die cast aluminium fitted with 5 nos. twin wheel castors (castor wheel dia. 6.0 cm approx.), base pedestal dia 65.0cm (approx.) and pitch center dia. 71.0 cm with castors, twin wheel castors injection moulded in Nylon etc. all complete as per manufacturers specification, approved sample and direction of Engineer-in-Charge. Product should be BIFMA gold rated SCSglobal certified for in-house air quality and with 05 years warranty and complete as per the approved sample and as per the direction of Engineer-In-Charge.	4.00	Each	22350.00	89,400.00
20.24	Providing and placing Mid Back chairs. Chair shall be made up of cushioned seat assembly, moulded plywood upholstered with moulded polyurethane foam &	44.00	Each	19189.00	8,44,316.00

	<p>finished with Leatherite. Back size shall have width of 450 - 500 mm and height of 550-580mm. Seat size shall have length 450mm - 500mm and width of 450 - 500mm with Polyurethane Foam. Polyurethane Foam: The polyurethane foam (Recyclable) of minimum density 32 kg/cum fixed to moulded plywood and upholstered with Leatherette. Fixed armrest of premium quality of SS Chromed finish with PU cushion pads. Synchro mechanism: 360 degree revolving type, from pivot for tilt with multiple locking position &amp; feet resting on ground for extra comfort. The pneumatic adjustment has an adjustment stroke of 70-120 mm. Pedestal Assembly: It should have 5 star aluminium die cast with hard castors suitable for tiles flooring with adjustment, twin wheel castors &amp; the pitch centre Dia is 650 +/- 50mm. (750 +/- 10mm with castors). Twin wheel castors: these are made of injection moulded in black PP having 50-60mm dia, complete in all respect. The above chair should be finished / completed as per above mentioned specifications including providing and fixing of other related materials including hardware's, etc. complete or as directed by the Engineer-in-Charge and having back curvature in longitudinal and in trasverse direction. Product should be BIFMA gold rated SCSglobal certified for in-house air quality and with 05 years warranty and complete as per the approved sample and as per the direction of Engineer-In-Charge.</p>				
20.25	<p>Providing and placing Mid Back chair. Chair seat shall be made up of insert moulded Polyurethane Foam upholstered with foam laminated mesh fabric, insert moulded foam assembled over a load bearing plastic seat cover, back is made up of two-piece injection moulded frame, inner frame upholstered with mesh fabric and mounted on the main assembly, back adjustable lumbar support for achieving comfortable seating posture. Chair shall have width of 60.0 -62.0 cms, depth of 60.0-63.0 cm, height 96.0-105.0cm. Seat size of 46 - 52 cm depth (approx.) and 45.4 - 51.0 cm width (approx.). Sub assembly back size shall be of 55 cm- 62 cm height. (approx.), effective back height from Seat - 57 cm (approx.), polyurethane foam for seat having minimum density 64 kg/m3. The armrest shall be top injection moulded in polyurethane and mounted on the injection moulded height adjustable type armrest,</p>	207.00	Each	14718.00	30,46,626.00



	<p>armrest height adjustable up to 4.5 cm (approx) in 3 steps &amp; width movement adjustable. Synchro mechanism: 360-degree revolving type mechanism, single point control for seat and back adjustment, front pivot for tilt, tilt adjustment for back in 3 position locking with antishock feature, pneumatic height adjustment of 8.5 cm spine bracket made of aluminum die cast piece connecting to back with mechanism. The pedestal shall be made of nylon base. It shall be fitted with 5 nos twin wheel castor. The size of the pedestal shall be 670mm pitch-centre-dia 700-720mm with castors). The twin wheel castors shall be made of Nylon injection moulded in black color. Product should be BIFMA gold rated SCSglobal certified for in-house air quality and with 05 years warranty and complete as per the approved sample and as per the direction of Engineer-In-Charge.</p>				
20.26	<p>Providing &amp; supplying Training Room Chair. Chair seat shall be made up of insert moulded polyurethane foam upholstered with foam laminated mesh fabric, insert moulded foam assembled over a load bearing plastic seat cover, back made up of two-piece injection moulded frame, inner frame upholstered with mesh fabric and mounted on the main assembly, back adjustable lumbar support for achieving comfortable seating posture. Seat shall have 52.5 cm width (approx.), 54.0 cm depth (approx.), sub assembly back size 48.5 cm max. width, 62.0 cm height.(approx.), effective back height from Seat 57.0 cm. (approx.), polyurethane foam for seat moulded with minimum density 64 kg/m<sup>3</sup>, sled base leg frame welded assembly made of MS ERW round tube having outer dia 24mm (approx.) and thickness 2mm. including powder coating, based shoes on frame etc. all complete as per direction of Engineer-in-Charge.. Product should be BIFMA gold rated SCSglobal certified for in-house air quality and with 05 years warranty and complete as per the approved sample and as per the direction of Engineer-In-Charge.</p>	16.00	Each	11339.00	1,81,424.00
20.27	<p>Providing and placing Cafe Chair. The seat and back shall be made up of injection molded high impact strength polypropylene polymer (PP) compound with indoor grade UV Resistance. The Powder coated welded tubular frame is made from M.S.E.R.W tube. Leveller are made of high impact strength polypropylene polymer compound</p>	16.00	Each	4176.00	66,816.00

	with indoor grade UV Resistance and pressed fitted with tubular frame. Overall size shall be 420(W) x 480(D) x 780-810(H) mm. The chair shall be easy to store when not in use with stack up to 6 chairs on top of each other. Product should be BIFMA gold rated SCS global certified for in-house air quality and with 05 years warranty and complete as per the approved sample and as per the direction of Engineer-In-Charge.				
20.28	Providing and fixing High chair of overall size 480(W) mm x 440(D) mm x 990(H) mm & seating Height is 760 mm. Seat shall have Lightly cushioned & Understructure made up of teak wood with melamine polish. Product should be BIFMA gold rated SCSglobal certified for in-house air quality and with 05 years warranty and complete as per the approved sample and as per the direction of Engineer-In-Charge.	14.00	Each	8177.00	1,14,478.00
20.29	Providing and placing in Cafe chair of overall size of 400(W) mm x 500(D) mm x 830(H) mm. Seat / Backrest/ Base shall be made up of Bended pipe steel with chrome plated base. The understructure is made of SS Chrome. Leveller are made of high impact strength polypropylene polymer compound with indoor grade UV Resistance and pressed fitted with tubular frame. Product should be BIFMA gold rated SCSglobal certified for in-house air quality and with 05 years warranty and complete as per the approved sample and as per the direction of Engineer-In-Charge.	10.00	Each	9213.00	92,130.00
20.30	Providing & Placing Medium Height Planter Storage of overall size 900(W) x 450(D) x 1200(H) mm with storage of height 900mm & planter box height of 300Hmm. Body of storages shall be made up of 18 mm thick Particle Board (E-1 Grade), melamine finishes with 2 mm PVC edge-banding. E1 grade laminate shall be used for better in-house quality. This should comply with (EN 120-1992). Front of Storages should be made out of 16 mm thick Particle Board (E-1 Grade) melamine finishes with 2 mm PVC edge-banding fitted with extruded aluminum handle. Top should be made up of 25 mm thick Particle Board (E-1 Grade), melamine finishes with 2 mm PVC edge-banding. Storages should be provided with adjustable levelers. Door Lock should be of three-way lock mechanism, Door should be provided with Hinge-damping mechanism to enable soft closing of doors. Product should be BIFMA	24.00	Each	25269.00	6,06,456.00

	gold rated SCSglobal certified for in-house air quality and with 05 years warranty.				
	<b>SUBHEAD 20 TOTAL</b>				<b>3,16,83,001.00</b>
	<b>Total of all subheads</b>				<b>56,52,85,758.00</b>

# **PART-C**

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

## ADDITIONAL CONDITIONS

1. The scope includes Planning, Design & preparation of Drawings for E&M services, obtaining approvals from the department, supplying, Installation, testing and commissioning of Internal & External Electrical Installations, Point Wiring, Power wiring, LT Cabling Work, LED light Fittings, Ceiling fans, Switch boards, MCB / MCCB DBs, Sub-station, Automatic Fire Alarm System, Fire Fighting with wet riser and sprinkler system, Lifts, DG set, Solar PV generation, LAN, EPABX, UPS, VRV/VRF system, Ventilation, CCTV, Water Pumps & Dewatering Pumps, Lighting Protection system, Sensor based car parking, EV charging, ETP, Audio-Video Conferencing system as per CPWD specifications and relevant BIS standards as amended up to last date of submission of bid including extensions if any.
2. 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 & Escalators) 2003, Part -IV (Substation) 2013, Part-V (Wet Riser & sprinkler system) 2020, Part-VI Fire detection and alarm System-2018, Part-VII (DG Set) 2013, Part-VIII (Gas based Fire Extinguishing system) 2013, General specification for Heating Ventilation & Air Conditioning (HVAC) works -2017, and amended up to date and in accordance with Indian Electricity Rules, 1956, Indian Electricity Act, 2003, ECBC 2017 as amended up to date and NBC 2016 as amended up to date and as per instructions of the Engineer-in-Charge i/c as below and nothing extra will be paid.
3. 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.
4. 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.
5. 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.
6. Agency will get the scheme approved from the local bodies wherever required before start of the work and if required after completion of the work also.
7. The contractor shall obtain all applicable mandatory approval for the work and No Objection Certificate / Consent for Establishment from local body authorities like local Fire department, local town planning authority, local ground water authority, local electricity supply authority, local

pollution control board, Forest department, Environment clearance, Lift inspectorate, Central Electricity Authority etc.

8. The contractor has to prepare all the documents as required and submit directly to the local Statutory bodies. the contractor shall at his own cost collect field samples and carry out all Necessary tests required for submission of necessary applications. The contractor has to comply and, if necessary, resubmit applications which are required by the local bodies. If required the contractor has to appoint at his own cost consultants for obtaining local body approval. The statutory payments or fees shall be paid by the department.
9. 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. The contractor shall obtain completion certificate after completion of the project from statutory local bodies before handing over.
10. 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>

11. **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 Sub-Station Work :-**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending on 29.02.2024.

Three similar works each costing not less than **Rs. 56.14 Lacs**

OR

Two similar works each costing not less than **Rs. 84.21 Lacs**

OR

One similar works each costing not less than **Rs. 112.28 Lacs**

Similar work shall mean “**Supplying, Installation, testing & commissioning Sub Station Equipments**”.

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

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending on 29.02.2024.

Three similar works each costing not less than **Rs. 10.83 Lacs**

OR

Two similar works each costing not less than **Rs. 16.24 Lacs**

OR

One similar works each costing not less than **Rs. 21.66 Lacs**

Similar work shall mean “**Supplying, Installation, testing & commissioning of DG set/s with minimum 80% capacity of individual DG set proposed in NIT**”.

**c) Eligibility Criteria for Lifts:**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending on 29.02.2024.

Three similar works each costing not less than **Rs. 30.37 Lacs**

OR

Two similar works each costing not less than **Rs. 45.55 Lacs**

OR

One similar works each costing not less than **Rs. 60.73 Lacs**

Similar work shall mean “**Lifts System**”.

**d) Eligibility Criteria for LAN & EPABX work:**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending on 29.02.2024.

Three similar works each costing not less than **Rs. 12.58 Lacs**

OR

Two similar works each costing not less than **Rs. 18.87 Lacs**

OR

One similar works each costing not less than **Rs. 25.16 Lacs**

Similar work shall mean "**LAN & EPABX System**".

e) **Eligibility Criteria for CCTV work:**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending on 29.02.2024.

Three similar works each costing not less than **Rs. 13.01 Lacs**

OR

Two similar works each costing not less than **Rs. 19.51 Lacs**

OR

One similar works each costing not less than **Rs. 26.02 Lacs**

Similar work shall mean "**Supplying, Installation, testing & commissioning of CCTV System** "

f) **Eligibility Criteria for Automatic Fire Alarm System:**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending on 29.02.2024.

Three similar works each costing not less than **Rs. 17.51 Lacs**

OR

Two similar works each costing not less than **Rs. 26.27 Lacs**

OR

One similar works each costing not less than **Rs. 35.03 Lacs**

Similar work shall mean "**SITC of Automatic Fire Alarm System**".

g) **Eligibility Criteria for Fire Fighting system:**

(i) Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending on 29.02.2024.



Three similar works each costing not less than **Rs. 89.85 Lacs**

OR

Two similar works each costing not less than **Rs. 134.77 Lacs**

OR

One similar works each costing not less than **Rs. 179.69 Lacs**

Similar work shall mean **SITC of Fire Fighting system , Wet Riser & Sprinkler System.**

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

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending on 29.02.2024.

Three similar works each costing not less than **Rs. 77.17 Lacs**

OR

Two similar works each costing not less than **Rs. 115.75 Lacs**

OR

One similar works each costing not less than **Rs. 154.34 Lacs**

Similar work shall mean **“Supplying, Installation, testing & commissioning of VRV/VRF system with minimum 80% capacity of Capacity proposed in NIT**

**i) Eligibility Criteria for Solar PV generation:**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending on 29.02.2024.

Three similar works each costing not less than **Rs. 9.49 Lacs**

OR

Two similar works each costing not less than **Rs. 14.24 Lacs**

OR

One similar works each costing not less than **Rs. 18.99 Lacs**

Similar work shall mean **“Supplying, Installation, testing & commissioning of Solar PV generation plant” with minimum 80% capacity of Capacity proposed in NIT.**

**j) Eligibility Criteria for Online UPS:**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending on 29.02.2024.

Three similar works each costing not less than **Rs. 16.30 Lacs**

OR

Two similar works each costing not less than **Rs. 24.45 Lacs**

OR

One similar works each costing not less than **Rs. 32.60 Lacs**

Similar work shall mean “**Supplying, Installation, testing & commissioning of Online UPS**” with minimum 80% capacity of Capacity proposed in NIT.

**k) Eligibility Criteria for Hydropneumatics pump:**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending on 29.02.2024.

Three similar works each costing not less than **Rs. 3.31 Lacs**

OR

Two similar works each costing not less than **Rs. 4.96 Lacs**

OR

One similar works each costing not less than **Rs. 6.62 Lacs**

Similar work shall mean “**Supplying, Installation, testing & commissioning of Hydropneumatics pump system**” with minimum 80% capacity of Capacity proposed in NIT.

**l) Eligibility Criteria for Sensor based Car Parking:**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending on 29.02.2024.

Three similar works each costing not less than **Rs. 8.30 Lacs**

OR

Two similar works each costing not less than **Rs. 12.45 Lacs**

OR

One similar works each costing not less than **Rs. 16.60 Lacs**

Similar work shall mean “**Supplying, Installation, testing & commissioning of Sensor based Car Parking**”.

**m) Eligibility Criteria for ETP:**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending on 29.02.2024.

Three similar works each costing not less than **Rs. 4.02 Lacs**

OR

Two similar works each costing not less than **Rs. 6.03 Lacs**

OR

One similar works each costing not less than **Rs. 8.04 Lacs**

Similar work shall mean “**Supplying, Installation, testing & commissioning of ETP**”.

n) **Eligibility Criteria for Audio-Video Conferencing System:**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending on 29.02.2024.

Three similar works each costing not less than **Rs. 45.38 Lacs**

OR

Two similar works each costing not less than **Rs. 68.07 Lacs**

OR

One similar works each costing not less than **Rs. 90.75 Lacs**

Similar work shall mean “**Supplying, Installation, testing & commissioning of Audio-Video Conferencing System**”.

o) **Eligibility Criteria for EV Charging:**

Agency should have satisfactorily completed the similar works as mentioned below during the last 7 years ending on 29.02.2024.

Three similar works each costing not less than **Rs. 1.79 Lacs**

OR

Two similar works each costing not less than **Rs. 2.69 Lacs**

OR

One similar works each costing not less than **Rs. 3.58 Lacs**

Similar work shall mean “**Supplying, Installation, testing & commissioning of EV Charging**”.

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.

12. 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.
13. The contractor shall employ Supervisory staff as per NIT provision who will be constantly in touch with the department and will sign site order book.
14. 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.
15. The work shall be carried out according to instructions of the Engineer-in-Charge.
16. 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 about recovery shall be final & binding on the contractor.
17. The bad workmanship will not be accepted and defects shall be rectified at contractor's cost to the satisfaction of the Engineer-in-Charge. The program of electrical works is to be coordinated in accordance with the civil work.
18. 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.
19. Cement for work is to be arranged and used by the contractor himself and nothing extra will be paid on this account.
20. 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.
21. The size of conduit and wiring shall be got approved from the Engineer-in-Charge before the execution of work.
22. 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.
23. 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.
24. No tax shall be separately paid by the department. The rates tendered should be inclusive all taxes and duties. Statutory deductions at source shall be made while releasing payment through running/final bills as applicable. A certificate specifying the rate and amount of deduction shall

however be issued by the department. 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.

25. Notwithstanding the schedule of quantities, all items of interrelated works considered necessary to make the installation complete and operative are deemed to be included, shall be provided by the contractor at no extra cost.
26. 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.
27. Nothing extra shall be paid for inter connections with thimbles/Wires/Tapes strips etc. used on the work.
28. The contractor has to make his own arrangements for stores and watch and ward and no extra claim for this will be entertained.
29. The contractor shall make his own arrangements for electrical power supply for the construction activities. No extra payments for the same will be made.
30. 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.
31. The rupturing capacity of the MCB's shall be 10KA. The MCB's shall have ISI mark.
32. The insulated copper wire to be used on this work shall be FRLS type of multi stranded.
33. Make of MCB/MCCB shall be the same as the make of MCB DB.
34. 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.
35. 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.
36. 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.
37. 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.
38. 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.

39. The connection between incoming switch/isolator and bus bar shall be made with suitable size of thimble and cable at no extra cost.
40. Copper conductor of insulated cables of size 1.5 Sq.mm and above shall be stranded and terminals provided with crimped lugs.
41. 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.
42. All hardware items such as nuts/bolts/screws/washers etc. to be used in work shall be of zinc/cadmium plated iron.
43. While laying conduit, suitable size junction boxes shall be provided for pulling the wire as per the decision of the Engineer-in-charge.
44. 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.
45. 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.
46. The materials used in the work shall be of approved make as per list of preferred makes. In the preferred makes of fitting model no. of one of the acceptable makes has been mentioned for guidance. However, the contractor is free to supply other makes mentioned therein, provided the parameters of the fittings match with the fitting model No. mentioned in NIT. The decision of Engineer-in-charge shall be final.
47. 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.
48. The contractor shall have to work as per the convenience of the concerned Department.
49. 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.
50. 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"**.
51. 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.

52. 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, CED-I, CCU** 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.
53. 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.
54. 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.
55. 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.
56. 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 price of LED fittings for the remaining 4 years 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.
57. 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.
58. 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.

59. The contractor shall at his own cost submit samples of all materials sufficiently in advance and obtain approval of Engineer-in-Charge. The materials to be used in actual execution of the work shall strictly conform to the quality of samples approved by the Engineer-in-Charge and nothing extra shall be paid on this account. The acceptance of any sample or material on inspection shall not be a bar to its subsequent rejection, if found defective.
60. The contractor shall at his cost, make all arrangements and shall provide necessary facilities as the Engineer-in-Charge may require for collecting, preparing, packing, forwarding and transportation of the required number of samples for tests and for analysis at such time and to such places as directed by the Engineer-in-Charge. Nothing extra shall be paid for the above operations including the cost of materials required for tests and analysis. All expenditure to be incurred for testing of samples e.g. Packaging, sealing, transportation, loading, unloading etc including testing charges shall be borne by the contractor.
61. 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.
62. 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.
63. 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.
64. 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.



65. 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.
66. 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.
67. 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.
68. 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.
- 69. Quality Assurance Manual (Quality Assurance Plan & Checklist for E &M Service).**
- (a) Main contractor/Associate 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 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 directly come to department.
70. 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.
71. Models of the fittings other than that mentioned in list of preferred make may be accepted provided the performance parameters are at par or higher than the model mentioned therein. Nothing extra shall be paid on this account.
72. 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.
- 73. Inspection before Dispatch:** All routine tests shall be conducted before dispatch of equipment. No equipment shall be dispatched out from the manufactures 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-deliverytests. 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.

74. 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.
75. **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.
76. **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.
77. **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.
78. **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.
79. **Inspection and testing at Factory and site:** The department reserves the right to inspect the equipment and get it tested at factory itself for which the Contractor has to give 15 day's notice for inspection. The travelling cost of Officers will be borne by the Department. The installation shall be subject to necessary inspection during every stage of erection, by the Engineer In-charge or his authorized representative. The successful bidder shall provide all facilities and assistance for the purpose. The completed installation shall be inspected and tested by the Engineer-in charge in the manner as will be laid down by department. All instruments and facilities necessary for the tests shall be provided by the agency.

80. All electrical & mechanical fittings / fixture / appliances, to be provided for the work, where BEE certification is available should have **5-star rating (of BEE)**.
81. **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.
82. 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.
83. 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.
84. **Interpreting Specifications:** In interpreting the specifications, the following order of decreasing importance shall be followed in case of contradictions:
- i) Nomenclature of items as per Schedule of Quantities
  - ii) Special/Additional Conditions
  - iii) Particular Specifications
  - iv) Architectural/Structural drawings
  - v) CPWD Specifications including upto date correction slips.
  - vi) CPWD General Conditions of Contract (2023) for Construction works including correction slips issued up to last date of submission of bid including extensions if any.
  - vii) Indian Standards Specifications of B.I.S.
  - viii) ASTM, BS, or other foreign origin code mentioned in tender document.
  - ix) Manufacturer's specifications and as decided by the Engineer-in-Charge.
  - x) Sound Engineering practices or well-established local construction practices

**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



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 MANUFACTURERS 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**

Acceptable makes of materials to be used in the work are enclosed. In case of non-availability of these makes, the Superintending Engineer, CCU may allow use of alternative makes on the recommendations of Engineer-in-charge. Only BIS marked materials in the list shall be used in the work. Non-BIS marked materials may be permitted by the Engineer-in-charge only when BIS marked materials are not manufactured. If approved make/brand of any material is not given in the list, the same will be approved by the Superintending Engineer, CCU on the recommendations of Engineer-in-charge.

Sl. No.	Items	Makes
	<b><u>Electrical Installations</u></b>	
1	PVC insulated FRLS copper conductor single core cable	Polycab/Anchor/ KEI/ Havells
2	MS Conduit and its Accessories	AKG/BEC / NIC
3	PVC Conduit and its Accessories	BEC/ Precision/ Norpack
4	G.I. Race way	Legrand/ MK (Honey well)/ OBO
5	Modular Switch & Socket/ USB charger/ Telephone socket / TV socket / Fan Regulator	Legrand (Arteor)/ / Schneider (Unica pure) / MK -ORNA/ ABB- IVIE
6	Anchor fastener	Hilti/ 3M/ Fischer
7	Fan Box (with rod & hook assembly)	For concealed: Cast iron/GI Continuously welded
8	1.1 KV Grade XLPE Power Cable	Polycab/ Anchor/ KEI/ Havells
9	1.1 KV Grade Fire survival cable	Polycab/ Anchor/ KEI/ Havells
10	11 KV Grade XLPE Power Cable	Polycab/KEI/ Havells /Gloster
11	Cable Lugs and Gland	Commet / Gripwel / Dowell/ Jainsons/Raychem
12	Cables (Control, Signal & communication, Coaxial system cable)	Polycab/ KEI/ Havells/ Grandlay
13	Cat-6 UTP/CAT-6A,UTP/ STP Cable, Fibre Optics cable	Legrand /PANDUIT/COMMOSCOPE
14	GI Perforated Cable Tray	Slotco / Indiana / AKG/BEC
15	UPVC/ HDPE Pipe/DWC	Duraline/ Rex/ Tirupati
	<b><u>DG Set</u></b>	
1	Diesel Engine	Cummins / /Caterpillar/ Perkins/ Kirloskar
2	Alternator	Stamford/ Crompton/ Leroy somer
3	Protection Relays & CT'S	As per main equipment Manufactures standard/ AE/ Crompton/ L&T/ Siemens/ Salzer
4	Battery	Exide / Hitachi /Amaron
5	Sound proof Enclosure	OEM of DG SET
6	M.S. Pipes	SAIL/ Tata/ Jindal Hissar
	<b><u>Sub-station</u></b>	

1	LT Bus Trunking and accessories	L&T / Schneider / Legrand / C&S
2	HT Jointing Kit/ Termination	Raychem/ Mahindra-3M / ABB
3	GI Perforated Cable Tray	Slotco / Indiana / AKG/BEC
	<b><u>UPS</u></b>	
1	UPS	Schneider (APC) / Eaton/ Emerson (vertiv)/ Pegasus
2	Battery	Exide/ Amaron/ TATA Green
	<b><u>Electrical Panel</u></b>	
1	Air Circuit Breaker	L&T (U-Power Omega)/ABB-EMAX 2 / Siemens 3 WL/ Schneider Electric Master Pact NW/ Legrand (Dmx3)
2	Contactors/ Starters/ Overload Relay / Timer	Siemens / Schneider/ ABB / L&T
3	Protection Relays	GE / Schneider/ ABB / L&T
4	Indicators/ Push Buttons	Vaishno / Schneider/ Siemens/ L&T
5	Panel Meters/ other Accessories	Schneider/ Siemens/ L&T / AE /
6	Soft starters	Siemens/ Schneider/ ABB / Rockwell / L&T
7	CT, PT	Advance / Kappa / AE / G&M
8	Equipment Mounting Accessories for DG set/ Transformer	As per Equipment Manufacturer's Practice
9	MCB , RCCB	Legrand (DX3) / L&T(Exora) / Siemens (Betagard) /Schneider (Acti-9)/ Havells
10	MCCB	Siemens(3VA) Schneider NSX / L&T (D-Sine) / Legrand (DPX3)
11	MCB DB	Legrand (Ekinox) / Hager / Siemens (Betagard) /Schneider (Acti-9)
12	MV Electrical Panels	Tricolite / Advance Power Control Ltd. / SPC /Neptune/Precision System Control/ ASPL/ ACPPL
13	Bus Bar aluminium	Hindalco / Nalco
14	Ceiling fan / Exhaust fan / kitchen fresh air/ wall fan	Havells / Crompton/ Khaitan/Usha
15	LED Exit Signage	Legrand/ Wipro/ Mr. Lite/ AGNI/ Regent
16	LED Indoor Luminaires	Philips/ Trilux/ Regent/ Lighting Technology/ Wipro
17	LED Decorative light Luminaires	Philips/ Trilux/ Regent/ Lighting technology/ Wipro
18	LED Street Light/ Outdoor Fittings	Philips/ Trilux/ Regent/ Lighting technology
19	MS Decorative Pole	Bajaj / Hilite/ Twinkle LuxMax/ Havells/ Luster
20	Bollards	Philips/ Regent/ Lighting technology/ Hilite / Twinkle

		LuxMax/ Havells/ Luster
21	Plastic IP 67 Junction Box with connector	Hensel / Cape Spelsberg/ OBO Bettermann
22	Sensors for Light control	Philips /ABB /Honey Well / Schneider/ Siemens
	<b><u>EPABX</u></b>	
1	IP-PBX system / IP Phone	Cisco/ Polycom/ Mytel/ Avaya
2	Server	Dell / HP/ IBM / Lenovo
3	Rack	Panduit/ APW/ HP/ Poweride/ Protection Engineering
4	Cat 6 A UTP Cable/UTP patch cord/CAT 6A/I/O/Jack panel/LIU/Face plate /Fiber cables	Belden / Panduit / Molex  Note- All accessories shall be of same make
5	Wi- Fi System	Cisco/ Juniper/ Arista / Netgear
6	Caller ID Phone	Beetel/ Coral Telecom
7	Jelly filed Telephone cable	Havells/ Polycab/ KEI
	<b><u>Fire Alarm System</u></b>	
1	Addressable Fire Alarm Control Panel	Edwards / Notifier / Siemens / Notifier
2	Addressable Detectors, Graphic User Interface Software, Sounder Control Module /Monitoring Module, Response Indicators, Manual Call Boxes, Input /Output devices	Edwards / Notifier/Notifier (Honey well)/ Siemens
3	Manual call point, hooter	Agni, ASES Security, Siemens, Notifier
	<b><u>Fire Fighting System</u></b>	
1	2-way/4-wayFBC,Air Release Valve, Double/single Headed Landing valve	Safex/ NewAge/ Life gaurd
2	Diesel Engine (Fire-fighting)	Cummins/ Kirloskar/ Ashok Leyland/ Greaves / Cater Piller
3	Diesel Engine Alternator	Siemens/ Kirloskar/ ABB/ Crompton
4	Fire Extinguishers	Safex/ Ceasefire/ Minimax/ Life Guard/ Fire shield
5	Fire Hose	CRC/ NewAge / Minimax/ Lifeguard/ Safex
6	Fire man Axe	CRC/ NewAge/ Minimax/ Lifeguard/ Safex
7	First Aid Hose Reel and Drum	Firex /Lifeguard/ Safex/ Eversafe/ Newage
8	Flexible Couplings	Life guard/ Victaulic/ Tyco/ Gridnell/ Rapid Drop
9	Flexible Drop	Life guard/ Victaulic/ Tyco/ Gridnell/ Rapid Drop
10	Hose Box (External) Stainless Steel	Manufacturers of Panels

11	Installation Control Valve/ Deluge Valve	Safex/ Tyco/ HD/ Victaulic/ Lifeguard
12	Sprinkler Heads	Tyco/HD/ Victaulic/Rapid Drop/ Life guard/ Vikng
13	Sprinkler Panel, Curtain system Panel	Tyco/ Honeywell/ HD/ Viking/ Notifire
14	Stainless Steel Brach Pipe	Safex/ Life guard / New wage
15	Fire water Jockey/ Main pump set- Hydrant system, Sprinkler system, Water curtain system	Armstrong/ Grundfoss// Wilo/ Mather Platt/ Xylem
16	Electrical Motor	ABB/ Bharat Bijlee/ Kirloskar Electric Co./ Siemens India Ltd/ Crompton Greaves Ltd
17	Thermal insulation for exhaust pipe	UPTwiga/ Lloyd Insulation/ Owens Corning/ Kimmco
18	M.S. Pipes	SAIL/ Tata/ Jindal Hissar
19	M.S. Fittings	UNCO/ UNIK/ NEW/ HB/ Bharat Forge
20	Anchor Fastener, Clamps, Pipe hangers support	Hilti/ Fisher/ Easyflex
21	Welding Rods	Advani/ L&T/ ESAB/ Marglam
22	Structural steel	Tata/ SAIL/ Jindal Hissar APL-Apollo
23	Sluice Valves	SANT/ Advance/ Audco/ Zoloto
24	Butterfly (manual, gear operated) Valves	Audco/ Advance/ Zoloto/ Sant/ Honeywell/ Kirloskar
25	Non-Return Valves	Audco/ Advance/ Zoloto/ Sant/ Honeywell/ Kirloskar
26	Tamper switch for Butterfly Valve	Honeywell/ Potter/ Rapid Control/ System Sensor/ Pacific Fire
27	Ball Valves	Zoloto/ Sant/ Hawa/ Honeywell/ Castle
28	Globe Valve	Zoloto/ Sant/ Hawa/ Honeywell/ Castle
29	Foot valve with strainer	Kirloskar/ Normex/ Castle/ Audco
30	Air Release Valve	Sant/ Leader/ Zoloto/ Castle/Life guard
31	Y-type Strainer	Zoloto/ Honeywell/ Emerald/ Sant/ Kartar/ DRP
32	Air vessel	Nema/ Zenith/ As per CPWD specifications tested upto 25kg/sqrmtr /Life guard
33	Pressure Release Valve	Newage (Mumbai)/ Cla-Val/ Tyco/ Viking/ H-Guru
34	Pressure Switch	Danfoss/ Indfos/ Viking/ Delta Control
35	Pressure Gauge	Feibig/ H. Guru/ Emerald/ Waaree
36	Flow Test Meter	Viking/ Newage (Mumbai)/ Global Vision/ Eureka Forbes/ Fabri-Tek Equipments Pvt Ltd./ Gerand
37	Hydrant Valve, Branch pipe with nozzle	Safex/ Minimax/ Eversafe/ AAAG / Life guard
38	Hose Coupling	Safex/ Minimax/ Eversafe/ AAAG / Life guard

39	Fire brigade connection	Newage (Mumbai)/ Eversafe/ Shah Bhogilal/ Newage (Surendranagar)/ Gtech/ safeguard
40	Alarm Control Valve, Installation Control Valve	Tyco/ HD/ Newage (Mumbai)/Newage (Surendranagar)/ Viking
41	Zone Control Valve (ZCV)	Tyco/ Viking/ HD Fire/ Reliable
42	Sprinkler flexible pipe (UL listed only)	HD Fire/ Tyco/ Safex/ Newage (Mumbai)/ Safex/ Minimax/ Eversafe/ AAAG / Life guard (Surendranagar)
43	Sprinkler annunciation panel	Minilec/ Alan/ PCD Linovate Global/ Agni Fire/ ASES Security
44	Power cables	As per make list of Electrical Installations
45	Control cables - armoured, unarmoured, FRLS	As per make list of Electrical Installations
46	Water flow switch	Honeywell /Johnson Controls / Siemens / System Sensor/ Plotter
47	Paint, Primer	Asian Paint/ Nerolac / Berger,
48	Anti-Vibrating Mounting pads, Expansion Joints	Dulop/ Resistoflex/ Easyflex/ Flexionics/ Vimpa
49	Circuit integrity cables for fire alarm, voice evacuation, suppression, hssd;	Caliplast/ KEI/ Beldon
50	Fire Fighting Panel	As Per Electrical Panel Make
51	Local Starter Panel	As Per Electrical Panel Make
52	Lugs & Glands	Comet, Dowell
53	Anti Vibration Mounting	Dunlop/ Resistoflex/ Ewren
54	Sealing Compound	HILTI/3M/ M-SEAL
	<b>HVAC</b>	
1	VRV/VRF System including Indoor units	Daikin/ Hitachi/ Mitusbishi/ O-General/ Carrier-Toshiba
2	Split Type AC	Daikin/ Hitachi/ Mitusbishi/ O-General/ Carrier-Toshiba
3	Refrigerant Piping	Mandev / Mexflow / Rajco/RR SHRAMIK
4	Closed cell Nitrile rubber insulation/ EPDM insulation	Armaflex /Aerocell / ALP
5	PPR Pipe	Jindal / Astral /Fusion
6	Centrifugal/ Axial/ Vane Axial/ In-line fans and their motors	Kruger / Greenheck/ Nicotra /with motor from their approved OEM
7	Vibration isolator /Rubbed pad/Duct support Arrangement	Dunlop/ Resistoflex/ Gerb
8	G.I. Sheet for Ducting etc	TATA/ SAIL / Jindal
9	Grill/ Diffuser/ Fire Dampers/ Louvers/ Volume Control Damper	System Air/ Carryaire/ Cosmos/ Trox / Greenheck

10	Flexible Grooved fittings/ Couplings	Victaulic/ Tycogrinnel/ Viking
11	Pre Fabricated Duct & duct flange (With GI sheets of makes)	Zeco/ Rollastar/ Ductofab/ WAVES
12	Variable Frequency Drive	Allen Bradley / Danfoss / ABB / Honeywell / Siemens / L&T
13	Aluminum tape	Johnson/ Birla-3M/ Nippon industries
14	FLRS Cables	As per Electrical section make list
15	DX units and VRF	Daikin/ Hitachi/ Tohsiba/ Mitsubishi Electric
16	Dry Scrubber	Trion/ RYD Air/ Humidin/ ESPAIR
17	EC Fan	ziehl-abegg/ Rosenberg/ Ebm-papst
18	Expansion Bellows/ Pipe Supports/ Vibration Isolators/ Duct Flexile Connections	Resistoflex/ Kanwal (Easiflex/ Cori/ Flexionics
19	Fan coil Units	Edgetech/ JCI/ Diakin/ Trane/ Citizen/ Zeco/ Carrier
20	Filters (Pre, Fine, Hepa)	Dyna Filters/ American Air Filter/ Camfil/ Thermodyne
21	Flexible Duct	Twiga/ RuskinTitus/ Atco/ Kimmco/ Sevenstar
22	Flow switch	Rapidcool/ Siemens/ Anergy/ Honeywell/ Danfoss
23	FRP Material	Reichhold/ Equivalent
24	Fibre glass insulation	Owens corning/ U. P. Twiga
25	Fire Paint	Flamebar/ AMEETUFF/ 3M/ promat/ JAY / CO-ISCEM
26	GSS Factory Fabricated Ducts/ Duct Flanges	Rolastar/ Zeco/ Ductofab/ Wabes
27	Inline Fans	Systemair/ Kruger/ Greenheck/ Humidin/ NicotraAir
28	M.S. Pipes	SAIL/ Tata/ Jindal(HISSAR)
29	M.S. Sheets	SAIL/ Tata/ Jindal
30	Motorized Actuator For Valves & Damper	Belimo/ Honeywell/ Siemens/ Johnson Controls
31	Induction Motors	ABB/ Siemens/ CGL/ Bharat Bijlee/ Marathon/Havells
32	Differentials pressure switch (Blowers & Filters)	Schneider/ Honeywell/ Siemens/ Omicron
33	Wall/ duct Mount temperature sensor	Schneider/ Honeywell (Webs)/ Johnson Controls/ Siemens/ Omicron
34	Flame Proof Level Switch/ Level Transmitter	Veksler/ Filpro/ ABB/ Techtrol/ Omicron
35	DC Voltage Transducers	AB/ Risabh/ L&T/ Omicron
36	Pressure sensor for measuring line pressure	Schneider/ Honeywell/ Jumo/ Siemens/ Omicron/ Hub- Control
37	Duct Type RH Sensor	Schneider/ Honeywell/ Siemens/ Omicron
38	Differential Pressure Switch Water Application	Schneider/ Honeywell/ Siemens/ Omicron/ United Electric
39	Power Factor Transducer/ Frequency Transducer/ KW Transducer	Veris/ Seto/ Omicron/ Omron/ ABB/ Rishabh/ L&T
40	CO2 Sensor	Schneider/ Honeywell/ Siemens/ Omicron
	<b>LIFT</b>	

1	Lift	Kone/ Mitsubishi/ Schindler/ Otis Elevator/ Thyssenkrupp/ Jhonson
2	Cable/ DB/ MCB/ MCCB	As per make list of electrical installations
	<b><u>PUMPS</u></b>	
1	Water supply, STP, Drainage, Submersible	Kirlosakar /KSB/ Grundfoss/ Wilo/ Xylem/ Armstrong
2	MS Pipe, GI Pipe	SAIL/ TATA/ Jindal (Hissar)
3	Butter fly Valve, Ball Valve/ NRV	Zoloto/ Audco/ Sant/ Advance/ Leader
4	Control Panel	As per make list of electrical panel
	<b><u>LAN</u></b>	
1	Network Switch /Media Convertor	Netgear/ Juniper/ Cisco/ Extreme/ Arista
2	Port Managed PoE Ethernet switch	Cisco/ Juniper/ Netgear/ Extreme/ Arista
	<b><u>SOLAR POWER</u></b>	
1	Material for Structure	Tata/Jindal /Sail
2	Power Conditioning Unit (PCU)	SMA(Germany)/Delta/Schneider Electric/ABB
3	Solar PV Panel	Tata solar/ BHEL/ Havells/ Exide/ Waaree Energy/ UTL Solar
4	Inverter Panels for Solar Power System	Tricolite / Advance Power Control Ltd. /Neptune
5	Solar Module	Tata solar/ BHEL/ Havells/ Exide/ Waaree Energy/ UTL Solar
6	Solar inverters	Delta/ SMA/ ABB/ Schneider
7	Data logger	Compatible to inverter
8	Industrial PC for data monitoring	HP/ Dell/ Lenovo/ IBM
9	ACDB	Tricolite / Advance Power Control Ltd. / Neptune
10	MCB	Schneider / Legrand / Siemens L&T / Hager/ Havells
11	MCCB	Schneider NSX / Siemens (3VA)/ L&T (D-Sine), Legrand (DPX3), Hager
12	DCDB	Hensel / Honey well/ VNT / Sun garner
13	DC cable (modules to inverter)	Polycab/ Anchor/ KEI/ Havells
14	AC cable (inverter to MCCB)	Polycab/ Anchor/ KEI/ Havells
15	Module mounting structure (MMS) As per MNRE standards / specifications- Hot	TATA / Jindal

	Dip GI 2-3mm thick	
16	MMS – Accessories SS (304 grade or above)	TATA / Jindal
	<b><u>ETP</u></b>	
1	ETP Plant manufacturer	Grannus water and Environmental Solutions Pvt. Ltd./ Cimera Engineers/ Spectrum Engineering Tech Pvt. Ltd.
2	Air Blower	Everest / Beta / Akash /Ingersole
3	Air Diffusers	Rehau / Welbrick / MM Aqua
4	Raw Sewerage Transfer Pump/ Sludge Recycle Pump/ Filter Feed Pump/ Non Clog Horizontal Centrifugal Pump/ De watering pump	Armstrong/ Xylem/ Grundfos/ Kirloskar / Wilo
5	Dosing Pump/ SBR feed pump/ Filter feed pump/ sludge pump/ Chlorine dosing pump	Armstrong/ Xylem/ Grundfos/ Kirloskar / Wilo
6	Filter Press	SachinFiltech / Pharmatech
7	Tube settler Media /MBBR Media	Welbrick / Pharmatech / MM Aqua
8	M.S. Filter	Welbrick / Ion Exchange / Astha / Thermax
9	Ozonator	Creative/ Ozonics/ Orapl
10	Non Clogg Horizontal Screw Type Filter Press Pump	Roto/ Positive/ Rotamac/ Tushaco
11	Centrifuge	Apollo / Welbrick / GWSPL / Pharmatech
12	Pressure Gauge	H Guru / Feibig / Gluck
13	Butterfly / Dual Plate Check Valves	Zoloto / Advance / Castle / Sant
14	Pipe & Fitting UPVC	Astral / Supreme / Finolex
15	GI / MS pipes	Jindal / Prakash Surya / Tata
16	MCB	Legrand/ Schneider/ L&T
17	Metering CT	Kappa/ AE/
18	Digital Voltmeter	Enercon/ L&T/ Legrand/ ABB/ Schneider
19	Digital Ammeter	Enercon/ L&T/ Legrand/ ABB/ Schneider
20	Indication Light	L&T/ Legrand/ ABB/ Schneider
21	Overload relay	L&T/ Legrand/ ABB/ Schneider
22	Power contactor	L&T/ Legrand/ ABB/ Schneider
23	Push Button	L&T/ Legrand/ ABB/ Schneider
24	PLC	Delta/ Siemens/ Schneider
25	Single phase preventer	L&T/ Legrand/ ABB/ Schneider
	<b><u>EV Charging</u></b>	
1	EV Charger	ABB/ DELTA/ NEPTUNE AUTOMATIVE PVT. LTD./OKAYA
	<b>Sensor Based Car parking</b>	



1	Sensor Based Car parking	NEPTUNE AUTOMATIVE PVT. LTD. / ASPL/ DESIGNA / COLDWIRE
	<b>AUDIO-VIDEO</b>	
1	LED VIDEO WALL	CHIRSTIE / BARCO / SAMSUNG/LG
2	LED DISPLAY	CHIRSTIE/ SAMSUNG/ LG/SONY/PANASONIC
3	SPEAKERS	QSC/ BOSE/ QUEST
4	AMPLIFIER	QSC/ QUEST/ BOSE
5	DIGITAL SIGNAL PROCESSOR	QSC/Allen & HEATH/ BIAMP
6	BOUNDARY MICROPHONE	SHURE/QSC/DPA
7	GOOSENECK MICROPHONE	SHURE/DPA/Sennheiser/Televic
8	HANDHELD MICROPHONE	SHURE/BOSCH/ SENNHEISER/QSC/Audio-Technica
9	LAVIER MICROPHONE	SHURE/BOSCH/ SENNHEISER/QSC/Audio-Technica
10	PODIUM	Fidato / Globus/ Ordain/ATDSC
11	MATRIX SWITCHER	Kramer/Lightware/ Extron/ Crestron.
12	DISTRIBUTION AMPLIFER	Kramer/Lightware/ Extron/ Crestron.
13	TRANSMITTER & RECEIVER	Kramer/Lightware/ Extron/ Crestron.
14	TABLE MOUNT ENCLOSURE	KRAMER/CRESTRON/ LEGRAND
15	PTZ CAMERAS	SONY/LUMENS/VADDIO/QSC
16	CONTROL TOUCH PANEL AND CONTROL SYSTEM	CRESTRON/QSC/KRAMER
17	NETWORK SWITCH	HPE / CISCO/ NETGEAR/ JUNIPER
18	EQUIPMENT RACK	APW PRESIDENT /VALRACK/ RITTAL/ POWERIDE/ PROTECTION ENGINEERING
19	SPEAKER & MICROPHONE CABLE	KRAMER/CRESTRON/EXTRON/LIGHTWARE
20	HDMI CABLE/ VGA CABLE, PATCH CABLES, CONTROL CABLE/ ACTIVE USB CABLE	KRAMER/CRESTRON/EXTRON/LIGHTWARE
	<b>CCTV</b>	
1	PTZ, Bullet, Doom CCTV Camera	Bosch/ Panasonic/ Axis/ Honeywell Enterprises
2	NVR	Bosch/ Panasonic/ Axis/ Honeywell Enterprises
3	POE Smart Managed Switch	Extreme/ CISCO
4	Rack	Protection Engineering/ POWERIDE
5	CAT 6 Cable	Legrand/ COMMSCOPE/ PANDUIT
6	Display	Panasonic/ Samsung/ Sony

**Note:**

1. The contractor shall submit samples & technical submittals of all material before procurement for approval & shall procure after approval directly from manufacturer and the Authorized dealers only.
2. Material not specified in attached list of acceptable makes shall be got approved from Engineer-in-charge & consultant before use on work. Decision of Engineer-in-charge & Consultant shall be final in this respect.
3. Either the model shall be got approved or Sample shall be submitted for approval by Engineer in Charge before confirming order to supplier.
4. Contractor shall normally not use more than two (except for Equipments: Lifts, DG Set, Transformer, HVAC Equipments, UPS, where only One make is allowed) out of the above preferred makes.
5. For any item not covered in the above list, the contractor shall get the samples and make approved from the Engineer-in-charge before the supply is made.
6. All items shall conform to e-waste management and handling rules 2011 issued by Min. of Environment and Forest, Government of India or ROHS (restrictions on use of Hazardous substances)/WEEE compliant as per EU norms or American norms. Certificate shall be submitted wherever applicable.
7. The material shall not be older by more than Six months from date of supply at site.
8. Proof of dispatch from factory/dealer shall always be submitted to Engineer-in-charge for verification.

# **SCHEDULE OF QUANTITY FOR ELECTRICAL WORK**

## SCHEDULE OF QUANTITY (E&M WORK)

**Name of work:** Construction of New Building in the Existing Premises of Parivesh Bhawan,  
CPCB, Delhi

Sl. No.	Description	Qty	Unit	Market Rate	Amount
	<b>SUB-HEAD:I [INTERNAL EI &amp; FANS]</b>				
1	Wiring for light point/ fan point/ exhaust fan point/ call bell point with 1.5 sq.mm FRLS 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 PVC insulated copper conductor single core cable etc. as required.				
a)	Group C	1005	Point	1,960.00	19,69,800.00
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 PVC insulated copper conductor single core cable in surface/ recessed steel conduit, and earthing the point with 1.5 sq. mm FRLS PVC insulated copper conductor single core cable etc. as required.				
a)	Group C	685	Point	1,135.00	7,77,475.00
3	Wiring for twin control light point with 1.5 sq.mm FRLS PVC insulated copper conductor single core cable in surface / recessed steel conduit, 2 way modular switch, modular plate, suitable GI box and earthing the point with 1.5 sq.mm. FRLS PVC insulated copper conductor single core cable etc. as required.				
		13	Point	2,104.00	27,352.00
4	Wiring for light/ power plug with 2X4 sq. mm FRLS PVC insulated copper conductor single core cable in surface/ recessed steel conduit alongwith 1 No. 4 sq. mm FRLS PVC insulated copper conductor single core cable for loop earthing as required.				
		2000	Mtr	420.00	8,40,000.00
5	Wiring for light/ power plug with 4X4 sq. mm FRLS PVC insulated copper conductor single core cable in surface/ recessed steel conduit alongwith 2 Nos. 4 sq. mm FRLS PVC insulated copper conductor single core cable for loop earthing as required.				
		3000	Mtr	608.00	18,24,000.00

6	Wiring for circuit/ submain wiring alongwith earth wire with the following sizes of FRLS 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	1075	Mtr	339.00	3,64,425.00
b)	4 x 1.5 Sqmm + 2 x 1.5 Sqmm earth wire (Circuit Wiring & Power Wiring for VRV Indoor Units).	1200	Mtr	367.00	4,40,400.00
c)	2 X 4 sq. mm + 1 X4 sq. mm earth wire	46	Mtr	415.00	19,090.00
d)	2 X 6 sq. mm + 1 X6 sq. mm earth wire	275	Mtr	569.00	1,56,475.00
e)	4 X 6 sq. mm + 2 X 6 sq. mm earth wire	50	Mtr	844.00	42,200.00
f)	4 X 10 sq. mm + 2 X 6 sq. mm earth wire	200	Mtr	1,048.00	2,09,600.00
7	Supplying and drawing following sizes of FRLS PVC insulated copper conductor, single core cable in the existing surface/ recessed steel/ PVC conduit as required (For DALI)				
a)	2 x 1.5 Sqmm	150	Mtr	59.00	8,850.00
8	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. (Upto Terrace/ GF)				
		400	Mtr	35.00	14,000.00
9	Supplying and drawing following pair <b>0.5 mm dia FRLS PVC insulated annealed copper conductor, unarmored telephone cable</b> in the existing surface/ recessed steel/ PVC conduit as required				
a)	2 Pair	2400	Mtr	34.00	81,600.00
b)	10 Pair	100	Mtr	55.00	5,500.00
c)	20 Pair	60	Mtr	85.00	5,100.00
10	Supplying and drawing of <b>4 Pair, 23 AWG, CAT-6A, UTP LAN Cable</b> in the existing surface/ recessed steel/ PVC conduit as required.				
a)	1 run of cable	1450	Mtr	52.00	75,400.00
b)	2 run of cable	800	Mtr	81.00	64,800.00
c)	3 run of cable	2000	Mtr	110.00	2,20,000.00
11	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 (For Fire Alarm System)	1250	Mtr	250.00	3,12,500.00

b)	25 mm (For LAN, TV cable)	4650	Mtr	286.00	13,29,900.00
12	Supplying and fixing following <b>modular switch/ socket/ accessories</b> on the existing modular plate & switch box including connections but excluding modular plate etc. as required				
a)	Telephone socket outlet	141	Each	165.00	23,265.00
b)	TV antenna socket outlet	26	Each	165.00	4,290.00
c)	RJ 45 Data Socket(i/c Crimping)	354	Each	576.00	2,03,904.00
d)	Blanking Plate	70	Each	46.00	3,220.00
e)	5/6 Amps Switch	40	Each	118.00	4,720.00
f)	3 pin 5/6 amp socket outlet	40	Each	135.00	5,400.00
13	Supplying and fixing call bell/ buzzer suitable for single phase, 230 V, complete as required.	15	Each	111.00	1,665.00
14	Supplying and fixing two module stepped type electronic fan regulator on the existing modular plate switch box including connections but excluding modular plate etc. as required	216	Each	552.00	1,19,232.00
15	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 (75mmX75mm)	438	Each	344.00	1,50,672.00
16	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 amps modular socket outlet and 5/6 amps modular switch, connection etc. as required.	173	Each	537.00	92,901.00
17	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 & 15/16 amps modular socket outlet and 15/16 amps modular switch, connection etc. as required.	303	Each	652.00	1,97,556.00
18	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.	351	Each	752.00	2,63,952.00

19	Supplying & fixing suitable size GI box with modular plate and cover in front on surface or in recess including providing and fixing 25 A modular socket outlet and 25 A modular SP MCB, "C" curve including connections, painting etc. as required. (For Geyser & STAC Units)	24	Each	803.00	19,272.00
20	Supplying and fixing 30 A, 415 V, TPN Industrial type socket outlet, with 4 pole and earth, metal enclosed plug top alongwith 30 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.	21	Each	4,247.00	89,187.00
21	Supply and fixing of slim design 8 (2 x 4) module metal <b>pop-up type flush mounting box</b> in desired color finish including fixing on floor/furniture table etc complete as required	20	Each	5,322.00	1,06,440.00
22	Supplying installation testing and commissioning of following pair <b>MS powder painted Krone Tag Box IP44</b> , i/c Krone module complete including slide lock/unlock system, connections testing and commissioning etc. as required				
a)	10 Pair	5	Each	827.00	4,135.00
b)	20 Pair	6	Each	961.00	5,766.00
c)	100 Pair	2	Each	1,699.00	3,398.00
23	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)	6 Way, Double Door (2+4 Way)	1	Each	2,026.00	2,026.00
b)	8 way, Double door (2+8 Way)	26	Each	2,188.00	56,888.00
c)	12 way, Double door (2+12 Way)	1	Each	2,514.00	2,514.00
24	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) (IP-43)				
a)	4 way (4 + 12), Double door	2	Each	3,226.00	6,452.00
b)	8 way (4 + 24), Double door	23	Each	4,661.00	1,07,203.00
c)	12 Way (4+ 36), Double Door	13	Each	7,982.00	1,03,766.00

25	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)	4 Way (4 + 12), Double Door	20	Each	8,051.00	1,61,020.00
b)	8 way (4 + 24), Double door	2	Each	10,873.00	21,746.00
26	Supplying and fixing <b>cable end box (Loose wire box) (IP 43)</b> suitable for following single pole and neutral, sheet steel, MCB distribution board, 240 V, on surface/ recess, complete with testing and commissioning etc. as required				
a)	For 6 Way, Double Door SPN MCB DB	1	Each	830.00	830.00
b)	For 10 Way, Double Door SPN MCB DB	26	Each	892.00	23,192.00
c)	For 14 Way, Double Door SPN MCB DB	1	Each	989.00	989.00
27	Supplying and fixing <b>cable end box (Loose wire box)(IP43)</b> suitable for following triple pole and neutral, sheet steel, MCB distribution board, 415V, on surface/ recess, complete with testing and commissioning etc. as required				
a)	For 4 Way, Double Door TPN MCB DB	2	Each	1,179.00	2,358.00
b)	For 8 Way, Double Door TPN MCB DB	23	Each	1,454.00	33,442.00
c)	For 12 Way, Double Door TPN MCB DB	13	Each	2,896.00	37,648.00
28	Supplying and fixing <b>cable end box (Loose wire box)</b> suitable for triple pole and neutral, sheet steel, Vertical MCB distribution board, 415 V, on surface/ recess, complete with testing and commissioning etc. as required.	22	Each	1,275.00	28,050.00
29	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)	25 Amp	1	Each	1,867.00	1,867.00
b)	40 Amp	27	Each	1,882.00	50,814.00



30	Supplying and fixing of following rating four pole ( <b>three pole and neutral</b> ), <b>415 Volts, residual current circuit breaker (RCCB)</b> , having a sensitivity current of 30 mA, in the existing MCB DB complete with connections, testing and commissioning etc. as required [Make: Hager / Legrand / Schneider]				
a)	40 Amp	2	Each	3,411.00	6,822.00
b)	63 Amp	36	Each	3,076.00	1,10,736.00
31	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 MCB	1412	Each	54.00	3,58,648.00
b)	Triple Pole MCB	48	Each	928.00	44,544.00
32	Supplying and fixing of <b>600 mm x 600 mm (nominal), ≤36 Watt, recess mounting, full glow and fully diffused LED Panel</b> having lumen output ≥ 3600 lumens and efficacy ≥100lumens/Watt with replaceable electronic driver etc., PDC aluminium / fabricated CRCA housing with corrosion resistance powder coating, microprismatic diffuser for fully difused light, power factor ≥ 0.90, IP 20, CRI ≥ 80, color temperature 5700-6500°K, complete including connections with 1.5 Sqmm FRLS PVC insulated copper conductor single core cable, earthing etc. as required. (With 5 Year Warranty.)	334	Each	3,701.00	12,36,134.00
33	Supplying and fixing of <b>600 mm x 600 mm (nominal), ≤36 Watt, Surface mounting, full glow and fully diffused LED Panel</b> having lumen output ≥ 3000 lumens and efficacy ≥100 lumens/Watt with replaceable electronic driver etc., fabricated CRCA housing with corrosion resistance powder coating, highly tranansmissivity diffuser for fully difused light, power factor > 0.90, IP 20, CRI ≥ 80, color temperature 5700-6500 °K, complete including connections with 1.5 Sqmm FRLS PVC insulated copper conductor single core cable, earthing etc. as required as required. (With 5 Year Warranty.)	115	Each	3,522.00	4,05,030.00
34	Supply, Installation, Testing and Commissioning of Of recessed Type flat panel luminaire (2'X2') having Aluminium/CRCA and PC diffuser with min. 3600 lumens output, Efficacy not less than 100 lm/watt, THD<10%, PF>0.95 , CRI>=80, 5700/6500K CCT and Min. service life of 50000 Hrs @ L70B50 complete etc as required at site. (With 5 Year Warranty.)	54	Each	5,529.00	2,98,566.00

35	Supply, Installation, Testing and Commissioning of 20 watt LED type industrial light Energy saving, environmental friendly, long life, corrosion resistant, impact proof, surface mounting IP66 luminaire with PC housing & opal finish cover suitable for wet location. LEDs used as light source. having minimum 2000 lumens output with system efficacy of 100 Lm/Watt or better, Aluminium/ CRCA housing prismatic/ PMMA difuser, SDCM ≤ 5, PF≥0.95, CRI>80, THD≤10%, Service life of 50,000 hrs @ L70, , 5700/6500K CCT with inbuilt Driver, i/c connections etc complete as required at site. (With 5 Years warranty)	130	Each	1,479.00	1,92,270.00
36	Supply, Installation, Testing and Commissioning of surface mounting LED Batten having minimum 2000 lumens output with system efficacy of 100 Lm/Watt or better, Aluminium/ CRCA housing prismatic/ PMMA difuser, SDCM ≤ 5, PF≥0.95, CRI>80, THD≤10%, Service life of 50,000 hrs @ L70, , 5700/6500K CCT with inbuilt Driver, i/c connections etc complete as required at site. (With 5 Years warranty)	4	Each	1,479.00	5,916.00
37	Supply, Installation, Testing and Commissioning of surface mounting LED Batten Mirror light having minimum 1000 lumens output with system efficacy of 100 Lm/Watt or better, Aluminium/ CRCA housing prismatic/ PMMA difuser, SDCM ≤ 5, PF≥0.95, CRI>80, THD≤10%, Service life of 50,000 hrs @ L70, , 5700/6500K CCT with inbuilt Driver, i/c connections etc complete as required at site. (With 5 Years warranty)	16	Each	648.00	10,368.00
38	Supply, installation, testing and commissioning of <b>surface mounting, 1200 mm (Nominal) long LED mirror light luminaire</b> with extruded aluminium housing, polycarbonate diffuser, integrated SMD mounted LEDs, Luminaire efficacy ≥ 100 lm/watt, CCT-6000/6500K, PF ≥ 0.90, lumen output ≥ 2000 lumens, ingress protection-IP20 or higher, with integral electronic driver etc., suitable for operation on 150-270V, 1Φ, 50Hz AC supply system, complete including connections with 1.5 Sqmm FRLS PVC insulated copper conductor single core cable, earthing etc. as required. (With 5 Year Warranty.)	13	Each	895.00	11,635.00
39	Supplying, installation, testing and commissioning of Microwave technology based occupancy sensor having high performance, non regulating programmable type, suitable for connected load upto 10Amp , for mounting height up to 2.6 mtr and for 5m X 20m coverage area along with necessary fixing arrangements i/c programming at site etc. complete as required.	60	Each	7,627.00	4,57,620.00

40	Supply, Installation, Testing and Commissioning of Round Surface Type LED Downlighter made of Aluminium die cast housing, prismatic/ PMMA difuser, SDCM $\leq 5$ having min. 1500 lumens output with system efficacy of 100 Lm/Watt or better , PF $\geq 0.95$ , CRI $>80$ , THD $\leq 10\%$ , Service life of 50,000 hrs @ L70, 5700/6500K CCT with inbuilt Driver i/c connections etc complete as required at site. (With 5 Years warranty)	333	Each	1,479.00	4,92,507.00
41	Supply, Installation, Testing and Commissioning of Round Surface /recessed Type Downlighter having Aluminium/CRCA and PC diffuser with min. 1200 lumens output, Efficacy not less than 100 lm/watt, THD $<10\%$ , PF $>0.95$ , CRI $\geq 80$ , 5700/6500K CCT and Min. service life of 50000 Hrs @ L70B50 complete etc as required at site.(With 5 Year Warranty.)	139	Each	1,726.00	2,39,914.00
42	Supply, installation, testing and commissioning of <b><math>\leq 24</math>W (nominal) rating recess mounting round LED deep recessed downlighter, extremely low glare (UGR <math>\leq 19</math>)</b> & high quality faceted reflector for superior lighting and aesthetics, having powder painted PDC aluminum housing, efficacy $\geq 100$ lm/watt, CCT- 4000°K, PF $\geq 0.90$ , Lumen output $\geq 2000$ lm, wide beam ( $\geq 65^\circ$ ) optics, with DALI Dimmable electronic driver etc., suitable for operation on 150-270V, 1 $\Phi$ , 50Hz AC supply system, directly on the false ceiling, complete including making connections with 1.5 Sqmm FRLS PVC insulated copper conductor, single core cable as required (With 5 Year Warranty.)	62	Each	4,997.00	3,09,814.00
43	Supply, installation, testing and commissioning of <b><math>\leq 8</math> W (nominal) recess mounting round LED downlighter luminaire</b> having powder painted PDC aluminum housing, efficacy $\geq 70$ lm/watt, CCT-3000K, PF $\geq 0.80$ , Lumen output $\geq 480$ lm, ingress protection-IP20 or higher, with replaceable electronic driver etc., suitable for operation on 160-270V, 1 $\Phi$ , 50Hz AC supply system, directly in the false ceiling, complete including making connections with 1.5 Sqmm FRLS PVC insulated copper conductor, single core cable as required (With 5 Year Warranty.)	72	Each	1,135.00	81,720.00
44	Supply, Installation, Testing and Commissioning of bulkhead luminaire having minimum 1000 lumens output with system efficacy of 100 Lm/Watt or better, Aluminium/ CRCA housing prismatic/ PMMA difuser, SDCM $\leq 5$ , PF $\geq 0.95$ , CRI $>80$ , THD $\leq 10\%$ , Service life of 50,000 hrs @ L70, , 5700/6500K CCT with inbuilt Driver, i/c connections etc complete as required at site. (With 5 Years warranty)	53	Each	1,374.00	72,822.00

45	Supplying and installation of <b>single arm fancy wall bracket Luminaire</b> made out of stainless steel/ powder painted MS complete including glass diffuser, B-22 base, providing and fixing of 1 no. 9W LED lamp (Philips/Havells make) complete including connection etc, as reqd. (With 5 Year Warranty.)	6	Each	1,542.00	9,252.00
46	Supplying and fixing of <b>1-2 Watt Modular LED Bulk Head / Skirting Night Light Luminaire (3M)</b> including providing and fixing 3 module GI box alongwith modular base & cover plate for modular switches in recess etc, including connections, as required (In Guest Rooms) (With 5 Year Warranty.)	2	Each	1,190.00	2,380.00
47	Supply, installation, testing and commissioning of <b>LED illuminated signnages</b> with built-in battery back-up of atleast 60 minutes, having suitable demarcation of 'EXIT', FIRE HYDRANT, STAIRS, TOILETS, LIFT etc. as per standard design and with directional arrows, single or double side and in requisite colour. Each luminaire shall be complete with integral ON/OFF switch, hanging arrangement, sufficient illumination to be visible in smoky conditions, ingress protection IP-20, with integral electronic driver suitable for operation on 160-270V, 1Φ, 50Hz AC supply system, complete including connections with 1.5 Sqmm FRLS PVC insulated copper conductor single core cable, earthing etc. as required. (With 5 Year Warranty.)	65	Each	4,515.00	2,93,475.00
48	Supplying and fixing of <b>Engagement Light Luminaire consisting of two no. (1 no. Red and 1 no. Green/White colour) over door modular lights and 1 no. modular electronic chime (ding-dong)</b> complete including providing and fixing 6 module GI box alongwith modular base & cover plate, in recess etc, including connections, earthing etc. as required (for officer's room)	13	Each	1,368.00	17,784.00
49	Supply, Installation, Testing and Commissioning of 1200 mm sweep, BEE 5 star rated, ceiling fan with Brush Less Direct Current (BLDC) Motor, class of insulation: B, 3 nos. blades, 30 cm long down rod, 2 nos. canopies, shackle kit, safety rope, copper winding, Power Factor not less than 0.9, Service Value (CM/M/W) minimum 6.00, Air delivery minimum 210 Cum/Min , 350 RPM (tolerance as per IS : 374-2019), THD less than 10%, remote or electronic regulator unit for speed control and all remaining accessories including safety pin, nut bolts, washers, temperature rise=75 degree C (max.), insulation resistance more than 2 mega ohm, suitable for 230 V, 50 Hz, single phase AC Supply, earthing etc. complete as required.	216	Each	2,923.00	6,31,368.00

50	Supplying and fixing <b>extra down rod</b> of 10 cm length G.I. pipe, 15 mm dia, heavy gauge including painting etc. as required. (Note: More than 5 cm length shall be rounded to the nearest 10 cm and 5 cm or less shall be ignored)	900	Each	52.00	46,800.00
51	Providing and fixing <b>circular/ hexagonal GI Box</b> for ceiling fan clamp, of internal dia. 140mm, 73mm height, top lid of 1.5mm thick GI Sheet with its top surface hacked for proper bonding, top lid shall be screwed into the GI box by means of 3.3mm dia round headed screws, one lock at the corners. Clamp shall be made of 12mm dia. M.S. bar bent to shape as per standard drawing	216	Each	218.00	47,088.00
52	Supplying and installation of heavy duty <b>exhaust fan of following sweep</b> , (copper wound), preferably 900 RPM, with metal blades, GI louver/shutter & stainless steel bird screen, medium to heavy duty in the existing opening i/c connection, providing & fixing suitable size minimum 8 mm thick phenolic sheet, with circular opening of the size of exhaust fan sweep, to cover the opening including fixing the exhaust fan and louver/shutter on the phenolic sheet, testing and commissioning etc. complete as required.				
a)	300 mm Sweep	30	Each	2,559.00	76,770.00
b)	450 mm Sweep	5	Each	4,913.00	24,565.00
53	Supplying and installation of <b>250 mm Sweep PVC Fresh Air Fan</b> with integrated louver/shutter, suitable for operating on 230V±10%, 50 Hz, 1-Φ AC supply in the existing opening including connections, testing, commissioning etc., complete as required [Make: Almonard / Crompton / Havell's / Orient]	2	Each	1,583.00	3,166.00
54	Supplying, installing on wall, testing and commissioning of following capacity <b>Air Insulated Compact Type Rising Mains</b> for use on 3 phase 4 wire 415 Volts, 50Hz A.C. supply with enclosure made of 1.6mm thick steel sheet duly powder coated in convenient sections complete with 4 Nos. aluminium bus bars, necessary joints including 1 no. expansion joint, fire barrier at each floor, provision of tapping at every metre/ ½ 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				
a)	200 A (Isc = 15kA for 1 second)	64	Mtr	8,548.00	5,47,072.00
b)	315 A (Isc = 25 kA for 1 second)	64	Mtr	9,976.00	6,38,464.00

55	Supplying, installing, connecting to existing Air Insulated Compact Type bus trunking/ rising mains, testing and commissioning of following capacity <b>End Feed Unit</b> for use on 3 phase 4 wire 415 volts, 50Hz A.C. supply made with 1.6 mm thick steel sheet enclosure 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)	200 Amps 15KA SC for 1 Second	2	Each	9,039.00	18,078.00
b)	315 Amps 25KA SC for 1 Second	2	Each	10,889.00	21,778.00
56	Supplying, installing, connecting to existing Air Insulated Compact Type bus trunking/ rising mains, testing and commissioning of following capacity <b>Plug In/ Tap Off Box</b> for use on 3 phase 4 wire 415 volts, 50Hz A.C. supply with 1.6mm thick steel sheet enclosure duly powder coated with provision of MCCB (but without MCCB) complete etc. as required				
a)	125 Amps 15KA SC for 1 Second	33	Each	9,247.00	3,05,151.00
b)	200 Amps 25KA SC for 1 Second (On Terrace for VRV)	1	Each	9,247.00	9,247.00
57	Providing and fixing following rating and breaking capacity and pole <b>MCCB with thermomagnetic release</b> and terminal spreaders in existing cubicle panel board/end feed unit/tap-off box including drilling holes, making connections etc. as required [Ics= 100% Icu]				
a)	100 Amp, 25 KA, FPMCCB	37	Each	7,108.00	2,62,996.00
b)	125 Amp, 25 KA FP MCCB	23	Each	8,908.00	2,04,884.00
c)	200 Amp, 25 KA FP MCCB	3	Each	13,618.00	40,854.00
d)	400 Amp, 36 KA FP MCCB	2	Each	22,825.00	45,650.00
58	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 meter long etc. with charcoal/ coke and salt as required. (Note: For Lightning Protection and Rising Mains)	14	Set	8,288.00	1,16,032.00
59	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.	30	Mtr	761.00	22,830.00
60	Providing and fixing 25 mm X 5 mm G.I. strip on surface or in recess for connections etc. as required	130	Mtr	280.00	36,400.00

61	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.	26	Each	593.00	15,418.00
62	Providing and fixing G.I. tape 20 mm X 3 mm thick on parapet or on surface of wall for lightning conductor complete as required. (For Horizontal run)	315	Mtr	145.00	45,675.00
63	Providing and fixing G.I. tape 20 mm X 3 mm thick on parapet or on surface of wall for lightning conductor complete as required. (For vertical run)	175	Mtr	230.00	40,250.00
64	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.	5	Each	137.00	685.00
65	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.	25	Each	133.00	3,325.00
66	Providing and laying G.I. tape 32 mm X 6 mm from earth electrode directly in ground as required.	40	Mtr	218.00	8,720.00
<b>Total SH-1</b>					<b>1,85,99,470.00</b>
<b>SUB-HEAD-2 [External Lighting]</b>					
1	Supplying, installing, testing and commissioning of <b>3.0 metre height (Nominal) hot dipped mild steel step pole</b> , in two sections, bottom section made out of not less than 139 mm dia. $\geq$ 4.8 mm thick MS pipe (1000mm approx) and top section made out of not less than 76 mm (NS) dia. $\geq$ 3.5 mm thick MS pipe (2000 mm approx) with nipple at top of suitable size for mounting post-top luminaire, complete with decorative aluminium/CI embellishment at the junction, base plate of not less than 300 mm x 300 mm x 12 mm thickness, builtin termination box with 10A, 10KA DP MCB, DIN bar, 4 No. connectors suitable for minimum 16 A rating, shorting links etc., duly factory painted with UV resistant PU paint in glossy graphite / Black colour finish, matching with the post top luminaire; GI Foundation bolts ('J' bolts) of 16mm $\Phi$ , GI nuts and washers, anchor plate complete including RCC foundation of 450mm (L) x 450mm (B) x 1000mm deep [850mm below ground+150mm above ground] including plastering with 1:4 (1 cement : 4 course sand) cement mortar, laying of 2 nos. DWC, HDPE pipe of 63 mm OD in foundation, and painting the same in weather proof paint in requisite colour, providing a GI sheet canopy, in trepezium shape, to cover the foundation bolts and base plate of approximately 300mm height, made out of 16/14 SWG thick GI sheet steel duly factory painted with UV	24	Each	19,339.00	4,64,136.00

	resistant PU paint in glossy graphite / Black colour finish matching with the pole, as required				
	<i>Note:</i>				
	<i>1. Only hot dip galvanized pipe of size and thickness mentioned shall be used for manufacturing the approved model of the Pole. Higher dia &amp; thickness MS pipes in the Poles shall, however, be acceptable without any extra cost.</i>				
2	Supplying, Installation, Testing and Commissioning of Min. 40 Watt stylish, LED decorative post top lantern fitting having Aluminum die Cast Housing and Polycarbonate diffuser, CRI $\geq$ 70,CCT 3000/4000/5700/6500K(as per direction of Engineer in Charge), IP65/66 protection, to be mounted on existing pole including connections with 3 x 1.5 sq.mm. PVC insulated PVC sheathed copper conductor cable from looping box to post top lantern etc. complete as reqd.(With 5 Year Warranty.)	24	Each	14,283.00	3,42,792.00
3	Supplying, installing, testing and commissioning of <b>10-12 W LED LED Bollard</b> of 800-1000mm height, having extruded aluminium housing, duly painted with weather proof PU, in approved colour, optical grade diffuser, with replaceable constant current electronic driver, colour temperature-4000K, THD<10%, PF $\geq$ 0.9, built-in surge protection, Ingress Protection $\geq$ IP66, suitable for operation on 140-270V, 1- $\Phi$ , 50 Hz AC supply, including, foundation, connections etc. as required.	20	Each	8,704.00	1,74,080.00
4	Supplying and laying of following size <b>DWC HDPE Pipe, ISI marked</b> , alongwith all accessories like socket, bend, couplers etc. conforming to IS: 14930, Part II complete with fitting, cutting, jointing etc. direct in ground (90 cm below ground level) including excavation and refilling the trench but excluding sand cushioning and protective covering etc., complete as required				
a)	63mm dia (OD-63mm & ID-51mm nominal)	540	Mtr	252.00	1,36,080.00
5	Supplying & laying of following size of <b>XLPE insulated, armoured, power cable of 1.1 KV grade, duly ISI marked, with aluminum conductor, conforming to IS:7098 (Part-1)</b> in the existing RCC/ HUME/ METAL/ DWC HDPE pipe as required				
a)	2 C x 10 Sqmm	581	Mtr	363.00	2,10,903.00
6	Supplying & laying of following size of <b>XLPE insulated, armoured, power cable of 1.1 KV grade, duly ISI marked, with aluminum conductor, conforming to IS:7098 (Part-1)</b> in the existing masonry open duct/ loose in the panel as required				
a)	2 C x 10 Sqmm	8	Mtr	352.00	2,816.00



7	Supply and making <b>end termination</b> with heavy duty double brass compression gland and aluminium lugs for following size of PVC insulated and PVC sheathed Aluminium conductor cable of 1.1 KV grade as required				
a)	2 C x 10 Sqmm (19 mm)	4	Set	281.00	1,124.00
8	<b>Supplying and drawing following sizes of FRLS PVC insulated copper conductor, single core cable</b> in the existing surface/ recessed steel/ PVC conduit / Pole, as required				
a)	3 x 1.5 Sqmm	52.8	Mtr	77.00	4,065.60
9	Supplying and fixing following way, <b>single pole and neutral, sheet steel, MCB distribution board</b> , 240 volts, 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)	2 + 12 Way, Double Door	1	Each	3,076.00	3,076.00
10	Supplying and fixing <b>cable end box (Loose wire box) (IP 43)</b> suitable for following single pole and neutral, sheet steel, MCB distribution board, 240 V, on surface/ recess, complete with testing and commissioning etc. as required				
a)	For 14 Way, Double Door SPN MCB DB	1	Each	1,105.00	1,105.00
11	Supplying and fixing 5 A to 32 A rating, 240/415 V, 10 kA, "C" curve, <b>miniature circuit breaker</b> suitable for inductive load of following poles and other DIN mounting switchgear in the existing MCB DB/ Box complete with connections, testing and commissioning etc. as required				
a)	Triple pole and neutral	1	Each	1,565.00	1,565.00
b)	Single Pole	3	Each	313.00	939.00
c)	Analog Time switch (Horizontal) with 100 hr. working reserve, Accuracy ±5 Minutes	1	Each	3,258.00	3,258.00
d)	3P Contactor of ≥20A AC1 rating (DIN mounting type) (220-240V AC coil)	1	Each	997.00	997.00
12	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	589	Mtr	49.00	28,861.00
	<b>Total SH:-2</b>				<b>13,75,797.60</b>
	<b>SUB-HEAD-3: (Sub Station)</b>				
	<b>[Dismantling and Reinstallation of Sub-Station Equipment]</b>				
1	Shifting the following existing sub-station equipments including disconnection, dismantling from foundation,				

	shifting within the same complex (maximum lead of 100 mtr) including all hardware, masonry work, thimbling, re-installation, connection/terminations, HT/LT cable joint & termination testing and commissioning etc. complete for all lifts and leads etc. as required				
	<i>Note:</i>				
	<i>1. The work shall include the cost of all hardware, T&amp;P, machinery like Hydra etc.</i>				
	<i>2. The equipment shall be properly packed to avoid any damage during transit. Any damage caused to the equipment will have to be made good by the contractor at his own risk and cost.</i>				
	<i>3. The work includes all HV &amp; LV tests, dielectric strength test of transformer oil, polarity test and calibration of CT's and Relays/Releases which shall be mandatory before commissioning the HV &amp; LV equipment as per the Indian Electricity Rules.</i>				
	<i>4. It is proposed to use existing HT cables &amp; terminations and therefore the terminations and laying of existing HT cable in the open trench is deemed included.</i>				
	<i>5. Reinstallation of the DG set shall be got done by authorized service dealer of the OEM.</i>				
a)	1000 KVA, 11/0.433 KV, DYn11, ONAN Transformer	2	Job	19,460.00	38,920.00
b)	3 Panel HV Panel Board	1	Job	26,433.00	26,433.00
2	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	6	Set	15,057.00	90,342.00
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	30	Mtr	1,660.00	49,800.00
4	Providing and fixing 25 mm X 5 mm copper strip on surface or in recess for connections etc. as required	30	Mtr	1,255.00	37,650.00
5	Supply of aluminium conductor 11 kV (E) , armoured XLPE insulated Power Cables of conforming to IS:7098, Part-2 of following size as required				
a)	3 x 240 sqmm	55	Mtr	2,461.00	1,35,355.00
6	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	20	Mtr	162.00	3,240.00
7	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	23	Mtr	138.00	3,174.00
8	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	6	set	17,552.00	1,05,312.00
9	Providing, laying and fixing following dia G.I. pipe (medium class) in ground complete with G.I. fittings including trenching (75 cm deep) and re-filling etc as required				
a)	150 mm dia	20	Mtr.	2,345.00	46,900.00
	<b>[LT Panels]</b>				
1	Fabrication, supply, installation, testing and commissioning of following size floor mounted cubical type LT panel suitable for 415V, 3 phase, 4 wire 50 HZ AC supply system fabricated in compartmentalized design from CRCA sheet steel of 2 mm thick for frame work, 3mm thick for gland plates, self standing floor mounting, depth not less than 900 mm, totally dust and vermin proof i/c cleaning & finishing complete with 9 tank process for powder coating in approved shade, having TPN electrolytic grade Aluminium bus bars of high conductivity, DMC/SMC bus bars supports, with short circuit withstand capacity of fault rating of the bus-bar for 1 sec, bottom base channel of MS section not less than 100 mm X 50 mm X 5 mm thick, fabrication shall be done in transportable sections, entire panel shall have a common tinned copper earth bar of size 25 mm X 5 mm at the rear, solid connections from main bus bar to switchgears with required size of aluminium bus-bars and control wiring with FRLS multi-stranded copper conductor cables, cable alleys, individual gland plates for each feeder both at top and bottom				
	<b><u>Main LT Distribution Panel (New Block)</u></b>				
	<b>Note:-</b>				
	<i>All incoming ACBs shall have microprocessor based releases with overload, short circuit, earth fault, instantaneous protections with adjustable settings and time delay settings. ACB's shall be arranged in single tier arrangement. ACB shall be with ON/ OFF/ Trip/ Spring Charged/ Trip circuit healthy/ Isolated/ Test/ Load position &amp; R/ Y/ B indicating lamps with protection SP MCB of 2A 10 KA rating</i>				
	<i>All outgoing MCCB's shall have microprocessor based releases (unless otherwise specified) with overload, short circuit, earth fault, instantaneous protections with adjustable settings and time delay settings. All outgoing feeders shall be with ON/ OFF indicating lamps with protection SP MCB of 2A 10 KA rating</i>				
	<i>All MCCBs shall have front operating rotary handle, terminal spreaders and door interlock etc. All MCCBs shall have Ics=100% Icu</i>				

	<i>All indication light shall be LED type only duly protected with 2A SP MCB's</i>				
	<i>All digital measuring instruments shall be of accuracy class 1.0 and with LCD display unless otherwise required. The metering circuits shall be protected through 2A SP MCB i/c neutral</i>				
	<i>All metering CT's and PT's shall be cast resin type of accuracy class 1.0, 15VA Burden Class</i>				
	<i>All shunt trip coils, under-voltage relays, auxiliary transformers, contactors, aux. NO/NC contacts, relays etc. required for meeting the scheme are deemed included in the scope of work</i>				
	<b>Incoming - 02 Nos. (From existing LT Panel LHS &amp; RHS) each having the following:</b>				
	1 No. 1000 Amp, 4 Pole ACB (EDO) having microprocessor based programmable trip setting with releases for the following integral protections, LED display, memory for recording fault history & RS-485 communication port etc.				
	<i>Under voltage, Overvoltage, Overload, Short Circuit, Earth fault &amp; instantaneous Protection with time delay settings</i>				
	3 Nos. 1000A/5A, 15VA, 5P10 cast resin CTs for protection				
	3 Nos. 1000A/5A, 15VA, Class 1.0 cast resin CTs for Metering				
	1 No. 1000/5A, 15VA, Accuracy class-0.5, CTs for APFC relay				
	Multi Function Meter with LED Display and RS485 Communication Port				
	R, Y, B indicating lamps, each with 3 Nos. 2A, 10KA SP MCBs - 1 Set				
	ON/ OFF/ Trip/ Spring Charged/ Trip circuit healthy/ Isolated/ Test/ Load position, indicating lamps with protection SP MCB of 2A 10 KA rating - 1 Set				
	Auto/Manual Selector Switch, Incomer interlocking with other incomer and bus-coupler etc. complete as required				
	<b>Bus Coupler</b>				
	1000 Amp, 4 Pole ACB (EDO) having microprocessor based programmable trip setting with releases for the following integral protections, LED display, memory for recording fault history & RS-485 communication port etc.				
	<i>Under voltage, Overvoltage, Overload, Short Circuit, Earth fault &amp; instantaneous Protection with time delay settings</i>				
	3 Nos. 1000A/5A, 15VA, 5P10 cast resin CTs for protection				
	3 Nos. 1000A/5A, 15VA, Class 1.0 cast resin CTs for Metering				

	Multi Function Meter with LED Display and RS485 Communication Port				
	R, Y, B indicating lamps, each with 3 Nos. 2A, 10KA SP MCBs - 1 Set				
	ON/ OFF/ Trip/ Spring Charged/ Trip circuit healthy/ Isolated/ Test/ Load position, indicating lamps with protection SP MCB of 2A 10 KA rating - 1 Set				
	Auto/Manual Selector Switch, interlocking with other incomers etc. complete as required				
	<b>Bus-Bars</b>				
	4 strip Electrolytic grade Aluminium bus bars of 1600 Amps, 50 KA fault rating with heat shrinkable coloured sleeves i/c DMC/SMC bus bars supports				
	<b>Outgoing</b>				
	400 Amps, TPN 50 KA MCCB - 04 nos.				
	250 Amps, TPN 35 KA MCCB - 02 nos.				
	200 Amps, TPN 35 KA MCCB - 03 nos.				
	160 Amps, TPN 25 KA MCCB - 05 nos.				
	100 Amps, TPN 25 KA MCCB - 02 nos.	1	Job	12,73,544.00	12,73,544.00
2.0	<b><u>Main LT Panel (Existing Sub-Station)</u></b>				
	Fabrication, supply, installation, testing and commissioning of following size floor mounted cubical type LT panel suitable for 415V, 3 phase, 4 wire 50 HZ AC supply system fabricated in compartmentalized design from CRCA sheet steel of 2 mm thick for frame work, 3mm thick for gland plates, self standing floor mounting, depth not less than 900 mm, totally dust and vermin proof i/c cleaning & finishing complete with 9 tank process for powder coating in approved shade, having TPN electrolytic grade Aluminium bus bars of high conductivity, DMC/SMC bus bars supports, with short circuit withstand capacity of fault rating of the bus-bar for 1 sec, bottom base channel of MS section not less than 100 mm X 50 mm X 5 mm thick, fabrication shall be done in transportable sections, entire panel shall have a common tinned copper earth bar of size 25 mm X 5 mm at the rear, solid connections from main bus bar to switchgears with required size of aluminium bus-bars and control wiring with FRLS multi-stranded copper conductor cables, cable alleys, individual gland plates for each feeder both at top and bottom				
	<i>Note:- The LT Panels are to be integrated with the existing Main LT Panel in the Sub-Station by way of extension of bus-bar on either side of the Bus-coupler. They shall therefore be of the same height and colour as the existing LT Panel. The design shall be straight or 'L' shape depending on the dimensions at site. The bus-bar size and material shall be same as in the existing LT Panel</i>				

	<i>All ACB's shall have microprocessor based releases (unless otherwise specified) with overload, short circuit, earth fault, instantaneous protections with adjustable settings and time delay settings</i>				
	<i>All indication light shall be LED type only duly protected with 2A SP MCB's</i>				
	<i>All digital measuring instruments shall be of accuracy class 1.0 and with LCD display unless otherwise required. The metering circuits shall be protected through 2A SP MCB i/c neutral</i>				
	<i>All metering CT's and PT's shall be cast resin type of accuracy class 1.0, 15VA Burden Class</i>				
	<i>All shunt trip coils, under-voltage relays, auxiliary transformers, contactors, aux. NO/NC contacts, relays etc. required for meeting the scheme are deemed included in the scope of work</i>				
	<b>OUTGOING</b>				
i)	1 No. 1000 Amp, 4 Pole ACB (EDO) having microprocessor based programmable trip setting with releases for the following integral protections, LED display, memory for recording fault history & RS-485 communication port etc.				
	<i>Under voltage, Overvoltage, Overload, Short Circuit, Earth fault &amp; instantaneous Protection with time delay settings</i>				
	<i>3 Nos. 1000A/5A, 15VA, 5P10 cast resin CTs for protection</i>				
	<i>3 Nos. 1000A/5A, 15VA, Class 1.0 cast resin CTs for Metering</i>				
	<i>Multi Function Meter with LED Display and RS485 Communication Port</i>				
	<i>R, Y, B indicating lamps, each with 3 Nos. 2A, 10KA SP MCBs - 1 Set</i>				
	<i>ON/OFF/Trip/ Spring Charged &amp; Trip circuit healthy indicating lamps with protection SP MCB of 2A 10 KA rating - 1 Set</i>				
	<i>Auto/Manual Selector Switch, Incomer interlocking with other incomer and bus-coupler etc. complete as required</i>				
ii)	1 No. 800 Amp, 4 Pole, 50KA ACB (EDO) having microprocessor based programmable trip setting with releases for the following integral protections, LED display, memory for recording fault history & RS-485 communication port etc.				
	<i>Under voltage, Overvoltage, Overload, Short Circuit, Earth fault &amp; instantaneous Protection with time delay settings</i>				
	<i>3 Nos. 800A/5A, 15VA, 5P10 cast resin CTs for protection</i>				
	<i>3 Nos. 800A/5A, 15VA, Class 1.0 cast resin CTs for Metering</i>				

	<i>Multi Function Meter with LED Display and RS485 Communication Port</i>				
	<i>R, Y, B indicating lamps, each with 3 Nos. 2A, 10KA SP MCBs - 1 Set</i>				
	<i>ON/OFF/Trip/ Spring Charged &amp; Trip circuit healthy indicating lamps with protection SP MCB of 2A 10 KA rating - 1 Set</i>				
	<i>Auto/Manual Selector Switch, Incomer interlocking with other incomer and bus-coupler etc. complete as required</i>				
	<b>Bus-Bars</b>				
	4-Strip Electrolytic grade Aluminium bus bars of 1600 Amps, 63 KA fault rating with heat shrinkable coloured sleeves i/c DMC/SMC bus bars supports [Note: The size shall not be less than size and material as the existing main LT Panel in the sub-station]	2	Job	5,05,975.00	10,11,950.00
3.0	<b><u>Essential Supply Panel (New Block)</u></b>				
	Fabrication, supply, installation, testing and commissioning of following size floor mounted cubical type LT panel suitable for 415V, 3 phase, 4 wire 50 HZ AC supply system fabricated in compartmentalized design from CRCA sheet steel of 2 mm thick for frame work, 3mm thick for gland plates, self standing floor mounting, depth not less than 900 mm, totally dust and vermin proof i/c cleaning & finishing complete with 9 tank process for powder coating in approved shade, having TPN electrolytic grade Aluminium bus bars of high conductivity, DMC/SMC bus bars supports, with short circuit withstand capacity of fault rating of the bus-bar for 1 sec, bottom base channel of MS section not less than 100 mm X 50 mm X 5 mm thick, fabrication shall be done in transportable sections, entire panel shall have a common tinned copper earth bar of size 25 mm X 5 mm at the rear, solid connections from main bus bar to switchgears with required size of aluminium bus-bars and control wiring with FRLS multi-stranded copper conductor cables, cable alleys, individual gland plates for each feeder both at top and bottom				
	<b>NOTE:</b>				
	<i>All incoming ACBs shall have microprocessor based releases with overload, short circuit, earth fault, instantaneous protections with adjustable settings and time delay settings. ACB's shall be arranged in single tier arrangement. ACB shall be with ON/ OFF/ Trip/ Spring Charged/ Trip circuit healthy/ Isolated/ Test/ Load position &amp; R/ Y/ B indicating lamps with protection SP MCB of 2A 10 KA rating</i>				
	<i>All outgoing MCCB's shall have Thermo-magnetic releases (unless otherwise specified) with overload, short circuit, earth fault, protections with adjustable settings. MCCB's shall be with ON/ OFF indicating lamps</i>				
	<i>All MCCBs shall have front operating rotary handle, terminal spreaders and door interlock etc. All MCCBs shall have Ics=100% Icu</i>				

	<i>All indication light shall be LED type only duly protected with 2A SP MCB's</i>				
	<i>All digital measuring instruments shall be of accuracy class 1.0 and with LCD display unless otherwise required. The metering circuits shall be protected through 2A SP MCB i/c neutral</i>				
	<i>All metering CT's and PT's shall be cast resin type of accuracy class 1.0, 15VA Burden Class</i>				
	<i>All shunt trip coils, under-voltage relays, auxiliary transformers, contactors, aux. NO/NC contacts, relays etc. required for meeting the scheme are deemed included in the scope of work</i>				
	<b>INCOMING</b>				
	2 Nos. 630 Amp, 50 KA, 4 Pole ACB having microprocessor based programmable trip setting releases for the following integral protections, LED display, memory for recording fault history & RS-485 communication port, interlocked with each other so that only one of the two remains 'ON' at any one time with auto sensing of supply (Break before make analogy) etc.				
	<i>Under voltage, Overvoltage, Overload, Short Circuit, Earth fault &amp; instantaneous Protection with time delay settings</i>				
	3 Nos. 630A/5A, 15VA, 5P10 cast resin CTs for protection				
	3 Nos. 630A/5A, 15VA, Class 1.0 cast resin CTs for Metering				
	1 No. 630/5A, 15VA, Accuracy class-0.5, CTs for APFC relay				
	Multi Function Meter with LED Display and RS485 Communication Port				
	R, Y, B indicating lamps, each with 3 Nos. 2A, 10KA SP MCBs - 1 Set				
	ON/ OFF/ Trip/ Spring Charged/ Trip circuit healthy/ Isolated/ Test/ Load position, indicating lamps with protection SP MCB of 2A 10 KA rating - 1 Set				
	Auto/Manual Selector Switch, Incomer interlocking with other incomer and bus-coupler etc. complete as required				
	<b>Bus-Bars</b>				
	4 strip electrolytic grade aluminium bus-bars of 800 Amps, 50 KA fault rating with heat shrinkable coloured sleeves i/c DMC/SMC bus bars supports				
	<b>Outgoing</b>				
	250 Amps, TPN 35 KA MCCB - 01 Nos.				
	200 Amps, TPN 35 KA MCCB - 03 Nos.				
	100 Amps, TPN 25 KA MCCB - 07 Nos.				
	63 Amps, TPN 25 KA MCCB - 03 Nos.	1	Job	7,96,472.00	7,96,472.00



4.0	<b><u>Synchronization Panel (In Existing Sub-Station)</u></b>				
	Fabrication, supply, installation, testing and commissioning of following size floor mounted cubical type LT panel suitable for 415V, 3 phase, 4 wire 50 HZ AC supply system fabricated in compartmentalized design from CRCA sheet steel of 2 mm thick for frame work, 3mm thick for gland plates, self standing floor mounting, depth not less than 900 mm, totally dust and vermin proof i/c cleaning & finishing complete with 9 tank process for powder coating in approved shade, having TPN electrolytic grade Aluminium bus bars of high conductivity, DMC/SMC bus bars supports, with short circuit withstand capacity of fault rating of the bus-bar for 1 sec, bottom base channel of MS section not less than 100 mm X 50 mm X 5 mm thick, fabrication shall be done in transportable sections, entire panel shall have a common tinned copper earth bar of size 25 mm X 5 mm at the rear, solid connections from main bus bar to switchgears with required size of aluminium bus-bars and control wiring with FRLS multi-stranded copper conductor cables, cable alleys, individual gland plates for each feeder both at top and bottom				
	<b>NOTE:</b>				
	<i>All ACB's shall have microprocessor based releases (unless otherwise specified) with overload, short circuit, earth fault, instantaneous protections with adjustable settings and time delay settings</i>				
	<i>All MCCB's shall have microprocessor based releases (unless otherwise specified) with overload, short circuit, earth fault, instantaneous protections with adjustable settings</i>				
	<i>All MCCBs shall have front operating rotary handle, terminal spreaders and door interlock etc. All MCCBs shall have <math>I_{cs}=100\% I_{cu}</math></i>				
	<i>All indication light shall be LED type only duly protected with 2A SP MCB's</i>				
	<i>All digital measuring instruments shall be of accuracy class 1.0 and with LCD display unless otherwise required. The metering circuits shall be protected through 2A SP MCB i/c neutral</i>				
	<i>All metering CT's and PT's shall be cast resin type of accuracy class 1.0, 15VA Burden Class</i>				
	<i>All shunt trip coils, under-voltage relays, auxiliary transformers, contactors, aux. NO/NC contacts, relays etc. required for meeting the scheme are deemed included in the scope of work</i>				

	<i>The Panel shall have the feature of manual over-ride of operation of DG sets through synchronization of supplies. All incomers from DG Sets shall be with synchronization relay and reverse power protection relays. In no case normal supply and DG supply incomers operate in parallel. Necessary time delay relays shall be provided in addition to the PLC, woodworth relay for added safety</i>				
	<b>Incoming</b>				
i)	<b>From existing LT Panel --- 02 Nos. [1 from LHS &amp; 1 from RHS) each having the following:</b>				
	1 Nos. 800 Amp, 4 Pole, 50KA ACB (EDO) having microprocessor based programmable trip setting with releases for the following integral protections, LED display, memory for recording fault history & RS-485 communication port, interlocked with other incomer so that only one of the two remains 'ON' at any one time with auto sensing of supply (Break before make analogy) etc.				
	<i>Under voltage, Overvoltage, Overload, Over current &amp; Earth fault &amp; instantaneous Protection with time delay settings</i>				
	<i>3 Nos. 800A/5A, 15VA, 5P10 cast resin CTs for protection</i>				
	<i>3 Nos. 800A/5A, 15VA, Class 1.0 cast resin CTs for Metering</i>				
	<i>Multi Function Meter with LED Display and RS485 Communication Port</i>				
	<i>R, Y, B indicating lamps, each with 3 Nos. 2A, 10KA SP MCBs - 1 Set</i>				
	<i>ON/OFF/Trip/ Spring Charged &amp; Trip circuit healthy indicating lamps with protection SP MCB of 2A 10 KA rating - 1 Set</i>				
	<i>Auto/Manual Selector Switch, Incomer interlocking with other incomer and bus-coupler etc. complete as required</i>				
ii)	<b>From 500 KVA DG Set --- 01 No. having the following:</b>				
	1 No. 800 Amp, 4 Pole, 50KA ACB (EDO) having microprocessor based programmable trip setting with releases for the following integral protections, LED display, memory for recording fault history & RS-485 communication port etc.				
	<i>Under voltage, Overvoltage, Overload, Over current &amp; Earth fault &amp; instantaneous Protection with time delay settings</i>				
	<i>3 Nos. 800A/5A, 15VA, 5P10 cast resin CTs for protection</i>				
	<i>3 Nos. 800A/5A, 15VA, Class 1.0 cast resin CTs for Metering</i>				
	<i>Multi Function Meter with LED Display and RS485 Communication Port</i>				
	<i>R, Y, B indicating lamps, each with 3 Nos. 2A, 10KA SP MCBs - 1 Set</i>				

	<i>ON/OFF/Trip/ Spring Charged &amp; Trip circuit healthy indicating lamps with protection SP MCB of 2A 10 KA rating - 1 Set</i>				
	<i>Auto/Manual Selector Switch, Incomer interlocking with other incomer and bus-coupler etc. complete as required</i>				
iii)	<b>From 320 KVA DG Set --- 01 No. having the following:</b>				
	1 No. 630 Amp, 4 Pole, 50KA ACB (EDO) having microprocessor based programmable trip setting with releases for the following integral protections, LED display, memory for recording fault history & RS-485 communication port etc.				
	<i>Under voltage, Overvoltage, Overload, Short Circuit, Earth fault &amp; instantaneous Protection with time delay settings</i>				
	3 Nos. 500A/5, 15VA, 5P10 cast resin CTs for protection				
	3 Nos. 500A/5A, 15VA, Class 1.0 cast resin CTs for Metering				
	1 No. 500/5A, 15VA, Accuracy class-0.5, CTs for APFC relay				
	Multi Function Meter with LED Display and RS485 Communication Port				
	R, Y, B indicating lamps, each with 3 Nos. 2A, 10KA SP MCBs - 1 Set				
	<i>ON/ OFF/ Trip/ Spring Charged/ Trip circuit healthy/ Isolated/ Test/ Load position, indicating lamps with protection SP MCB of 2A 10 KA rating - 1 Set</i>				
	<i>Auto/Manual Selector Switch, Incomer interlocking with other incomer and bus-coupler etc. complete as required</i>				
iv)	<b>From 200 KVA DG Set --- 01 No. having the following:</b>				
	1 No. 630 Amp, 4 Pole, 50KA ACB (EDO) having microprocessor based programmable trip setting with releases for the following integral protections, LED display, memory for recording fault history & RS-485 communication port etc.				
	<i>Under voltage, Overvoltage, Overload, Short Circuit, Earth fault &amp; instantaneous Protection with time delay settings</i>				
	3 Nos. 315A/5A, 15VA, 5P10 cast resin CTs for protection				
	3 Nos. 315A/5A, 15VA, Class 1.0 cast resin CTs for Metering				
	1 No. 315/5A, 15VA, Accuracy class-0.5, CTs for APFC relay				
	Multi-Function Meter with LED Display and RS485 Communication Port				
	R, Y, B indicating lamps, each with 3 Nos. 2A, 10KA SP MCBs - 1 Set				

	ON/ OFF/ Trip/ Spring Charged/ Trip circuit healthy/ Isolated/ Test/ Load position, indicating lamps with protection SP MCB of 2A 10 KA rating - 1 Set				
	Auto/Manual Selector Switch, Incomer interlocking with other incomer and bus-coupler etc. complete as required				
	<b>PLC &amp; Woodworth/ similar Relay for synchronization of DG Sets for parallel operation, auto load selection &amp; operation:</b>				
	1 No. 64-bit microprocessor based PLC with MMI, Woodworth/similar Relay, synchronization relay, reverse power relay etc. for auto load Management of DG Sets, Sensing & Signalling, AMF operation, Selection of Master DG Sets, operation (Opening/closing) as required incomers ACB's interlocking etc as required, interlocking of two normal supply incomers, AMF commencement for operation of DG Set(s), interfacing with DG Set Control Modules and coordination with Controller and DG Sets, auto Load selection & sharing for selection of DG Set and synchronized operation of DG Sets etc.				
	<b>Bus-Bars</b>				
	4 strip electrolytic grade aluminium bus-bars of 1200 Amps, 50 KA fault rating with heat shrinkable coloured sleeves i/c DMC/SMC bus bars supports				
	<b>Outgoing</b>				
	5 No. 630 Amp, 50 KA, 4 Pole ACB having microprocessor based programmable trip setting with releases for the following integral protections, LED display, memory for recording fault history & RS-485 communication port etc. each having the following:				
	Under voltage, Overvoltage, Overload, Over current & Earth fault & instantaneous Protection with adjustable settings				
	3 Nos. 630A/5A, 15VA, 5P10 cast resin CTs for protection				
	3 Nos. 630A/5A, 15VA, Class 1.0 cast resin CTs for Metering				
	1 No. 630/5A, 15VA, Accuracy class-0.5, CTs for APFC relay				
	Multi Function Meter with LED Display and RS485 Communication Port				
	R, Y, B indicating lamps, each with 3 Nos. 2A, 10KA SP MCBs - 1 Set				
	ON/ OFF/ Trip/ Spring Charged/ Trip circuit healthy/ Isolated/ Test/ Load position, indicating lamps with protection SP MCB of 2A 10 KA rating - 1 Set				
	Auto/Manual Selector Switch	1	Job	27,43,680.00	27,43,680.00
5.0	<b><u>EV Charging Panel (Basement of New Block)</u></b>				
	Fabrication, supply, installation, testing and commissioning of following size floor mounted cubical type LT panel suitable for 415V, 3 phase, 4 wire 50 HZ AC supply system fabricated in compartmentalized design from CRCA sheet steel of 2 mm thick for frame work,				

3mm thick for gland plates, self standing floor mounting, depth not less than 300 mm, totally dust and vermin proof i/c cleaning & finishing complete with 9 tank process for powder coating in approved shade, having TPN electrolytic grade Aluminium bus bars of high conductivity, DMC/SMC bus bars supports, with short circuit withstand capacity of fault rating of the bus-bar for 1 sec, bottom base channel of MS section not less than 100 mm X 50 mm X 5 mm thick, fabrication shall be done in transportable sections, entire panel shall have a common tinned copper earth bar of size 25 mm X 5 mm at the rear, solid connections from main bus bar to switchgears with required size of aluminium bus-bars and control wiring with FRLS multi-stranded copper conductor cables, cable alleys, individual gland plates for each feeder both at top and bottom				
<i>All incoming MCCBs shall have microprocessor-based releases with overload, short circuit, earth fault, instantaneous protections with adjustable settings and time delay settings. ACB's shall be arranged in single tier arrangement unless otherwise required</i>				
<i>All MCCB`s shall have Thermo-magnetic releases (unless otherwise specified) with overload, short circuit, earth fault, protections with adjustable settings</i>				
<i>All MCCBs shall have front operating rotary handle, terminal spreaders and door interlock etc. All MCCBs shall have Ics=100% Icu</i>				
<i>All indication light shall be LED type only duly protected with 2A SP MCB's</i>				
<i>All digital measuring instruments shall be of accuracy class 1.0 and with LCD display unless otherwise required. The metering circuits shall be protected through 2A SP MCB i/c neutral</i>				
<i>All metering CT's and PT's shall be cast resin type of accuracy class 1.0, 15VA Burden Class</i>				
<i>All shunt trip coils, under-voltage relays, auxiliary transformers, contactors, aux. NO/NC contacts, relays etc. required for meeting the scheme are deemed included in the scope of work</i>				
Incoming (From Main LT Distribution Panel (New Block)				
1 No. 160 Amp, 35 KA, 4 Pole MCCB with RS-485 communication port				
3 Nos. 160A/5A, 10VA, Class 1.0 cast resin CTs for Metering				
(0-500V) Digital Voltmeter with VSS				
(0-200A) Digital Amperemeter with SS				
R, Y, B indicating lamps, each with 3 Nos. 2A, 10KA SP MCBs - 1 Set				
<b>Bus-Bars</b>				
4 strip electrolytic grade aluminium bus-bars of 200 Amps, 36 KA fault rating with heat shrinkable coloured sleeves i/c DMC/SMC bus bars supports				

	<b>Outgoing</b>				
	40 Amps, 16/25 KA, TPN MCCB - 06 Nos.	2	Job	1,28,992.00	2,57,984.00
6.0	<b>160 KVAR Capacity APFC Panel (Hybrid type)</b>				
	Fabrication, supply, installation, testing and commissioning of following size floor mounted cubical type <b>160 KVAR Capacity APFC Panel (Hybrid type)</b> , suitable for 415V, 3 phase, 4 wire 50 HZ AC supply system fabricated from CRCA sheet steel of 2 mm thick for frame work, 3 mm thick for gland plates, self standing floor mounting, depth not less than 700 mm, totally dust and vermin proof i/c cleaning & finishing complete with 9 tank process for powder coating in approved shade, having TPN electrolytic grade aluminium bus bars of high conductivity, DMC/SMC bus bars supports, with short circuit withstand capacity of fault rating of the bus-bar for 1 sec, bottom base channel of MS section not less than 100 mm X 50 mm X 5 mm thick, entire panel shall have a common tinned copper earth bar of size 25 mm X 5 mm at the rear, solid connections from main bus bar to switchgears with required size of aluminium bus-bars and control wiring with FRLS multi-stranded copper conductor cables, cable alleys, individual gland plates for each feeder both at top and bottom				
	<i>All incoming MCCBs shall have microprocessor based releases with overload, short circuit, earth fault, instantaneous protections with adjustable settings and time delay settings. ACB's shall be arranged in single tier arrangement unless otherwise required</i>				
	<i>All MCCB's shall have Thermo-magnetic releases (unless otherwise specified) with overload and short circuit with adjustable settings</i>				
	<i>All MCCBs shall have front operating rotary handle, terminal spreaders and door interlock etc. All MCCBs shall have Ics=100% Icu</i>				
	<i>All indication light shall be LED type only duly protected with 2A SP MCB's</i>				
	<i>All digital measuring instruments shall be of accuracy class 1.0 and with LCD display unless otherwise required. The metering circuits shall be protected through 2A SP MCB i/c neutral</i>				
	<i>All metering CT's and PT's shall be cast resin type of accuracy class 1.0, 15VA Burden Class</i>				
	<i>All capacitors shall be heavy duty MPP type rated for 600 V, conforming to IS:13340, 1993, self healing type, Over Pressure Disconnection and Finger-proof termination safety features, power loss&lt;0.50 W/KVAR</i>				
	<i>Panel shall have 2 nos. auto operating continuous duty ventilation fans</i>				

	<b>INCOMER</b>				
	1 No. 250A TP MCCB, 50 kA at 415 V (Ics=Icu) with microprocessor release for overcurrent and short circuit				
	1 No. Intelligent multifunction digital meter to read V, A, KVA, KWH, THD, PF Hz etc. having RS 485 port and compatible to PC with Modbus protocol				
	3 Nos. resin cast CTs of 630/5 A class 1.0 accuracy and 15 VA burden				
	1 No. Auto / Manual Selector Switch				
	1 Set of R, Y, B indicating lamps, each with 3 Nos. 2A, 10KA SP MCBs				
	<b>Bus Bars</b>				
	4 strip electrolytic grade aluminium bus-bars of 320 Amps, 50 KA fault rating with heat shrinkable coloured sleeves i/c DMC/SMC bus bars supports				
	<b>OUTGOING</b>				
	1 No. PF regulator / APFC relay (3 CT Operated):- Advance range PF regulator / microprocessor based APFC relay with LCD display & suitable steps				
	1 No. 60A, 3-phase, 4 wire AHF with neutral compensation				
	2 Nos. 125A TP MCCB, 36 KA with 14% copper wound reactor & capacitor duty contactor for 50 KVAR heavy duty capacitor				
	1 No. 50A TP MCCB, 36 KA with 14% Copper reactor& capacitor duty contactor for 20 KVAR heavy duty capacitor				
	1 No. 40A TP MCCB, 36 KA with 14% Copper reactor& capacitor duty contactor for 15 KVAR heavy duty capacitor				
	1 No. 25A TP MCCB, 36 KA with 14% Copper reactor& capacitor duty contactor for 10 KVAR heavy duty capacitor				
	1 No. 25A TP MCCB, 36 KA with 14% Copper reactor& capacitor duty contactor for 8 KVAR heavy duty capacitor				
	1 No. 20A TP MCCB, 36 KA with 14% Copper reactor& capacitor duty contactor for 4 KVAR heavy duty capacitor				
	1 No. 16A TP MCCB, 36 KA with 14% Copper reactor& capacitor duty contactor for 2 KVAR heavy duty capacitor				
	1 No. 10A TP MCCB, 36 KA with 14% Copper reactor& capacitor duty contactor for 1 KVAR heavy duty capacitor	3	Job	7,54,698.00	22,64,094.00

7.0	Supplying, installing by suspension on ceiling, testing and commissioning of following capacity Sandwich Type Bus Trunking for use on 3 phase 4 wire 415 volts, 50Hz A.C. supply with metal clad enclosure made of 1.6mm thick steel sheet duly powder coated in convenient sections complete with 4 Nos. aluminium bus-bars, necessary joints, elbow joints & expansion joints and bends, fire barrier at each floor, provision of tapping at every metre, adopter box and copper flexible for joints, continuous earthing with 2 Nos. aluminium strip of suitable size (one on each side) including, G.I. clamping brackets, suspenders, angle iron bracket, steel fasteners, connecting to earthing system etc. as required				
a)	630 Amps 50KA SC for 1 sec	14	Mtr	13,863.00	1,94,082.00
b)	800 Amps 50KA SC for 1 sec	13	Mtr	16,706.00	2,17,178.00
c)	1000 Amps 50KA SC for 1 sec	15	Mtr	18,024.00	2,70,360.00
d)	1600 Amps 50KA SC for 1 sec	54	Mtr	27,887.00	15,05,898.00
8.0	Supply of aluminium conductor, GI strip armoured XLPE insulated Power Cables of 1.1 KV grade, conforming to IS:7098, Part-1 of following size as required				
a)	3.5 C X 300 Sqmm	336	Mtr	2,176.00	7,31,136.00
b)	3.5 C X 240 Sqmm	100	Mtr	1,782.00	1,78,200.00
c)	3.5 C X 150 Sqmm	60	Mtr	1,097.00	65,820.00
d)	3.5 C X 120 Sqmm	154	Mtr	934.00	1,43,836.00
e)	3.5 C X 95 Sqmm	211	Mtr	761.00	1,60,571.00
f)	3.5 C X 70 Sqmm	328	Mtr	608.00	1,99,424.00
g)	3.5 C X 35 Sqmm	225	Mtr	337.00	75,825.00
h)	4.0 C X 25 Sqmm	486	Mtr	289.00	1,40,454.00
9.0	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/ DWC HDPE pipe as required				
a)	Upto 35 Sqmm	265	Mtr	44.00	11,660.00
b)	Above 35 Sqmm and upto 95 Sqmm	255	Mtr	68.00	17,340.00
c)	Above 95 Sqmm and upto 185 Sqmm	110	Mtr	92.00	10,120.00
d)	Above 185 Sqmm and upto 400 Sqmm	232	Mtr	162.00	37,584.00
10.0	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 Sqmm (clamped with 1 mm thick saddle)	144	Mtr	51.00	7,344.00
b)	Above 35 Sqmm and upto 95 Sqmm (clamped with 25 x 3 mm MS flat clamp)	72	Mtr	106.00	7,632.00
c)	Above 95 Sqmm and upto 185 Sqmm (clamped with 25/40 x 3 mm MS flat clamp)	84	Mtr	134.00	11,256.00



d)	Above 185 Sqmm and upto 400 Sqmm (clamped with 40 x 3 mm MS flat clamp)	56	Mtr	270.00	15,120.00
11.0	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 Sqmm	78	Mtr	34.00	2,652.00
b)	Above 35 Sqmm and upto 95 Sqmm	72	Mtr	55.00	3,960.00
c)	Above 95 Sqmm and upto 185 Sqmm	84	Mtr	76.00	6,384.00
d)	Above 185 Sqmm and upto 400 Sqmm	108	Mtr	138.00	14,904.00
12.0	Laying and fixing of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size on wall surface as required				
a)	Upto 35 Sqmm (clamped with 1mm thick saddle)	224	Mtr	63.00	14,112.00
b)	Above 35 Sqmm and upto 95 Sqmm (clamped with 25x3mm MS flat clamp)	40	Mtr	148.00	5,920.00
c)	Above 95 Sqmm and upto 185 Sqmm (clamped with 25/40x3mm MS flat clamp)	20	Mtr	175.00	3,500.00
d)	Above 185 Sqmm and upto 400 Sqmm (clamped with 40x3mm MS flat clamp)	40	Mtr	262.00	10,480.00
13.0	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)	3.5 C X 300 Sqmm (70mm)	12	Each	1,326.00	15,912.00
b)	3.5 C X 240 Sqmm (62mm)	10	Each	1,147.00	11,470.00
c)	3.5 C X 150 Sqmm (50mm)	6	Each	785.00	4,710.00
d)	3.5 C X 120 Sqmm (45mm)	4	Each	695.00	2,780.00
e)	3.5 C X 95 Sqmm (45mm)	4	Each	669.00	2,676.00
f)	3.5 C X 70 Sqmm (38mm)	8	Each	531.00	4,248.00
g)	3.5 C X 35 Sqmm (32mm)	8	Each	425.00	3,400.00
h)	4 X 25 Sqmm (28mm)	50	Each	362.00	18,100.00
14.0	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)	63 mm dia (OD-63 mm & ID-51 mm nominal)	445	Mtr	252.00	1,12,140.00
b)	120 mm dia (OD-120 mm & ID-103 mm nominal)	417	Mtr	493.00	2,05,581.00

15.0	Supplying and installing following size of perforated Hot Dipped Galvanised Iron cable tray (galvanisation thickness not less than 50 microns) with perforation not more than 17.5%, in convenient sections, joined with connectors, suspended from the ceiling with G.I. suspenders including G.I. bolts & nuts, etc. as required				
a)	300 mm width X 62.5 mm depth X 2.0 mm thickness	75	Mtr	1,300.00	97,500.00
b)	450 mm width X 62.5 mm depth X 2.0 mm thickness	55	Mtr	1,717.00	94,435.00
c)	600 mm width X 62.5 mm depth X 2.0 mm thickness	50	Mtr	2,083.00	1,04,150.00
16.0	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	4	Set	8,288.00	33,152.00
17.0	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	32	Mtr	761.00	24,352.00
18.0	Providing and fixing 25 mm x 5 mm G.I. strip on surface or in recess for connections etc. as required.	60	Mtr	280.00	16,800.00
19.0	Providing and fixing 6 SWG dia G.I. wire on surface or in recess for loop earthing along with existing surface/ recessed conduit/ sub-main wiring/ cable as required	3800	Mtr	49.00	1,86,200.00
20.0	Supplying, installation, Testing and commissioning of ANTI SKID RUBBER MAT ISI Marked, ERDA & CPRI type tested insulating mats Class-C category maximum usage voltage 33kv, 1 mtr x 2 mtr. 3mm thick etc. as required.	8	nos.	726.00	5,808.00
21.0	Supplying, installation, Testing and commissioning of Fire Bucket stand made from 24 swg. GI Sheet similar to IS: 2546 of M S angle suitable for and with 4 Nos Fire Buckets of 9.5 Ltrs capacity	2	Each	1,622.00	3,244.00
22.0	Supplying, installation, Testing and commissioning of First Aid Box including materials as approved by Indian Red Cross Society conforming to IS : 2217 etc. as required.	2	Each	317.00	634.00
23.0	Supplying, installation, Testing and commissioning of Shock Treatment Chart (prescribed under I.E.rules) duly framed with glass and supported from back with hard board with supply of all material labour T & P etc for proper completion of work. (Approx front area= 1.20 sqm)	2	Each	423.00	846.00
<b>TOTAL SH-3</b>					<b>1,38,95,740.00</b>

	<b>SUB-HEAD: 4 [SITC of DG Set]</b>				
1	Supplying, installing, testing and commissioning of 'Silent Type' Diesel Generating Set of following Prime Power Rating at 415 Volt, 1500 RRM, 0.8 lagging PF, 3-Phase, 4 Wire, 50 Hz, AC supply system and for 0.85 load factor along with the acoustic enclosure as per the latest CPCB norms CPCB-4), complete including making suitable cement concrete foundation as per the manufacturers design and as required by CPWD specifications, complete including the following:				
	<b>Diesel Engine:</b>				
	Diesel engine 4 stroke, turbo charged, water cooled, electric start, of suitable BHP at 1500 RPM suitable for 320 KVA output of alternator at 40 Degree Centigrade, 50% RH and at 1000 meter MSL and conforming to BS:5514, BS:649, IS:10000, Capable of taking 10% over loading for one hour after 12 hours of continuous operation. The engine shall be fitted complete with all the required accessories and electronic governor (Class A2) for Parallel synchronized operation of DG Sets				
	<b>Engine mounted instrument panel fitted with and having digital display for following</b>				
	i) Start-Stop switch with key				
	ii) Water temperature indication				
	iii) Lubrication oil pressure indication				
	iv) Lubrication oil temperature indication				
	v) Battery charging indication				
	vi) RPM indication				
	vii) Over speed indication				
	viii) Low lube Oil trip indication				
	ix) Engine Hours indication				
	<b>Alternator:</b>				
	Synchronous alternator rated at 320 KVA, 415 volts at 1500 RPM, 3 phase, 4 wire system, 50 Hz, AC supply with 0.8 lagging power factor at 40 Degree C, 50% RH and at 1000 meter MSL. The alternator shall be having SPDP enclosure, brushless, continuous duty, self-excited and self – regulated through AVR conforming to IS : 4722/BS 2613 suitable for tropical conditions and with class-H insulation				
	<b>Base Frame &amp; Foundation :</b>				
	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 specification.				
	<b>Fuel Tank:</b>				
	Built-in daily service fuel tank of 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' pipe of suitable dia, complete with valves, level indications & accessories as required as per specifications				
	<b>Exhaust System</b>				
	Dry exhaust manifold with residential exhaust silencer and catalytic converter				
	<b>Starting System :</b>				
	12 /24 V DC starting system comprising of starter motors, voltage regulator and arrangement for initial excitation complete with suitable nos. of batteries (Lead Acid with 2 year guarantee) as per manufacturers recommendation as required as per specifications				
	<b>Acoustic enclosure :</b>				
	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 as per specifications				
	<b>Warrantee :</b>				
	The DG Set shall be Guaranteed/Warranted for a period of 5 years against all manufacturing defects from the date of supply. The cost of services required from the dte of supply till the date of handing over shall be borne by the contractor including the requirement of fuel, oil and lubricants etc.				
a)	320 KVA	1	Set	23,10,249.00	23,10,249.00
2	Supply, installation, testing and commissioning of exhaust pipe fabricated out of $\geq 6$ mm thick welded black MS, 'B' class pipe, conforming to IS:1239 Part-I (Tata/ Jindal Hissar), cut to required lengths and installed with necessary bends, supports, anti-vibration mountings and with all fixing accessories and hardware's. The exhaust pipes shall be dual insulated with first layer of 25 mm thick ceramic fibre wool insulation (128 Kg/ cubic metre density) and second layer of 50 mm thick mineral wool (150 Kg/ cubic metre density) insulation wrapped in chicken mesh and clad with 24 gauge aluminium sheet including all support as required				
a)	150 mm dia.	20	Mtr	3,777.00	75,540.00
3	Structual steel work single section, fixed with or without connecting plate, including cutting, hositing, fixing in position and applying a priming coat of approved steel primer all complete.	150	Kg	133.70	20,055.00
4	Supplying and laying of one number aluminium conductor, armoured, XLPE power cable of 1.1 KV grade, conforming to IS:7098, Part-1, of following size, in the existing RCC/ HUME/DWC HDPE/ METAL pipe as required				
a)	3.5 x 300 Sqmm	32	Mtr	2,338.00	74,816.00
5	Supplying, laying and fixing of one number aluminium conductor, armoured XLPE power cable of 1.1 KV grade,				

	conforming to IS:7098, Part-1, of following size, on cable tray as required (Clamped with 40x3 mm MS flat clamp)				
a)	3.5 x 300 Sqmm	16	Mtr	2,385.00	38,160.00
6	Supplying and laying of one number 12 Core 2.5 Sqmm multistranded bright electrolytic grade anealed bare copper conductor PVC insulated and PVC sheathed, round, flexible, unarmoured control cable of voltage grade 300/500 Volt in the existing RCC/ HUME/DWC HDPE/ METAL pipe as required	10	Mtr	678.00	6,780.00
7	Supplying, laying and fixing of one number 12 Core 2.5 Sqmm multistranded bright electrolytic grade anealed bare copper conductor PVC insulated and PVC sheathed, round, flexible, unarmoured control cable of voltage grade 300/500 Volt on cable tray as required (Clamped with 1mm thick saddles)	8	Mtr	685.00	5,480.00
8	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)	200 mm dia (OD-200 mm & ID-175 mm nominal)	20	Mtr	1107.00	22,140.00
9	Providing, laying and fixing following dia G.I. pipe (medium class) in ground complete with G.I. fittings including trenching (75 cm deep)and re-filling etc as required				
a)	150 mm dia	12	Mtr.	2,345.00	28,140.00
10	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)	12 Core 2.5 Sqmm (25 mm - 28 mm)	2	Each	406.00	812.00
b)	3½ X 300 Sqmm (70 mm)	4	Each	1326.00	5,304.00
11	Supplying and installing following size of <b>perforated Hot Dipped Galvanised Iron cable tray</b> (galvanisation thickness not less than 50 microns) with perforation not more than 17.5%, in convenient sections, joined with connectors, suspended from the ceiling with G.I. suspenders including G.I. bolts & nuts, etc. as required.				
a)	300 mm width X 50 mm depth X 1.6 mm thickness	8	Mtr	1,300.00	10,400.00
12	Earthing with <b>copper earth plate 600 mm X 600 mm X 3 mm thick</b> 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	2	Set	15,438.00	30,876.00

13	Earthing with <b>G.I. earth plate 600 mm X 600 mm X 6 mm thick</b> including accessories, and providing masonry enclosure with cover plate having locking arrangement and watering pipe of 2.7 meter long etc. with charcoal/ coke and salt as required. <i>(Note: For Lightning Protection and Rising Mains)</i>	2	Set	8,288.00	16,576.00
14	Providing and fixing 25 mm X 5 mm <b>copper strip in 40 mm dia G.I. pipe</b> from earth electrode including connection with brass nut, bolt, spring, washer excavation and re-filling etc. as required	10	Mtr	1,660.00	16,600.00
15	Providing and fixing <b>25 mm X 5 mm G.I. strip in 40 mm dia G.I. pipe</b> from earth electrode including connection with G.I. nut, bolt, spring, washer excavation and re-filling etc. as required	8	Mtr	761.00	6,088.00
16	Providing and fixing 25 mm X 5 mm <b>copper strip on surface or in recess</b> for connections etc. as required	5	Mtr	1,255.00	6,275.00
17	Providing and fixing <b>25 mm X 5 mm G.I. strip on surface</b> or in recess for connections etc. as required	4	Mtr	280.00	1,120.00
18	Providing and fixing <b>6 SWG dia G.I. wire</b> on surface or in recess for loop earthing along with existing surface/ recessed conduit/ submain wiring/ cable as required	96	Mtr	49.00	4,704.00
	<b>Total SH- 4</b>				<b>26,80,115.00</b>
	<b>SUB-HEAD: 5 [LIFTS]</b>				
1	Supplying, installation, testing & commissioning of <b>13/14 Passenger (884 kg) lift, MRL type</b> , having contract speed of 1.5 MPS, serving eleven floors (B2, B1, GF, 1st floor, 2nd floor, 3rd Floor, 4th Floor, 5th Floor, 6th Floor, 7th Floor & 8th Floor) as per detailed specifications and technical particulars <i>(Note:- Lift shall be inclusive of all ancillaries and accessories as are mandatory as per the updated Bombay Lift Act, IS and GOI guidelines, whether specifically specified in the item and specifications or not)</i>				
	<b>Speed:</b> 1.5 MPS				
	<b>Floors:</b> Eleven floors (B2+B1+G + 8)				
	<b>Travel:</b> 35.70 mtr (approx. height of Shaft)				
	<b>Stops &amp; opening:</b> 11 & 11				
	<b>Controller:</b> VVVF Regenerative (Closed Loop)				
	<b>ARD:</b> Automatic Rescue Device complete with dry maintenance free SMF batteries shall be provided				

<b>Operation:</b> Microprocessor based duplex selective collective with/without attendant in a group of two lifts installed adjacently.				
<b>Power:</b> 415V, 3-Phase, 50 Hz, 4-Wires System				
<b>Phase Reversal protection:</b> Shall have auto phase corrector 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.				
<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, stainless steel in scratch proof finish (Honeycomb/ moonrock) {Fire rating of $\geq$ 120 minutes}				
<b>b. Landing doors:</b> Centre opening, horizontal sliding, stainless steel, scratch proof finish (Honeycomb/moonrock) [Fire rating of $\geq$ 120 minutes]				
<b>Lift Car:</b>				
<b>a, Lift car Size:</b> 1500mm X 1500mm				
<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 three rows of LED luminaires and ventilation grills				
<b>d. Ventilation:</b> Suitable ventilation from ceiling with no noise high quality ventilation (fans) with two rows of louvers along the depth of the car				
<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 infar 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, Door Open/ Close Button, Manual Rescue Operation, Belt Inspection Drive.				
	<b>n.</b> Provision of IP based CCTV camera inside car along with 30 days backup complete with NVR.				
	<b>o. 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>	4	Each	18,79,172.00	75,16,688.00
	<b>Total SH- 5</b>				<b>75,16,688.00</b>
	<b>SUB-HEAD: 6 [ONLINE UPS]</b>				
1	Supplying installation testing and comissioning of following capacity <b>IGBT based, microprocessor based Online UPS System with five years warantee</b> having pollution free instantaneous true sinewave control and with inbuilt isolation transformer, 3 Phase AC input and 3 phase AC output, LCD display & indication for various electrical parameters, LED indication with alarm for major fault, provision for remote indication and provision of communication to BMS system through RS 485/RS232 port etc. The UPS system shall be as per detailed specifications and shall be complete with parallel redundant kit, battery bank for providing 30 minutes backup time with SMF batteries having minimum 2 years warrantee, with all connections interconnections cables, MS stand for battery bank etc. complete as required				
	<b>Specifications of UPS</b>				
	<b>b) Technology :</b> True Online dual conversion with PWM IGBT & IGBT Rectifier Technology (Pure Sine Wave)				
	<b>Input Parameters</b>				
	a) Input Voltage range : 415V ± 15%, 3-Φ AC Supply				
	b) Rated frequency : 50Hz/ 60 Hz ± 10%				
	c) UPS Power factor: 0.99 or better lagging				
	<b>Output Parameters</b>				
	a) Rated Voltage: 415 V ± 10%				



	b) Frequency: 50Hz ± 0.5Hz				
	c) Load power factor range: 0.9 or better				
	d) Output wave form: Pure sine wave				
	e) Overload capacity: 150% of rated load for 1 minutes 125% of rated load for 10 minutes				
	f) Harmonic distortion: with Linear load ≤2%				
	g) Permitted non-linear load <5%				
	h) Crest factors: 3:1				
	<b>General Parameters</b>				
	a) Ambient operating temp: 0-40° C or better				
	b) Relative Humidity: ≥ 90% (Non-condensing) or better				
	c) Noise Level : ≤ 60 db at 1.5m distance or better				
	d) Overall efficiency: 94% or better				
	e) Computer interface: RS232 / RS485				
	f) Cooling: Forced Cooling				
	g) Indications: Main ON, Inverter ON, Battery ON, Low battery, Inverter Overload, Phase fail (or as per manufacturer's standards)				
	h) Bypass: Manual/Static				
a)	1x30 KVA Capacity Online UPS System	3	Set	4,71,987.00	14,15,961.00
b)	1x20 KVA Capacity Online UPS System	8	Set	3,27,262.00	26,18,096.00
	<b>Total SH-6</b>		<b>Rs.</b>		<b>40,34,057.00</b>
	<b>SUB-HEAD: 7 [EPABX &amp; LAN]</b>				
1	Supplying & fixing of Push button caller ID Phone having incoming & outgoing memories etc. <i>[Note: 1) The Phone shall be of the same make as the Exchange. 2) The colour of the Phone unit shall be as approved by the engineer-in-charge. 3) Nothing will relive the contractor of its responsibility of satisfactory functioning of the communication system. 4) It will be the responsibility of the contractor to connect the telephone set at the end user location i/c tracing of lines from main MDF/IDF to various Krone boxes of the EPABX system etc.]</i>	141.00	Each	782.00	1,10,262.00
2	Supplying and laying of one number 100 Pair Jelly-Filled Telephone Armoured Cable as per DOT specification 0.5 mm dia. annealed Copper conductor, in the existing RCC/HUME/ METAL/ DWC HDPE pipe as required	20	Mtr	1,171.00	23,420.00
3	Supplying and laying of one number 100 Pair Jelly-Filled Telephone Armoured Cable as per DOT specification 0.5 mm dia. annealed Copper conductor, on the surface of wall/ cable tray etc. as required	80	Mtr	1,189.00	95,120.00

4	Supplying and installing following size of perforated Hot Dipped Galvanised Iron cable tray (galvanisation thickness not less than 50 microns) with perforation not more than 17.5%, in convenient sections, joined with connectors, suspended from the ceiling with G.I. suspenders including G.I. bolts & nuts, etc. as required				
a)	300 mm width X 50 mm depth X 1.6 mm thickness	160	Mtr	1,059.00	1,69,440.00
b)	450 mm width X 50 mm depth X 2.0 mm thickness	200	Mtr	1,443.00	2,88,600.00
5	Supply, installation, testing & commissioning of wall mounting Jack Panel/Rack, 6 U, size 550mm (W) x 500mm (D) x 340mm (H), including one tray, 1 no. fan, 1 no. 6 socket 6A PDU, 1 no. hardware packet, cable manager etc. complete as required. <i>[Note: The rack shall be with transparent shutter jack panel, UL-94V-0, with cable support bar, clear label marks and earthing plug for CAT6 cable termination at rack end]</i>	7	Each	4,219.00	29,533.00
6	Supply, installation, testing & commissioning of Jack Panel/Rack, 17 U, size 600mm (W) x 600mm(D) x 845mm (H) approx., complete including minimum 3 nos. trays, 2 nos. cooling fans, 2 no. PDU 6 socket 6 A, 1 no. hardware packet, cable manager etc. complete as required. <i>[Note: The rack shall be with transparent shutter jack panel, UL-94V-0, with cable support bar, clear label marks and earthing plug for CAT6 cable termination at rack end]</i>	1	Each	7,945.00	7,945.00
7	Supplying, installation, testing & commissioning of web smart switch 24 port switch having 24 ports 10/100/1000BASE-T ports and four GbE/10GbE SFP/SFP+ uplink ports layer 2 from day 1 having static & RIP , stackable upto 08 switches, should support external redundant power supply, certified EAL3 , each switch should be provided with stacking port/cable. suitable for termination of multimode fibre cable for interconnection between this edge switch and distribution switch complete including patch cords etc. as required.	19	Each	1,21,135.00	23,01,565.00
8	Supply, installation, testing & commissioning 2 nos. 1Gbps SM Modules of 1000BASE-LX SFP 10 Pack in the existing 24 ports 10/100/1000BASE-T ports switch Industrial Temp, for termination of 20 nos. multimode fibre cables from above distribution switches to this edge switch complete, as required.	1	Each	71,500.00	71,500.00
9	Supplying and drawing of 1 No. Multimode fibre optic cable, UL Listed & RoHS compliant, in the existing surface/ recessed Steel/ PVC conduit as required	250	Mtr	68.00	17,000.00
	<b>Total SH-7</b>		<b>Rs.</b>		<b>31,14,385.00</b>

<b>SUB-HEAD: 8 [CCTV System]</b>					
1	<p>SITC of 2MP IP Network TDN Low-Light IR Rugged Dome Camera, 1/2.8" CMOS or better, 2MP (1920 x 1080) or better @ 50fps or better, triple stream at various resolution &amp; Frame Rates, Min. Illumination required 0.005 lux @ F1.6 (color), 0 Lux IR On, 4 IR LEDs Smart IR with upto 50m IR distance, Auto ICR (Infrared Cut Filter) 100dB True WDR, S/N Ratio 55db, Shutter Speed 1/8 - 1/30,000; Adavance Video Compression technology such as H.265 &amp; H.264 High Profile &amp; MJPEG , Triple stream, 2.7 to 13.5mm 5X motorized focus &amp; zoom lens, Field of View FoV H:90°-28°, BLC, HLC, WDR, 3DNR White Balance, Minimum Edge/Server Intelligence Video Analytics : Smart Motion Detection, Tampering, Intrusion, Multi Loitering, People Counter, Tripwire, Abandoned object, Missing object, 4 Privacy Mask, 8 Region Of Intreset, Defog, TLS1.2, AES-128/256, SSH/Telnet closed, Stream Encryption, Dual channel Audio, Alarm: 01In/ 01out, 256 GB SD card support, PoE (802.3 af) and 12V DC, Max 8W, IP 67, IK 10 vandal proof with Aluminium Alloy Housing, Gore Vent, Having Operating temp range : -40°C to 60° C. Certifications: ONVIF Profile S/G/T/M compliant, UL/CSA 62368-1, CE (EN 50130-4), FCC Part 15, EN 55032, RoHS (EN63000) &amp; NDAA Section 889 compliant. (With 5 years on site warranty)</p>	55	Each	23,551.00	12,95,305.00
2	<p>SITC of 2MP IP Network TDN Low-Light IR Rugged Bullet Camera, 1/2.8" CMOS or better, 2MP (1920 x 1080) or better @ 50fps or better, triple stream at various resolution &amp; Frame Rates, Min. Illumination required 0.005 lux @ F1.6 (color), 0 Lux IR On, 10 IR LEDs Smart IR with upto 60m IR distance, Auto ICR (Infrared Cut Filter) 100dB True WDR, S/N Ratio 55db, Shutter Speed 1/8 - 1/30,000; Adavance Video Compression technology such as H.265 &amp; H.264 High Profile &amp; MJPEG , Triple stream, 2.7 to 13.5mm 5X motorized focus &amp; zoom lens, Field of View FoV H:90°-28°, BLC, HLC, WDR, 3DNR White Balance, Minimum Edge/Server Intelligence Video Analytics : Smart Motion Detection, Tampering, Intrusion, Multi Loitering, People Counter, Tripwire, Abandoned object, Missing object, 4 Privacy Mask, 8 Region Of Intreset, Defog, TLS1.2, AES-128/256, SSH/Telnet closed, Stream Encryption, Dual channel Audio, Alarm: 01In/ 01out, 256 GB SD card support, PoE (802.3 af) and 12V DC, Max 10W, IP 67, IK 10 vandal proof with Aluminium Alloy Housing, Having Operating temp range : -40°C to 60° C. Certifications: ONVIF Profile S/G/T/M compliant, UL/CSA 62368-1, CE (EN 50130-4), FCC Part 15, EN 55032, RoHS (EN63000) &amp; NDAA Section 889 compliant. (With 5 years on site warranty)</p>	11	Each	23,974.00	2,63,714.00

3	SITC of IP Network TDN Low-Light 2MP or better 40X IP IR PTZ Camera, 1/2.8" CMOS, 2MP@ 50fps, H.265, H.264, Min. Illumination required 0.1 lux (color), 0 Lux B/W IR on, 100dB True WDR, HLC, BLC, triple stream, Lens wide 4 to 5mm - Tele 160 to 200mm, 40X motorized focus & zoom lens, Inbuilt/Externla IR uo to 300 Meters, Built in Video Analytics such as Video Motion Detection, Camera Tampering & Auto Tracking, 3DNR, Defog, Electronic Image Stabilization, 24 Privacy Mask, shutter speed 1/1 to 1/10,000 second, PAN Speed upto 400°/s, PAN Range 360° Endless, Tilt Speed upto 400°/s, Tilt Range -20° to +90° (Auto Flip ), 256 Presets, Dual channel Audio G.711a/G.711u/G726, 256GB SD card support, Alarm: 2 In, 1out, High-PoE (UPOE) and 24VAC, IP 66, IK 10 vandal proof, Inbuilt Heater, Operating temp range : -40°C to 60° C. Certifications: ONVIF Profile S & G compliant, UL, CE, EN, FCC, NDAA Section 889 & RoHS compliant. (With 5 years on site warranty)	2	Each	1,43,362.00	2,86,724.00
4	Supply, Installation, testing & commissioning of 64 Channel NVR (Network Vedio Recorder), for recording upto 64CH @ 1080P with 08 nos. SATA HDDs minimum 80TB storage or more (recording requirement all cameras recording at 2MP, 25fps for 30 days), H.265/H.264/MJPEG/MPEG4 codec decoding, Front Control Panel with LEDs Indication for HDDs Status, Power, 3 nos. USB, Onvif S, RAID 1/5, NTP & Daylight saving, iPhone; Audio IN/Out 3.5mm, Display Ports 2 HDMI & 01 VGA, On Screen Display Date Time & Camera Name, Supports Edge VA from Cameras Video Motion Detection, Video Loss, Camera Tamering, Intrusion, Loitering, System Alarm min Alarm In/Out, Disk Failure, Full, iPad; Android based Mobile clients, Video Export feature on USB, Search Mode: Time/Date; Alarm; Motion Detection (MD); Exact Search (accurate to a second); Smart Search, 16CH sync playback, 2 x LAN, N+1 Failover, Dual Redundant Power Supply, Alarm Input (16 nos.), Alarm Output (6 nos.), 400Mbps throughput, Operating Temperature -10°C to 55°CCertification : CE, FCC, UL, RoHS & NDAA Section 889 Compliant including fixing accessories and cable termination with required connectors/Jack, complete in all respect as per instruction of engineer in-charge. (With 5 years on site warranty)	2	Each	2,47,201.00	4,94,402.00
5	Supply, installation, testing & commissioning of 8/10 Port PoE smart managed Giga byte Switch 10/100/1000 having 8 PoE ports and 2/4 SFP ports etc. suitable for termination of CAT6 Cables, interconnection from this edge switch to distribution switch through fibre, having requisite power handing for upto 12 Cameras, complete including necessary hardware and software, licence etc. as reqd. (With 5 years on site warranty)	11	Each	36,359.00	3,99,949.00

6	Supply, installation, testing & commissioning of 24 Port smart managed Giga byte Distribution Switch 10/100/1000 having fibre ports complete with Power Supply, Interface Module etc. suitable for fibre connectivity to edge switches in star topology complete including necessary hardware and software, power capacity, licence etc. complete as required. (With 5 years on site warranty)	1	Each	77,757.00	77,757.00
7	Supply, installation, testing & commissioning of wall mounting Jack Panel/Rack, 6 U, size 550mm (W) x 500mm (D) x 340mm (H), including one tray, 1 no. fan, 1 no. 6 socket 6A PDU, 1 no. hardware packet, cable manager etc. complete as required. <i>[Note: The rack shall be with transparent shutter jack panel, UL-94V-0, with cable support bar, clear label marks and earthing plug for CAT6 cable termination at rack end]</i>	14	Each	5,086.00	71,204.00
8	Supply, installation, testing & commissioning of Jack Panel/Rack, 17 U, size 600mm (W) x 600mm(D) x 845mm (H) approx., complete including minimum 3 nos. trays, 2 nos. cooling fans, 2 no. PDU 6 socket 6 A, 1 no. hardware packet, cable manager etc. complete as required. <i>[Note: The rack shall be with transparent shutter jack panel, UL-94V-0, with cable support bar, clear label marks and earthing plug for CAT6 cable termination at rack end]</i>	1	Each	7,297.00	7,297.00
9	SITC of Min. 65 inch 4k display with 500 nits brightness having minimum Input Ports as 2 Nos. HDMI, 1 Audio 3.5mm jack and Duty Cycle 24x7 complete with all the mounting accessories etc as required at site. (With 5 years on site warranty)	2	Each	90,983.00	1,81,966.00
10	Supplying and drawing of UTP 4 Pair, 23 AWG, UL Listed, RoHS compliant CAT 6 Cable in the existing surface/ recessed Steel/ PVC conduit as required. <i>[Note: CAT 6 cable shall be LSZH as per ANSI/TIA 568 C.2 and ISO/ IEC 11801-2nd Edition, ROHS Compliant, solid copper conductors, tested @250 Mhz, with HDPE insulation of individual conductor]</i>				
a)	1 Run of cable	650	Mtr	52.00	33,800.00
b)	2 Run of cable	450	Mtr	81.00	36,450.00
c)	3 Run of cable	350	Mtr	110.00	38,500.00
11	Supplying & Fixing of Category 6, UTP patch cords shall be constructed of 24-27 AWG unshielded twisted pair stranded copper cable with an enhanced performance modular plug at each end. Patch cord cable shall be offered in multiple colored UTP cable for design flexibility with a clear strain relief boot on each modular plug. All patch cords shall be compatible with both T568A and T568B 240.00 nos. 132.00 31680.00 Correction – Nil Insertion – Nil Deletion – Nil AE(P) EE (P) Page 73 wiring schemes. UTP Cable will be 1.0 mtr. complete in all respect. Jacket - LSZH .	11	Each	132.00	1,452.00

12	Supply, installation, testing & commissioning of CAT 6 UTP information outlet (male/female), Universal (tool/toolless) in accordance with ANSI TIA 568 C.2, IEC 60603-7-4, 2nd Edition, ISO/IEC TR 11801-9901-2014, ROHS Compliant, UL approved, for Camera complete as required [Note: It should be of the same make as the CAT6 cable]	160	Each	115.00	18,400.00
13	Supplying and drawing of 6 Core Armoured Optical Fibre Cable in the existing surface/ recessed steel/ PVC conduit as required. (Commscope or equivalent)	150	Mtr	88.00	13,200.00
	<b>Total SH-8</b>		<b>Rs.</b>		<b>32,20,120.00</b>
	<b>SUB-HEAD: 9 [Automatic Fire Alarm System]</b>				
1	Supplying, installation, testing and commissioning of <b>micro processor based intelligent addressable main fire alarm panel</b> , 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)	Ten Loop Panel	1	Each	4,84,921.00	4,84,921.00
2	Supplying, installation, testing & commissioning of <b>central graphical fire alarm management system</b> to centrally monitor and operate the fire alarm system complete as required	1	Each	2,13,709.00	2,13,709.00
3	Supplying, installation, testing & commissioning of <b>repeater panel</b> wih 320 character/ Touch screen LCD display with inbuilt reset, acknowledge and silence switches complete as required	1	Each	1,15,667.00	1,15,667.00
4	Supplying, installation, testing & commissioning of <b>intelligent addressable Photoelectric Smoke Detector</b> complete with mounting base complete as required	717	Each	3,050.00	21,86,850.00
5	Supplying, installation, testing & commissioning of <b>intelligent addressable thermal detector</b> with rate of rise cum fixed temperature thermistor complete with base as required	4	Each	2,910.00	11,640.00

6	Supplying, installation, testing & commissioning of <b>addressable manual call point</b> complete as required	28	Each	4,127.00	1,15,556.00
7	Supplying, installation, testing & commissioning of <b>response indicator</b> on surface/recessed MS Box having two LED, metallic cover complete with all connections etc as required	439	Each	304.00	1,33,456.00
8	Supplying, installation, testing & commissioning of <b>addressable horn cum strobe</b> complete as required	31	Each	3,739.00	1,15,909.00
9	Supplying, installation, testing & commissioning of <b>intelligent addressable programmable sounder</b> complete as required	1	Each	2,829.00	2,829.00
10	Supplying, installation, testing & commissioning of <b>fault isolator</b> complete with base as required	42	Each	3,488.00	1,46,496.00
11	Supplying, installation, testing & commissioning of <b>fire fighter telephone handset</b> complete as required	22	Each	6,114.00	1,34,508.00
12	Supplying, installation, testing & commissioning of <b>fire fighter phone jack</b> complete as required	22	Each	1,712.00	37,664.00
	<b>PUBLIC ADDRESS SYSTEM</b>				
13	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.	2	Nos	1,34,425.00	2,68,850.00
14	Supplying, installation, testing & commissioning of 6 inches dia, 2 watts, 70/100 volts ceiling speaker complete as required.	32	Nos	1,966.00	62,912.00
15	Supplying, installation, testing & commissioning of digital audio amplifier 75 Watt, 25V rms operating at 240 Volt AC Supply complete as required.	1	No	1,55,034.00	1,55,034.00
16	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 Single pair, 2-core, 1.5 sqmm	800	mtr	60.00	48,000.00
17	Supplying and fixing of following sizes of medium class PVC conduit along with accessories in surface/recess including cutting the wall and making good the same in case of recessed conduit as required.				
a)	20 mm	750	mtr	135.00	1,01,250.00
	<b>Total SH-9</b>				<b>4335251.00</b>

	<b>SUBHEAD- 10 (FIRE FIGHTING)</b>				
1	<b>FIRE PUMPS - ELECTRICAL</b>				
	(a) Horizontal type, multistage, centrifugal, split casing pump of cast iron body & bronze impeller with stainless steel shaft, mechanical seal conforming to IS 1520.				
	(b) Suitable HP Squirrel cage induction motor, TEFC, synchronous speed 1500 RPM, suitable for operation on 415 volts, 3 phase 50 Hz, AC supply with IP 55 protection for enclosure, horizontal foot mounted type with Class-'F' insulation, conforming to IS-325.				
	c) M.S. fabricated Common base plate, coupling, coupling guard, foundation bolts etc. as required.				
	(d) Suitable cement concrete foundation duly plastered with anti vibration pads.				
a	2850 lpm at 88 m Head	2	Set	4,82,756.00	9,65,512.00
2	a) 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)				
	b) Horizontal type, multistage, centrifugal pump of cast iron body and bronze impeller with stainless steel shaft, mechanical seal conforming to IS : 1520.				
	c) Suitable HP squirell cage induction motor TEFC type suitable for operation on 415 volts, 3 phase 50 Hz AC supply with IP 55 class of protection for enclosure, horizontal foot mounted type with Class-'F' insulation, conforming to IS : 325.				
	c) M.S. fabricated Common base plate, coupling, coupling guard, foundation bolts etc. as required.				
	(d) Suitable cement concrete foundation duly plastered with anti vibration pads.				
a	180 lpm at 88 m Head	2	Set	1,36,022.00	2,72,044.00
3	<b>FIRE PUMPS - DIESEL</b>				
	a) 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 Drive Pump) Horizontal type, multistage, centrifugal pump of cast of iron body and bronze impeller with stainless steel shaft, mechanical seal conforming to IS 1520.				
	b) 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 equipment, 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.				



	c) 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.				
a	2850 lpm at 88 m Head	1	Set	7,29,872.00	7,29,872.00
4	Providing & fixing of pressure switch in M.S. pipe line including connection etc. as required.	5	Each	1,678.00	8,390.00
5	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.	5	Each	19,612.00	98,060.00
	<b>Fire Hose Cabinet</b>				
6	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	30	Each	6,665.00	1,99,950.00
7	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	5	Each	6,665.00	33,325.00
8	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 equipment's on wall.				
	Connections from riser with 25 mm dia stop gun metal valve & M.S. Pipe and socket.				
a	30 m	28	Each	9,461.00	2,64,908.00
9	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)	70	Each	4,742.00	3,31,940.00
10	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)	35	Each	1,780.00	62,300.00

11	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.	35	Each	1,432.00	50,120.00
12	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	4 way - 150 mm dia M.S. Pipe	3	Set	14,996.00	44,988.00
b	2 way-100 mm dia M.S. Pipe	1	Set	7,306.00	7,306.00
13	Supplying, fixing, testing & commissioning of double flanged sluice valve of rating PN 1.6 with non rising spindle, bronze/gun metal seat, ISI marked complete with nuts, bolts, washers, gaskets and conforming to IS 780 of following sizes as required :				
a	150 mm dia.pipe	6	Each	24,394.00	1,46,364.00
14	Providing, installation, testing and commissioning of stainless steel Ystrainer fabricated out of 1.6 mm thick stainless steel, Grade 304, sheet with 3 mm dia holes with stainless steel flange.				
a	150 mm dia.	2	Each	11,766.00	23,532.00
15	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	80 mm dia	7	Each	8,316.00	58,212.00
b	100 mm dia	2	Each	11,943.00	23,886.00
c	150 mm dia	15	Each	19,100.00	2,86,500.00
16	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	80 mm dia	37	Each	5,424.00	2,00,688.00
b	100 mm dia	2	Each	7,282.00	14,564.00
c	150 mm dia	24	Each	9,764.00	2,34,336.00
d	200 mm dia	1	Each	16,396.00	16,396.00
17	Providing and fixing in position the industrial type <b>Pressure Gauges</b> with gun metal / brass valves complete as required	30	Each	1,492.00	44,760.00
18	Providing laying, testing & commissioning of 'C' class heavy duty MS Pipe conforming to IS 1239/3589 i/c fittings like elbows, tees, flanges, tapers, nuts bolts,gaskets etc. in ground including welding, excavation & providing cement concrete blocks as supports, anticorrosive treatment with oaltar/asphalt tape as per IS 10221, refilling the trench etc. of following sizes complete as required.				
a	150 nominal bore (class C)	175	Metre	4,706.00	8,23,550.00

19	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 :				
	Note:				
	Threaded joint upto 50mm diameter pipe.				
	Welded joint above 50mm diameter pipe.				
a	250 mm nominal bore (class C) - (wall thickness 6.3 mm)	25.00	Mtr.	7,190.00	1,79,750.00
b	200 mm nominal bore (class C) - (wall thickness 6.3 mm)	25.00	Mtr.	5,918.00	1,47,950.00
c	150 mm nominal bore (class C)	902.00	Mtr.	3,896.00	35,14,192.00
d	100 mm nominal bore (class C)	682.00	Mtr.	2,799.00	19,08,918.00
e	80 mm nominal bore (class C)	981.00	Mtr.	2,079.00	20,39,499.00
f	65 mm nominal bore (class C)	350.00	Mtr.	1,791.00	6,26,850.00
g	50 mm nominal bore (class C)	405.00	Mtr.	1,424.00	5,76,720.00
h	40 mm nominal bore (class C)	655.00	Mtr.	1,160.00	7,59,800.00
i	32 mm nominal bore (class C)	145.00	Mtr.	959.00	1,39,055.00
J	25 mm nominal bore (class C)	3855.00	Mtr.	838.00	32,30,490.00
20	Providing, fixing, testing & commissioning of 15mm dia uartzoid bulb type sprinklers of rating 68 degree centigrade with required accessories :				
a	Pendent Sprinkler	708	Each	589.00	4,17,012.00
b	Upright Sprinkler	1394	Each	589.00	8,21,066.00
c	Horizontal side wall sprinkler	30	Each	691.00	20,730.00
d	Concealed sprinkler	10	Each	1,560.00	15,600.00
21	Providing & fixing flow switch in following sizes M.S. pipe including connection etc as required.				
a	150mm dia	11	Each	9,730.00	1,07,030.00
22	Providing & fixing of pressure switch in M.S. pipe line including connection etc. as required.	11	Each	1,678.00	18,458.00
23	Providing, fixing, testing & commissioning of installation control valve of cast iron body, brass/bronze working parts comprising of water motor alarm, bronze seat clapper, clapper arm and hydraulically driven mechanical gong bell to sound continuous alarm when the wet riser/sprinkler system activates, pressure gauges, emergency releases, strainer, pressure switch, cock valve complete with drain valve and bypass, test control box, ball valves, MS pipe of required size, flanges, orifice plate, gasket etc of follwing sizes as required :				
a	150mm dia	2	Each	51,528.00	1,03,056.00

24	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, stock bar of following sizes complete as required.				
a	1200mm	358	Set	1,810.00	6,47,980.00
b	1500mm	350	Set	1,983.00	6,94,050.00
25	Providing, installation, testing & commissioning of adjustable rosette plate for 15mm dia in white finish UL Listed or FM approved complete as required.	708	Each	257.00	1,81,956.00
26	Providing and fixing carbon-di-oxide type fire extinguishers consisting of pressure tested single cast cylinder with rotary discharge valve and high pressure discharge tube of minimum 1 m length, discharge horn, suspension bracket conforming to IS:15683 finished externally with red enamel paint and fixed to wall with brackets complete with internal charge (Halon Free Gas)				
a	Capacity 4.5 kg	61	Each	5,050.00	3,08,050.00
27	Providing and fixing ABC Powder type fire extinguishers consisting of welded M.S. cylindrical body, squeeze lever discharge valve fitted with pressure indicating guage internal discharge tube 30 cms long high pressure discharge hose, discharge nozzle, suspension bracket conforming to IS:15683 finished externally with red enamel paint and fixed to wall with brackets complete with internal charge. (Halon Free Gas)				
a	Capacity 6.0 Kg.	61	Each	1,804.00	1,10,044.00
28	Providing and fixing <b>mechanical foam</b> type Trolley Mounted Fire Extinguisher of bearing to IS:10568/IS13385/IS13386 with dis				
a	Capacity 50 Lit.	3	Each	9,782.00	29,346.00
29	Providing and fixing carbon-di-oxide fire extinguishers trolley mounted with all accessories internal discharge tube,high pressure discharge hose,discharge nozzle, ISI marked as per IS:2878 finished externally with red enamel paint. (Halon Free Gas)				
a	Capacity 22.5 kg.	3	Each	12,575.00	37,725.00
30	Providing and fixing ceiling mounted type modular automatic extinguishing system with CLEAN AGENT HFC - 236 type, made of MS body treated against corrosion with heat sensitive glass bulb sprinkler heads (68deg/79deg C), pressure indicator, arrangemet for fixing to the ceiling pressurized with nitrogen gas to 15 kgf/cm2 suitable for covering 13.25 cu.mt (465 cuft) volume.				
a	6 Kgs Capacity	2	Each	20,371.00	40,742.00

31	Providing and fixing MS partly glazed single/double hung lockable shutter fabricated from MS section as required with 5 mm thick glass for fire station complete including stove enamelled painting of door and frame and words "Fire Hydrant" written on glass, suitable to accommodate 2 Hydrant landing valves, 1 fire hose reel, 2 nos.15m long 63 mm dia hose,1-branch pipe, 1no. fire man's axe, fire extinguishers 2 nos, including suitably mounted on a raised masonry platform as required. (Approx.size 0.90 m x 2.1m )	28	Each	7,958.00	2,22,824.00
32	Providing and fixing of Weather proof hose cabinets fabricated from 14 g M.S. Sheet with full glass door and mortise locking arrangement , suitable to accommodate one Hydrant landing valve, 2 nos. 15 M long hose and 1 No branch pipe. The cabinet shall be painted with one coat of primer and finished stove enamelled "Fire Red", "Fire Hose" written on front including suitably mounted on a raised masonry platform as required. (Approx 0.75mx0.6 m x 0.25 m).	7	Each	4,303.00	30,121.00
33	Providing and fixing of Fire Axe	28	Each	374.00	10,472.00
34	Providing, fixing, testing and commissioning of full way level operated forged brass ball valve of brass body with forged brass hard chrome plated steel ball tested to a pressure not less than 15 kg/sq.cm with threaded/flanged complete with nuts, bolts, gaskets, washers etc. as required complete as per direction of Engineer incharge.				
a	25 mm NB	39	Each	956.00	37,284.00
b	50 mm NB	4	Each	3,664.00	14,656.00
35	Fabrication, supply, Insallation testing & commissioning of Electrical control panel of cubical construction, floor mounted type, fabricated out of 2mm thick CRCA sheet, ompartmentalised 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 :				
(i)	INCOMER				
(a)	400A, 50kA 4 Pole MCCB, Ics=100% Icu rating Digital Voltmeter 0-500V with selector switch Ammeter (0-400 A) with selector swtich & CTs etc.				
(b)	LED type RYB phase indicating lamps, ON, OFF, trip indicating lamps Set of Copper Bus Bar 500A				
	OUTGOING.				
(a)	<b>Main fire pump and Sprinkler pump</b>				
	200 A, 50kA TPN MCCB, Ics=100% Icu, with fully automatic Star/Delta starter suitable for 75 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, auto/manual/OFF operation.				
(b)	<b>Jockey pump</b>				
	100 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.				
(c)	<b>Diesel Engine Control</b>				
	Control for Diesel Engine comprising:-				
(i)	Auto / Manual selector switch & 3 attempt starting device, timers and relays as required, push buttons, start / stop in manual mode.				
(ii)	Indication lamp for High / Low Lub. Oil pressure, High Water Temp. and Engine ON indication.				
(iii)	Battery charger suitable for 12V / 24 V DC with boost and tickle selector switch, 0-30 V DC volt meter, 0-20A DC Ammeter.				
(iv)	All standard relays and accessories for automatic operation of diesel engine.				
	<b>SYSTEM CONTROLLER</b>				
	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	Set	3,06,078.00	3,06,078.00
	<b>TOTAL SH- 10</b>				<b>2,22,39,007.00</b>
	<b>SH:- 11 (HVAC SYSTEM (VRV/VRF &amp; VENTILATION SYSTEM)</b>				
	<b>VRV SYSTEM</b>				
<b><u>1</u></b>	<b><u>OUTDOOR UNITS (HEAT PUMP TYPE)</u></b>				
	Supply Installation, Testing & Commissioning of modular type Variable Refrigerant Flow/Variable Refrigerant Volume air-cooled Outdoorunits suitable for cooling and heating, having all hermetically sealed inverter type Scroll Compressor(s), minimum two compressor for above 14HP modules, microprocessor based Controller, top discharge type condensing unit(s), with R410 A Refrigerant, vibration isolators, with suitable foundation etc. complete as required. The unit shall deliver the rated capacity at AHRI Conditions and work even at 50°C ambient temperature without tripping. The unit shall be suitable to work on 400V+/-10%, 3Phase, 50Hz AC power supply. The unit shall be filled with first charge of the refrigerant and ready for use as required. The COP at AHRI conditions shall not be less than 3.1 and IEER not less than 6.5 .				

	For Enhanced energy saving the COP of Each refrigerant circuit system mentioned below shall be 7.5 minimum at 50% connectivity ratio at outdoor condition 35 Deg C DBT and indoor conditions 27 Deg C DBT and 19 deg C WBT in cooling mode. The unit shall also have features to automatically modulate the evaporative temperature between 6 deg to 11 deg with respect to load for better comfort and energy efficiency.				
	The systems shall have free phase technology & operation shall be continuous in case of phase reverse in supply electricity. In case the same is not provided automatic phase corrector shall be provided without any additional charge.				
	The compressor and VRV/VRF ODU shall be of same make. The PCB of the Outdoor unit should be refrigerant cooled for higher ambient operation.				
	Outdoor Units-Heat Pump , Fully Gas Charged				
	<b>The Vendor should consider the deration on ODU selection as per Delhi Ambient conditions</b>	218	HP	19532.00	42,57,976.00
-	<b>INDOOR UNITS</b>				
2	Supply, installation, testing and commissioning of following minimum capacity 4-way flow VRV/VRF <b>Cassette Type</b> 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 Drain Pump etc., suitable for operation on single phase 230 V $\pm$ 10%, 50Hz AC supply, complete, as required. The unit shall have automatic force shut down provision in case of fire on receiving signal from BMS System. The cooling capacity of indoor unit will be at air inlet conditions of 27 Degree C DB and 19 Degree C WB temperature.				
	<b>Ceiling Mounted Cassette Unit</b>				
a	410-460 CFM /1.0-1.02 TR	1	Nos.	29758.00	29,758.00
b	500-515 CFM /1.2-1.3 TR	4	Nos.	30922.00	1,23,688.00
c	800-820 CFM /1.55-1.60 TR	1	Nos.	31124.00	31,124.00
d	800-830 CFM /2.0-2.01 TR	36	Nos.	32175.00	11,58,300.00
e	850-870 CFM /2.8/ 2.6 TR	24	Nos.	34188.00	8,20,512.00
f	1080-1190 CFM /3.0-3.2 TR	3	Nos.	36090.00	1,08,270.00
g	1200-1225 CFM /4.0-4.01 TR	1	Nos.	39299.00	39,299.00
	<b>Ceiling Mounted Cassette Unit (2-Way)</b>				
h	410-425 CFM /1.2-1.28 TR	6	Nos.	46482.00	2,78,892.00
	<b>Ceiling Mounted Cassette Unit (Compact)</b>				
i	300-310 CFM /0.60-0.63 TR	30	Nos.	32115.00	9,63,450.00
j	315-325 CFM /0.80-0.85 TR	12	Nos.	34469.00	4,13,628.00

3	Supply, installation, testing and commissioning of following minimum capacity and external static pressure VRF/VRV ceiling mounted <b>ductable type</b> Indoor unit equipped with washable synthetic media pre-filter, fan section with low noise fan/dynamically balanced blower ,multispeed motor, coil section with DX copper coil, electronic expansion valve, corded remote control, outer cabinet, vibration isolators, drain pan, other necessary supports etc., suitable for operation on single phase AC supply 230V±10%,50 Hz complete as required. The unit shall have automatic force shut down provision in case of fire on receiving signal from BMS System. The cooling capacity of indoor unit will be at air inlet conditions of 27 Degree C DB and 19 Degree C WB temperature.				
	<b>Ceiling Mounted Ductable Unit</b>				
a	1050-1130 CFM / 3.0-3.18 TR	1	Nos.	35293.00	35,293.00
b	1275-1377 CFM / 3.85-4.0 TR	1	Nos.	40566.00	40,566.00
4.0	Supply, installation, tesing and commissioning of Imported fittings Y-joints insulated, distributor and headers for all Indoor units at both the ends floors layout as per layout drawings.	113	Nos	3905.00	4,41,265.00
5	Supply, Installation, testing and commissioning including vaccumiazation and Nitrogen testing of following nominal sizes of soft/hard drawn copper refrigerant piping for VRV/VRV 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 elastometric nitrile rubber tubular sleeves sections of specified thickness as given below for Suction and Liquid lines, all accessories as per specifications etc. as required. Also there should be no brazing to joint the copper piping. Copper pipe should be joint with the help of gas tight joints. No fire work is allowed at site.				
a	6.4 mm dia (OD) (Softdrawn) with tube thick ness 1.2 mm with 19mm thick insulation	200	Mtr.	177.00	35,400.00
b	9.5 mm dia (OD) (Softdrawn) with tube thick ness 1.2 mm with 19mm thick insulation	390	Mtr.	268.00	1,04,520.00
c	12.7 mm dia (OD) (Softdrawn) with tube thick ness 1.2 mm with 19mm thick insulation	360	Mtr.	357.00	1,28,520.00
d	15.86 mm dia (OD) (Softdrawn) with tube thick ness 1.2 mm with 19mm thick insulation	460	Mtr.	538.00	2,47,480.00
e	19.0 mm dia (OD) (Softdrawn) with tube thick ness 1.2 mm with 19mm thick insulation	380	Mtr.	579.00	2,20,020.00
f	22.2 mm dia (OD) (Softdrawn) with tube thick ness 1.2 mm with 19mm thick insulation	130	Mtr.	659.00	85,670.00
g	25.4 mm dia (OD) (Softdrawn) with tube thick ness 1.2 mm with 19mm thick insulation	30	Mtr.	823.00	24,690.00



h	28.58 mm dia (OD) (Softdrawn) with tube thick ness 1.2 mm with 19mm thick insulation	250	Mtr.	1028.00	2,57,000.00
i	31.8 mm dia (OD) (Softdrawn) with tube thick ness 1.62 mm with 19mm thick insulation	20	Mtr.	1259.00	25,180.00
j	34.9 mm dia (OD) (Softdrawn) with tube thick ness 1.62 mm with 19mm thick insulation	130	Mtr.	1500.00	1,95,000.00
k	38.1 mm dia (OD) (Softdrawn) with tube thick ness 1.62 mm with 19mm thick insulation	5	Mtr.	1769.00	8,845.00
l	41.3 mm dia (OD) (Softdrawn) with tube thick ness 1.62 mm with 19mm thick insulation	30	Mtr.	1913.00	57,390.00
6.0	Supply, installation, testing, termination and commissioning of control cum transimission wiring (should be shielded cable in PVC Pipe) of 2C x 1.5 Sqmm Cu between indoor unit and out door unit and indoor units and its remote controller.				
a	2C x 1.5 Sqmm Cu Cable	1675	Mtr.	117.00	1,95,975.00
7	Supply, install, test and commission Air Differential pressure switches complete with sensor probe , etc. integrated with Light and visual alarm signal, as per general details and specifications and approved make.To be installed across HEPA filter bank sections and Operating rooms.The necessary control and power wiring shall be in the scope of the contractor.				
a	Air Differential Pressure Switch. ( <b>ACROSS Labs.</b> )	2	Set	14086.00	28,172.00
8.00	Supply of following HVAC dedicated VFDs with IP 20 enclosures with Mains disconnect, complying with the tender specifications and having: 1. built-in dual 5% impedance DC link reactor (harmonic filters) on the positive and negative rails of the DC bus of the VFD. 2. built-in EMC Filters (electromagnetic compatibility filters) for VFDs for restriction of conducted emissions to comply with IEC61800: 3 (unrestricted distribution):2004 Category C 3, 3. Two-feedback PID controller having capability to simultaneously accept 2 feedback signals from temperature sensors or pressure sensors or CO2 sensors for process optimization and accordingly regulate the speed of the Fans/AHUs or pumps.4. Provision for additional 2 PID controllers to control external devices such as , fresh air damper, etc. thus reducing the number of I/Os in DDC Controllers & improving system reliability.5. Automatic Energy Optimization / Load dependent flux optimization functionality for maximum energy savings.6. MODBUS RTU as the communication protocol between BMS & VFDs.7. VFDs not meeting above requirements shall provide external disconnect, external harmonic filters, additional external EMC Filters to comply with IEC61800: 3 (unrestricted distribution):2004 Category C 1 (50 m), external PLCs / DDCs to achieve 2 Feedback PID Controller functionality and external devices controlling capabilities.				

a	Supply , Install, test and commission Variable Speed Drive package as described above and in specifications suitable for for 11.0 kW motor rating as per the specifications(3 Phase variable frequency output forFans , . These variable speed drives shall get the input from the remote air differential pressure adjuster , as described above in item.	2	No.	63385.00	1,26,770.00
b	Supply , Install, test and commission Variable Speed Drive package as described above and in specifications suitable for for 18.5 kW motor rating as per the specifications(3 Phase variable frequency output forFans , . These variable speed drives shall get the input from the remote air differential pressure adjuster , as described above in item.	4	No.	85205.00	3,40,820.00
9	Providing and fixing of uPVC drain pipe of 6 Kg /cm2 pressure rating complete with 6mm thick closed cell nitrile rubber insulation, fittings, supports, valves as per specifications & drawings.				
a	25 mm dia	600	RM	264.00	1,58,400.00
b	32 mm dia	180	RM	398.00	71,640.00
c	40 mm dia	80	RM	228.00	18,240.00
d	50 mm dia	60	RM	266.00	15,960.00
10	Supplying, fabricating, installing and testing of fire retardent double Canvas Flexible Connection 150mm wide for constructed of standard material as per the drawings/specifications.	6	Sqm	2986.00	17,916.00
	<b>Ventilation System</b>				
11	Supply, installation, testing and commissioning of <b>Propeller fan</b> of the following capacity of approved make and specification. Fan shall be supplied with aluminum gravity louver & bird screen.				
a	225 mm dia propeller fan, with single phase motor,900RPM	2	Nos.	1541.00	3,082.00
b	300 mm dia propeller fan, with single phase motor, 1400 - 1450 RPM	9	Nos.	3549.00	31,941.00
12	Supply, installation, testing and commissioning of ducted AMCA Certified Inline Fans of GSS construction (rectangular box type above 900cfm for upto 25 mm WG S.P and circular type for 10 mm WG SP upto 850cfm) with centrifugal blower and motor encased in sheet metal casing, canvas connection etc. The Fan motor shall be suitable for operation on 220 V± 10%, 50 Hz, 1 phase AC supply upto 2500cfm and above 400 V 3phase. noise level not more than 65dBA from 1 m The Fan assembly shall conform to specifications and in accordance with requirements of drawings and Schedule of Quantities.				
a	200-300 cfm capacity with 10 mm static pressure	13	Nos.	4569.00	59,397.00
b	400 to 500 CFM, 7-10 mm SP WG with Single phase motor with three speed	4	Nos.	7747.00	30,988.00

c	1100 CFM, 12-15mm SP WG with Single phase motor with three speed	2	Nos.	10212.00	20,424.00
13	SITC of AMCA Certified (For Air and Sound Performance) tube axial flow fan of different capacity as mentioned below in standard M.S.construction. Entire fan model & AMCA Seal shall appear in technical submittal of fan. All the fans are synthetic enamelled panited/hot dip galvanized with minimum 220 GSM Zinc Coating and complete with bird screen at inlet and fire retardent flexible connections at inlet/outlet. The electric motor coupler shall be squirrel cage induction motor (IE-3 type) confirming to IS - 325-IP - 55 with class 'H' insulation. Motor shall be of high temperature resistance "Class H Smoke Spill" 250° C for 2 hrs. Fan shall be EN 12101-3 Certified & CE/UL Listed for high temperature. Fan efficiency should not be less than 70 %, noise level should not be more than 80 db @ 3 m distance when measured in hemispherical reverberant room conditions for Normal mode Fans and noise level should not be more than 85 db @ 3 m distance when measured in hemispherical reverberant room conditions for Emergency mode Fans. Fans should be as per specification and drawings (As per Vent. Fan Schedule ). Normal/Smoke <b>Exhaust fans at St. Press. of 30 mmWG</b>				
a	2000 CFM Normal & smoke extract,	1	Nos.	27115.00	27,115.00
b	32000 CFM smoke extract	2	Nos.	147898.00	2,95,796.00
c	35500 CFM Normal & smoke extract parking	2	Nos.	179590.00	3,59,180.00
d	45500 CFM Normal & smoke extract parking	2	Nos.	235932.00	4,71,864.00
14	SITC of AMCA Certified (For Air and Sound Performance) tube axial flow fan of different capacity as mentioned below in standard M.S.construction. Entire fan model & AMCA Seal shall appear in technical submittal of fan. All the fans are synthetic enamelled panited/hot dip galvanized with minimum 220 GSM Zinc Coating and complete with bird screen at inlet and fire retardent flexible connections at inlet/outlet. The electric motor coupler shall be squirrel cage induction motor (IE-3 type) confirming to IS - 325-IP - 55 with class 'F' insulation. Fan efficiency should not be less than 70 %, noise level should not be more than 85 db @ 3 m distance when measured in hemispherical reverberant room conditions. Fans should be as per specification and drawings. (As per Vent. Fan Schedule ) ( <b>Makeup Air &amp; Pressurization Fans with St. Press. of 40 mmWG/Make Up Air Fan at 30mm WG</b> )				
a	10500 CFM for Liftwell pressurization, 40 mm S.P.	4	Nos.	51060.00	2,04,240.00
b	12000 CFM for pressurization, 40 mm S.P.	2	Nos.	66906.00	1,33,812.00
c	19500 CFM for pressurization, 40 mm S.P.	3	Nos.	102120.00	3,06,360.00
d	27500 CFM for pressurization, 40 mm S.P.	1	Nos.	137334.00	1,37,334.00
e	45500 CFM Normal & smoke Make Up Air parking	2	Nos.	235932.00	4,71,864.00

15	Supply , Install, test and commission <b>double skin Evaporative air washer</b> as per specifications , suitable for the following capacity given below at 90% efficiency of evaporative medium. The fan shall be of DIDW centrifugal construction. Packaged Type				
a	3000 CFM, 40 mm (WG) static pressure,Floor mounted with weather proof enclosure (For Kitchen), <b>Cost to be inclusive of unit isolator</b>	1	Nos.	49299.00	49,299.00
<b>16</b>	<b>Air Scrubber (DRY Type)</b>				
	<b>DIDW FAN :Kitchen Exhaust</b>				
<b>16.1</b>	Supply, installation, testing and commissioning of DIDW Backward curved horizontal floor mounted fan unit comprising of accurately cut scroll & side plates, heavy gauge with all welded construction, sheet steel fabricated impeller, drive with blower pulley, motor pulley, V-belts, squirrel cage motor complete as per specification (fan-motor efficiency exceeding ASHRAE 90.1-2007 Criteria). (The bidder shall submit fan performance curves for all fans).				
	The item should be all complete in line with relevant standards, technical specifications of the standards and direction of engineer incharge.				
a	3500 CFM / 75 mm WG SP (For Kitchen at UG Blocks),Cost to be inclusive of unit isolator	1	No.	66906.00	66,906.00
<b>16.2</b>	<b>DRY SCRUBBER : Kitchen Exhaust</b>				
	Supply, Installation, Testing and Commissioning of Dry Scrubber comprising of extract air intake section, electrostatic precipitation technology, dry type air cleaner to remove odour, smoke and fumes from exhaust air.				
	Electrostatic section shall be made of 16 gauge galvanised sheet,high bake epoxy powder coated, washable type aluminium mesh filters, stainless steel spiked ionizers to create high voltage DC field, Stainless Steel 316 collector plates which should be alternatively charged positive and negative with large collecting area with 14" deep cell, to work as magnet for charged smoke and oil particles. Average efficiency of 95% and more in single pass as per DOP test method. Electrostatic Precipitator should be able to charge particles from 0.01 micron to 10 microns through solid state power supply. The system should be fitted with interlock switch for safety. The system should allow connection to a fan section to achieve 500 FPM velocity across the air cleaner.				
a	3500 CFM / 75 mm WG SP (For Kitchen at UG Blocks),Cost to be inclusive of unit isolator	1	No.	69371.00	69,371.00
17	Supply, installation, testing and commissioning of CO sensors . The car park ventilation systems shall be controlled by an individual CO-Monitoring system for entire car park located on each level to optimize efficiency. The contactors within the motor control panel shall be controlled by a Carbon Monoxide monitoring panel which shall contain DDCs (Direct Digital	14	Nos.	15846.00	2,21,844.00

	Controllers) where the pre-determined switching strategy and logic shall be loaded. The CO monitoring panel shall receive signals from CO sensors located throughout the levels at a spacing of no. more than 1 per 350 m2. The 24Vac power supply for the CO sensors shall be mounted in the same panel. The power supply shall be looped across the CO sensors. The proposed CO sensor shall provide a 0-10 VDC signal for measuring the CO level in the car park area. CO monitoring devices shall be mounted remotely throughout the car parks. The devices shall be mounted in accordance with the manufacturers guidelines but no greater than 1.5 m above FFL. CO Sensor shall be suitable for wall mount & capable of following features: (As per 350 sqm covered area) for Basement ventilation.				
	Digital display of the CO level : 0 to 200 ppm				
	Analog output : 4 to 20 mA / 0-10VDC				
	Low Voltage operation : 24 VAC / VDC				
	Test Switch : Provides mode for system self test.				
	Automatic Calibration (Field Calibration Kit)				
	Over-range indication.				
	Start-up mode : steps display and output through test ranges.				
	Solid – Stat sensor : Life expectancy of 7 to 10 years.				
	Multiple sensors with one power supply.				
	<b>AIR DISTRIBUTION SYSTEM</b>				
18.0	Supply,Installation,balancing and commissioning of fabricated at site GSS sheet metal ducts (rectangular/round ducting complete with neoprene rubber gaskets, elbows, splitter,vanes, hangers, Gripple supportsetc.) in accordance with the approved shop drawings and specifications , and shall also confirm to the BIS specifications.The duct shall be fabricated at site for to suit pieces.				
a	0.63mm (24 gauge) GSS	400	Sqm	977.00	3,90,800.00
b	0.8 mm (22 gauge) GSS	600	Sqm	1104.00	6,62,400.00
c	1.0mm (20 gauge) GSS	500	Sqm	1229.00	6,14,500.00
19	Supply,Installation,balancing and commissioning of factory fabricated GSS sheet metal ducts (rectangular/round ducting complete with neoprene rubber gaskets, elbows, splitter,vanes, hangers, Gripple supportsetc.) in accordance with the approved shop drawings and specifications , and shall also confirm to the BIS specifications.The duct shall be fabricated at site for to suit pieces.				
a	0.63mm (24 gauge) GSS	100	SqM	1055.00	1,05,500.00
b	0.8 mm (22 gauge) GSS	400	SqM	1135.00	4,54,000.00
c	1.0mm (20 gauge) GSS	150	SqM	1248.00	1,87,200.00

20	Supplying, fixing, testing commissioning of GI volume control duct damper complete with neoprene rubber gaskets, nuts, bolts, screws linkages, flanges etc, in accordance with approved shop drawings and specifications complete as required.	1	Sqm.	6738.00	6,738.00
21	Supplying & fixing of powder coated extruded aluminium Supply Air Grills with aluminium volume control dampers as per specifications.	40	Sqm.	8589.00	3,43,560.00
22	Supplying & fixing of powder coated extruded aluminium Return Air Grills without volume control dampers complete as required.	35	Sqm.	4701.00	1,64,535.00
23	Supply, installation and balancing of extruded aluminium powder coated air louvers complete with aluminium wire mesh bird screen as per specifications.	35	Sqm.	6997.00	2,44,895.00
24	Supplying, fixing, Testing and commissioning of fire dampers in supply air duct/main branch and return air path as and where required of required size i/c control wiring, the damper shall be motorized combination fire and smoke damper (spring return type) of approved make of at least 120 minute fire rating and as per the specifications as detailed earlier in the relevant sections. The fire damper shall be complete with electronic temperature sensor and electrically operated actuator. The fire dampers shall be located in the supply/return air ducts, at all fire rated crossovers (shafts/walls etc.) The control panel will be such located that the reset can be easily done. These combination smoke and fire dampers shall be interlocked with the building management system for fire detection / HVAC and shall trip/close in the event of fire / smoke in the respective zone.				
a	Bare Fire Dampers with 400 mm sleeve	20	SqM	6119.00	1,22,380.00
b	Control panel actuator, including Electrical, spring type actuator, remote indication of the fire damper position.	22	No	5334.00	1,17,348.00
25.0	Supply, Installation, Testing and commissioning of double layer canvas connection with 2 hr. fire rating as per specification.	50	SqM	2986.00	1,49,300.00
26.0	Supplying and fixing of following thickness duly laminated aluminum foil of mat finish closed cell Nitrile rubber (class "O") insulation on existing duct after applying two coats of cold setting adhesive (CPR X compound). The joints shall be sealed with 50 mm wide and 3 mm thick self adhesive nitrile rubber tape insulation complete as per specifications and as required.				
a	19 mm	110	Sqm	801.00	88,110.00
27.0	Supply and fixing of Acoustic lining of supply air duct and plenum with 25 mm thick resin bonded glass wool having density of 32 kg/m <sup>3</sup> , with 25 mm X 25 mm GI section of 1.25 mm thick, at 600 mm centre to centre covered with Reinforced Plastic tissue paper and 0.5 mm thick perforated aluminum sheet fixed to inside surface of ducts with cadmium plated nuts, bolts, stick pins, CPRX compound etc. complete as required and as per specifications.	5	Sqm	766.00	3,830.00

	<b>ASSOCIATED ELECTRICAL WORKS</b>				
<b>28.0</b>	<b>Fan Panel</b>				
	Design, fabrication, assembling, wiring, supply, installation, testing and commissioning of following LT panels fabricated out of 14 guage CRCA sheet steel, 9 tank process in approved shade cubical formation with reinforcement of suitable size angle iron and channel T iron flats. All steel material used in the construction of panels shall be powder coated. A solid busbar shall be provided at the bottom of the panel with two connecting eyes for termination. The boards shall be suitable for 415 volts, 50 Hz, 3 phase , 4 wire supply system. All the hardware used in the fabrication of the panel shall be galvanized with zinc passivation. The panel shall be compartmentalized to accommodate one feeder in each compartment. A vertical cable alley of suitable width shall be provided to serve on or two vertical feeder sections. Also the opening between the busbar chamber and the feeder section shall be shrouded with bakelite / hylam sheet with min.3 mm thickness.				
	<b>The panel drawing shall be approved before taking up the fabrication and compitable BMS.</b>				
	<b>In All panel Each starter should have remote control and interlocking facilities including auto manual switch, NO/NC contacts for control and must have auto manual operation suitable to take signal from fire alarm panel for automatic operation of fan in case of fire. All smoke /vent. fan panel the starters shall have suitable facility to operate with fire sensing control modules.</b>				
a	<b>HVAC Fan Panel VMCC-1,2 (LB)</b>				
	<b><u>Incoming</u></b>				
	1 no. 100 amp 4P, 36 KA MCCB				
	Phase indicating lights with control fuses.				
	Breaker ON/OFF/TRIP indicating lights.				
	Bus Bars				
	125 amp TPN Aluminum Bus Bar with heat shrinkable insulation colored sleeves.				
	<b><u>Outgoings</u></b>				
	2 nos. 25-40 A,TP MPCB (with VFD Space Provision )	2	Nos	31692.00	63,384.00
b	<b>HVAC Fan Panel VMCC-3 (UB)</b>				
	1 no. 63 amp 25 KA 4P MCCB				
	Phase indicating lights with control fuses.				
	Breaker ON/OFF/TRIP indicating lights.				
	Bus Bars				
	100 amp TPN Aluminum Bus Bar with heat shrinkable insulation colored sleeves.				

	<b><u>Outgoings</u></b>				
	2 nos. 20-25 A,TP MPCB (with VFD Space Provision)				
	1 nos. 2.5-4 A,TP MPCB (with VFD Space Provision)	1	Nos	38735.00	38,735.00
<b>c</b>	<b>HVAC Fan Panel VMCC-4 (UB)</b>				
	<b><u>Incoming</u></b>				
	1 no. 100 amp 4P 36 KA MCCB				
	Phase indicating lights with control fuses.				
	Breaker ON/OFF/TRIP indicating lights.				
	Bus Bars				
	150 amp TPN Aluminum Bus Bar with heat shrinkable insulation colored sleeves.				
	<b><u>Outgoings</u></b>				
	2 nos. 13-18 A,TP MPCB (with DOL starter )	1	Nos	38735.00	38,735.00
<b>d</b>	<b>HVAC Fan Panel VMCC-5 (1st)</b>				
	<b><u>Incoming</u></b>				
	1 no. 32 amp 4P MCB				
	Phase indicating lights with control fuses.				
	Breaker ON/OFF/TRIP indicating lights.				
	Bus Bars				
	63 amp TPN Aluminum Bus Bar with heat shrinkable insulation colored sleeves.				
	<b><u>Outgoings</u></b>				
	1 nos. 2.5-4 A,TP MPCB (with VFD Space Provision,)				
	1 nos. 4-6.3 A,TP MPCB (with VFD Space Provision)	1	Nos	22889.00	22,889.00
<b>e</b>	<b>HVAC Fan Panel VMCC-6 (Terrace)</b>				
	<b><u>Incoming</u></b>				
	1 no. 125 amp 4P 36 KA MCCB				
	Phase indicating lights with control fuses.				
	Breaker ON/OFF/TRIP indicating lights.				
	Bus Bars				
	150 amp TPN Aluminum Bus Bar with heat shrinkable insulation colored sleeves.				
	<b><u>Outgoings</u></b>				
	1 nos. 9-14 A,TP MPCB (with DOL starter )				
	2 nos. 6-10 A,TP MPCB (with DOL starter )				
	2 nos. 20-25 A,TP MPCB (with Star Delta starter )	1	Nos	98599.00	98,599.00
<b>f</b>	<b>HVAC Fan Panel VMCC-7 (Terrace)</b>				
	<b><u>Incoming</u></b>				
	1 no. 100 amp 4P 25 KA MCCB				



	Phase indicating lights with control fuses.				
	Breaker ON/OFF/TRIP indicating lights.				
	Bus Bars				
	125 amp TPN Aluminum Bus Bar with heat shrinkable insulation colored sleeves.				
	<b><u>Outgoings</u></b>				
	1 nos. 9-14 A,TP MPCB (with DOL starter )				
	2 nos. 6-10 A,TP MPCB (with DOL starter )				
	1 nos. 20-25 A,TP MPCB (with Star Delta starter )	1	Nos	86274.00	86,274.00
29	<b>METER BOARD / SUB PANEL'S</b>				
	Supplying, Installation, Testing and Commissioning of dust, damp and vermin proof free floor standing / wall mounted factory built sheet steel enclosed modular construction extendable panel, suitable for operation on 415 + 10% volts, 50 Hz AC 3 phase 4 wire system fabricated out of suitable sized square tubular section and covered with 2.0mm thick CRCA sheet, hinged doors of 2mm thick CRCA sheet, duly painted complete with aluminium bus bars, interconnection with solid copper conductor wires / aluminium strips, neutral links, earth bus etc. necessary metering protections & indications and mounted with the following as per drawing and technical specifications attached etc. complete as required.				
a	<b>ODU's Panel-MCC-01</b>				
	Same as above item but outdoor Panel with following accessories.				
	<b>INCOMING:</b>				
	1 No. 630 amps, 415V TPN MCCB with overcurrent and short circuit releases, all indication, push button etc.				
	Coloured (Red, Yellow, Blue) phase indicating lamp - 1 set				
	(0 - 630 A) CT operated Ammeter with selector switch & 3 nos. CTs ratio 630/5A , 15VA burden & accuracy class of 1.0 - 1 set				
	0-500 V Voltmeter with selector switch - 1 set				
	LED indication lamp with control fuse				
	<b>BUSBAR:</b>				
	800 Amp. TPN, 35 kA Al. Bus Bar				
	<b>OUTGOINGS:</b>				
	80A, TPN ELCB with 100mA - 09 Nos. (Incl. 1No. Spare)				
	63A, TPN ELCB with 100mA -07 Nos. (Incl. 1No. Spare)				
	<b>ODU Panel</b> Described as above/As per Manufacturer ODU Configuration.	1	Nos.	172548.00	1,72,548.00

	<b>CABLING (POWER )</b>				
30	Supply, installation, testing & commissioning of Copper conductor cables PVC sheathed, armoured cables of 1.1 KV grade with identification tags, clamps and saddles etc. All Cables should be FRLS type				
a	3Cx04 Sqmm	140	Mtr.	291.00	40,740.00
b	3Cx06 Sqmm	240	Mtr.	403.00	96,720.00
c	3Cx10 Sqmm	380	Mtr.	647.00	2,45,860.00
d	4Cx06 Sqmm	220	Mtr.	519.00	1,14,180.00
e	4Cx04 Sqmm	150	Mtr.	374.00	56,100.00
	<b>Control Cabling</b>				
31	Supply, installation, testing & commissioning of Copper conductor , PVC insulated, PVC sheathed armoured cable of 1.1 KV grade (Which is Interconnecting wiring for the fire alarm system with the AHU and the smoke dampers & Touch screen controller ).				
a	5C x 1.5 Sqmm	110	Mtr.	213.00	23,430.00
32	Supplying and installing following size of perforated G.I. cable trays, G.I. bends with perforation not more than 17.5%, joined with connectors, suspended from the ceiling with suitable suspenders including G.I. bolts & nuts, painting of suspenders etc. complete as required.				
a	150 mm. Width x 50mm. Depth x 1.6mm. Thickness.	380	Mtr.	677.00	2,57,260.00
b	300 mm. Width x 62.5mm. Depth x 2mm. Thickness.	20	Mtr.	1021.00	20,420.00
33	Providing and fixing following size of G.I. wire on surface or in recess for loop earthing alongwith the existing surface/ recessed conduit/ submain wiring / on cable tray/ on surface including G.I. clamps etc. complete as required.				
a	6 SWG G.I. wire	80	Mtr.	49.00	3,920.00
	<b>TOTAL SH-11</b>				<b>1,91,01,336.00</b>
	<b>SUB-HEAD: 12 [Solar PV Module]</b>				
1	Supply, installation, testing and commissioning of <b>On grid Solar Photovoltaic Power Plant conforming to MNRE specification as amended upto date</b> , consisting of Mono-Crystalline (PER, Half Cut) Silicon Solar Cells (efficiency not less than 20.5%), Net Metering facility, Integration module suitable for Grid, DG and Solar Power, necessary protections, earthing, minimum 7 feet high GI mounting structure of suitable strength with following components complete as required				

a)	<b>Supply &amp; Installation of Solar Photovoltaic Module of capacity 545 Wp or above (MONO PERC, HALF CUT), Make in India (DCR),</b> conforming to IS14286/IEC61730-Part-1, IS/IEC61730-Part-2, Solar Photovoltaic Module conversion efficiency shall not be less than 20.5%) PV modules used in Solar Power Plant/ System 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				
b)	<b>Supply &amp; Installation of MPPT based 50 KW Power Conditioning Unit (PCU)</b> with 10 years onsite warranty, 350-1000 V DC Input Voltage range and 400V AC, three Phase, 4 Wire, 50 Hz, Output Voltage suitable to generate AC Power with efficiency not less than 97%, total harmonic distortion less than 3%, and suitable for ambient temperature from 0°C to 50°C. The PCU shall adjust the voltage and frequency level to suit the Grid voltage and frequency. PCU should come with Remote Monitoring System (RMS) with suitable provision for data integration.				
c)	Supply & Installation of Elevated (7 Ft Ground Clearance/ minimum height) module mounting structures (MMS) with mounting Clips shall be manufactured with Hot dip galvanized/ Galvoulme steel angles & channels; galvanized to IS 1477 Part-1 with thickness of 80 microns of aluminium alloy as per IS 5905. All fasteners shall be of Stainless steel. MMS having adequate strength & appropriate design and shall be suitable to withstand the wind velocity of 150 Km/hr, complete with civil work concrete (400:400:400 mm) made of PCC (1:2:4) M15 and other required hardware. Structure should be anchor fastened to RCC Slab with Chemical SS Fastners (MakeL Fisher/ Hilti)				
d)	Supply and Fixing of Array Junction Box (DCDB) and Solar Main Junction Box (ACDB) with IP:68 Protection and terminartion arrangement for incoming and outgoing cable alongwith glands, lugs and inclusive of all required components etc. as required.				
e)	Complete System with Loto Box with necessary protection devices and all required accessories for Net Metering as per updated norms of DiISCOM/ MNRE.				
f)	<b>Connections &amp; interconnection</b> by supplying & fixing required size XLPE insulated copper conductor DC cables (minimum 6 Sq.mm) between Solar Modules, AC power cable from inverter to ACDB alongwith supplying & fixing of necessary channel/conduit, compression glands, lugs and other accessories etc. as required				

2	<b>Supplying and laying of following size DWC HDPE pipe</b> 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, minimum 70 mtr. or as per requirement at site)				
a)	90 mm dia (OD-90 mm & ID-76 mm nominal)				
3	<b>Supplying Laying of one number XLPE insulated stranded aluminium conductor</b> , armoured, power cable of 1.1 KV grade conforming to IS:7098, Part-1, of following size in the existing RCC/ HUME/ METAL/ DWC pipe as required, (minimum 175 mtr. Or as per requiremen at site)				
a)	4 x 25 Sqmm				
4	Supplying and making <b>end termination with brass compression gland</b> and aluminium lugs for following size of PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 KV grade as required, minimum 2 nos. or as per requirement at site.)				
a)	4 x 25 Sqmm (28 mm)				
5	Earthing with <b>G.I. earth plate 600 mm x 600 mm x 6 mm thick</b> 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, (minimum 4 nos. or as per requirement at site).				
6	Providing and fixing <b>25 mm X 5 mm G.I. strip in 40 mm dia G.I. pipe</b> from earth electrode including connection with G.I. nut, bolt, spring, washer excavation and re-filling etc. as required (minimum 20 mtr. or as per requirement at site).				
7	Providing and fixing <b>25 mm X 5 mm G.I. strip</b> on surface or in recess for connections etc. as required. (minimum 45 mtr. or as per requirement at site).				
8	Providing and fixing <b>6 SWG dia G.I. wire on surface or in recess</b> for loop earthing along with existing surface/ recessed conduit/ sub-main wiring/ cable as required. (minimum 350 mtr. or as per requirement at site).	50	KWp	47,002.00	23,50,100.00
<b>Total SH-12</b>					<b>23,50,100.00</b>

	<b>SUB-HEAD: 13 [Domestic Water and dewatering pumps]</b>				
1	<b>Domestic Water Transfer Pumps</b>				
	Supplying & supervision of testing & commissioning of package vertical Hydropneumatic system, comprising of 2.0 nos. (1 duty + 1 stand by) Electrical Driven inline pumping sets each of 5.0 LPS to a head to 70 meter with all accessories, Pumps shall be with C.I. Base, S.S 304, impeller, shaft, mechanical seal, S.S. Shaft directly coupled to motor suitable for operation on 400/440 volts, 3 phase 2900 RPM. TEFC electronic motor mounted on a common channel baseplate 150mm dia pressure gauge, GM isolation cock and cement concrete foundation with plaster with dunlop cushy foot mountings with all accessories such as NRVs, valves, pressure switch, common suction and delivery header, bellows on suction and delivery side complete in all respects.				
	Pump mounted or wall mounted microprocessor based controller, Electronic control panel IP 54 with frequency inverter, logic controller relays, pressure sensor, pressure sensor transmitter, pressure tank, float switch, VFD, electrical wiring, cabling from panel to pumps, level controller, two lined LCD display, diodes to indicate pump ready, pump running and fault capable to communicate with toher RS 485 interface. with Power box equipped with fuses or isolators or circuit breakers as required. complete with all accessories as per manufacturer specifications.				
	Suction & Delivery Header - SS 304				
	Control Valve On suction and Delivery - Ball Valve Only (No Butterfly Valve Accepted).				
	Flow Prevention - Only Check Valve				
	One Number Variable frequency Drive				
	Impeller : Stainless Steel				
	Shaft : Stainless Steel				
	RPM : 2900.				
	Mover : Electric Motor				
	HP - As required.				
	Necessary foundation with bolts				
	Ball valve on suction & delivery				
	Including all electrical panel and cabling works.				
	NRV on delivery				
	Dust & vermin proof cubicle type motor control centre fabricated from powder coated 16 SWG MS sheet suitable to automatic working of above mentioned pumps.	1	Set	3,68,025.00	3,68,025.00

2	Supply, installing, testing and commissioning of submersible dewatering single stage single entry pumps with C.I. body and C.I. two vane enclosed type impeller, SS-304 shaft connected to TEFC submersible motor for 415 ± 10% volts, 3 phase, 50 cycles A.C. power supply with mechanical seal, pump connector unit with rubber diaphragm and bend, vertical discharge pipe, guide pipe and chain in built level controller, sequence running controller, arrangement for both pumps running together in case of emergency, audible hooter for failure or flooding, dry running Protection complete in all respects.				
	<b>(1W + 1S)</b>				
	<b>Pump Room Drainage Pumps and basement</b>				
	(Pumps to be suitable to handle solids upto 30 mm size)				
	Capacity - 4.0 LPS (Each)				
	Head - 15.0 M				
	H.P. - 2.5 HP Approx.	2	Set	66,824.00	1,33,648.00
3	<b>Electric Panel For Water Supply Pumps at Water Supply Pump Room</b>				
	Design, manufacture, supplying, installation, testing and commissioning of indoor cubical panel minimum depth 300mm made out of 2mm thick MS sheet, 9 tank process, powder coated, with IP42 protection with hinged and lockable doors complete with approved shade interconnections, tinned copper crimping lugs, bonding to earth and painting, suitable for use at 415 volts, 3 phase 4 wire 50 Hz system and suitable for a fault level of 25 MVA symmetrical at 415 volts. (minimum size 600mm x 600mm)				
	<b>INCOMING</b>				
a	63 A, 16KA FP, 415V MCCB with heavy duty solid neutral link with				
b	(0-100A) ammeter with 3 CT and selector switch - 1 set				
c	(0 - 500 V) voltmeter with selector switch - 1set				
d	LED indication light with protection fuse. - 01 Set (3 Nos.)				
e	100A 4 strip Al. busbar with DMC support - 1set				
	<b>OUTGOING</b>				
f	40A ,10 KA TPN MCB - 2 Nos. (outgoing to water booster pump set)				
g	40A, 10 KA TPN MCB - 2 Nos. (Spare)				
h	32A, 10 KA TPN MCB - 4 Nos. (2 nos. outgoing to waste water pump & 2 nos. spare)	1	Set	36,593.00	36,593.00
4	<b>SUB - PANELS FOR 2.0 HP WASTE WATER SUMP PUMPS.</b>				

	Design, manufacture, supplying, installation, testing and commissioning of indoor cubical panel, minimum depth 300mm, made out of 2mm thick MS sheet, 9 tank process, powder coated, with IP42 protection with hinged and lockable doors complete with approved shade interconnections, tinned copper crimping lugs, bonding to earth and painting, suitable for use at 415 volts, 3 phase 4 wire 50 Hz system and suitable for a fault level of 25 MVA symmetrical at 415 volts. (minimum size 600mm x 600mm)				
	<b>INCOMER</b>				
	40 A TPN MCB - 1 No.				
	(0-40A) ammeter with 3 CT and selector switch - 1 set				
	(0 - 500 V) voltmeter with selector switch - 1 set				
	LED indication light with protection fuse. - 01 Set (3 nos.)				
	<b>OUTGOINGS</b>				
	32A, 10KA TP MCB - 2 Nos.				
	DOL starter upto 5 HP, overload relay, start / stop push buttons, phase indication lights with protection fuse, on / off / trip indication lights with protection fuse, including single phase preventer. - 02 Nos				
	NOTE :				
	i) All the drainage pumps shall be work cyclic process i.e. in first operation duty pump work on duty and stand by pump duty pump work on stand by and stand by pump work as duty pump.				
	ii) The drainage Stand by pumps automatically work as drainage assist pump for Duty pump when level of water rises in drainage sump pumps i.e. Both pumps can work at a time & operation shall be controlled with the help of level controllers and float switches.	2	set	29,511.00	59,022.00
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	65 mm dia	10	Mtr.	1791.00	17910.00
b	80 mm dia	10	Mtr.	2079.00	20790.00
c	100 mm dia	10	Mtr.	2799.00	27990.00
d	150 mm dia	15	Mtr.	3896.00	58440.00
6	Supplying, fixing, testing and commissioning of Butterfly valves PN 16 rated without insulation for water circulation as per specifications.				
a	65 mm dia	2	Each	4,711.00	9422.00
b	80 mm dia	2	Each	5,424.00	10848.00
c	100 mm dia	2	Each	7,282.00	14564.00

7	Supplying, fixing, testing and commissioning of NON - RETURN VALVE with dual plate of C I body SS plates vulcanized NBR seal flanged end & PN 16 pressure rating as specified.				
a	65 mm dia	2	Each	6955.00	13910.00
b	80 mm dia	4	Each	8316.00	33264.00
8	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	Each	7280.00	14560.00
<b>Total SH-13</b>					<b>8,18,986.00</b>
<b>SH:-14 (Sensor Based Car Parking)</b>					
<b>Vehicle Access System</b>					
<b>1</b>	<b>Boom Barrier</b> Supply, installation, testing and commissioning of Automatic Boom Barrier (up to 6 mtr) for outdoor, Electromechanical drive, 24V DC Power Supply, CE Certified, IP-55 or better, extruded aluminium white colour boom arm, reflective red stickers, all housing and internal parts will be rust and corrosion free metal of high strength .The boom barrier will be suitable for operation automatically by RFID card/tags, ANPR cameras, remote from Guard Room with wired and wireless arrangement & manually, 100% intensive duty cycle, opening- closing time max 6 seconds(adjustable ), with in built reverse on contact protection, manual over ride, push button, Loop Detector for Auto Closing, Integration with Smart card and proximity reader etc, MCBF 12, Million cycles. (Note:- the items i/c all civil & electrical works i/c control cables) The Motor & Controller should be minimum IP55 rating.	2	Nos.	137932.00	2,75,864.00
<b>2</b>	Supply, Installation, Testing & Commissioning of Automatic Number Plate Recognition (ANPR) a) TCP/IP enable Color Camera b) High Resolution c) inbuilt OCR Engine d) integrated with PMS e) IP 67 or above f) additional illumination light g) Mounting Pole (SS or GI) h) Adjusted able lens i) High performance 4 core processor j) ANPR processor 1.4 ghz ARM quad core k) Range 4 m-20 mtr l) certificate CE/ UL/ FC/ OnViF with mounting pole and integrated with barrier for access control system of vehicle.	2	Nos.	134259.00	2,68,518.00
<b>PARKING GUIDANCE SYSTEM</b>					
<b>3</b>	SITC of Combo device of <b>Ultrasound Detector &amp; LED Indicator (Red/Green)</b> : To sense the vehicle occupancy with automatic detection. Ultrasonic detection sensing	108	Nos.	4560.00	4,92,480.00



	with RS485 as communication protocol.(a) Detectable range: 0.5m to 3.5m, Scope of detection: 15 deg,(b) Operating temp:20 to +60 Degree Celsius.(c) Working Voltage: DC 15- 24V(d) Working Current: 2 mA(e) Communication:RS485@9600Bps(f) Programmable range adjustable(g) Power Consumption-<3W(h) Dimension:120X120X75(i) Certification: CELED indicator should have common anode double color light design. The unit should have single module with standard baud rate & housing material should be ABS with all required mounting connectors & Accessories. Complete as per technical specification				
4	SITC of <b>DIRECTIONAL LED DISPLAY</b> (For indicating total vacant slots at respective floor Entry Floor/Level). a)Number of dynamic digit -4 with arrow b) Height of Character height 160 mm c) LED Type-5mm SMD ultra bright Multi color LED d) Every line will have separate address in case of multiple lines e) Power Supply - 230VAC f) Communication through RS 485 g) Out door display with weatherproof enclosure. h) MS Powder coated Panel with all required accessories for mounting i)Visibility: 120 mtr j) IP Rating 65	10	Nos.	22383.00	2,23,830.00
5	SITC of <b>SINGLE ROW FLOOR LED DISPLAY</b> (For indicating total vacant slots at respective floor Entry a)Number of dynamic digit -4 b) Height of Character height 160 mm c) LED Type-5mm SMD ultra bright Multi color LED d) Every line will have separate address in case of multiple lines e) Power Supply - 230VAC f) Communication through TCP-IP/RS 485 g) Out door display with weatherproof enclosure. h) MS Powder coated Panel with all required accessories for mounting i) IP Rating- 65	2	Nos.	22383.00	44,766.00
6	<b>Main Display</b> at Entry Gate Of Building : 2 ROWS MULTICOLOR LED DISPLAY (For indicating total vacant slots at respective Floor/level).(Installation of the said display unit is at entrance of Parking main gate) (minimum size 30"x60" i/c all mounting accessories i.e. required 80mm dia 3 mtr. length GI pipe pole 2 nos. i/c painting & foundation of pole) a)Number of dynamic digit -4 b) Height of Character height 160 mm c) LED Type-5mm SMD ultra bright Multi color LED d) Every line will have separate address in case of multiple lines e) Power Supply - 230VAC f) Communication through TCP-IP/RS 485 g) Out door display with weatherproof enclosure. h) MS Powder coated Panel with all required accessories for mounting	1	Nos.	51210.00	51,210.00

	i) IP Rating- 65				
7	SITC of <b>ZONE CONTROLLER</b> : Equipped with communication protocol: RS485, with Standard Baud rate, Maximum load quantity 28 units of UD. Maximum Communication distance: 800 mtrs, Working temp range: 5 deg C to 50 deg C. The above shall be housed in a vandal proof, lockable & secure PVC Cabinets to be supplied along with the Controllers and its necessary accessories.(a) Working Voltage: 24 Vdc(b) Current Rating:45mA(c) Power consumption:<10W(d) Communication: RS485@9600 Bps(e) Maximum Load Capacity:-28 units of UD(f) Maximum Communication Distance:800 mtr(g) Display:LED indicator(h) IP Rating: IP 54(i) Certification :CEComplete as per technical specification	4	Nos.	33998.00	1,35,992.00
8	SITC of <b>FLOOR CONTROLLER/ MASTER CONTROLLER</b> : Operating voltage :AC220V± 10%, Communication protocol : RS485, with Standard Baud rate & the above shall be housed in a vandal proof, lockable & secure PVC Cabinets. To be supplied along with the Controllers & all other Required Necessary Accessories. Baud Rate:9600 Bps.CPU:32 bit microprocessor. Rate: Half duplex. Voltage rating: AC 230V - 50Hz.Current rating:45 mA. Power Consumption:10W.Display Indicator: Red Power, Green ON.RAM:256K bytes. ROM:1 MB flash. Input Port Type: Upto 16 Channels TCP/IP & RS485 interface.Speed:10/100 Mbps (Auto Detect).Protocol: ARP, IP, ICMP, UDP, TCP, HTTP, DHCP. Mode: TCP Server/TCP Client/UDP/Virtual Com/Pairing. Setup: HTTP Browser Setup. Security: Login Password.RS-485 Pins: Data+, Data- (Surge Protected) Built-in RS-485 pull high/low resistor 15KV ESD protection for all signals. Certification: CE. Complete as per technical specification	2	Nos.	40661.00	81,322.00
9	<b>Server &amp; Software</b> Supplying, installation, testing & commissioning of Parking Guidance System Server with real time monitoring PGS application the following Characteristics a) Type: Rack Mountable b) size: 1U c)Processor Speed : 3.3 GHz d) Processor Type : Intel Core i7/ Xeon e) Hard disk : 1 x 1TB SSD 7.2K RPM SATA 6Gbps f) RAM: 1 x 32GB g) OS: Windows 11 Pro with software license h) 24 inch LED display with HDMI  Parking Guidance System with Software license Parking Guidance Software should have the following features Parking Graphical representation Long stay vehicle indication Average parking time Parking area with alarm and event monitoring Report Management Graphical representation based on actual	1	Set	297051.00	2,97,051.00

	layout Drawing Report Management for better parking operations Average traffic flow daily, weekly, monthly Different Color indication on software as per time spent in parking Manage and control each parking guidance device through software Floor wise parking count status, Vacancy status Additional hardware integration possibility				
	<b>ELECTRICAL WORKS</b>				
<b>10</b>	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.				
<b>a</b>	20mm dia	300	Mtr.	250	75,000.00
<b>b</b>	25mm dia	200	Mtr.	286	57,200.00
<b>11</b>	Supplying and drawing following sizes of control cable in the existing surface/ recessed steel/ PVC conduit as required.				
<b>a</b>	3C x 1.5 Sqmm Cu Cable	300	Mtr.	45.00	13,500.00
<b>b</b>	4C x 1.5 Sqmm Cu Cable	200	Mtr.	56.00	11,200.00
<b>12</b>	Supplying and drawing of UTP 4 pair CAT 6 LAN Cable in the existing surface/ recessed steel/ PVC conduit as required.				
<b>a</b>	1 run of cable	500	Mtr.	52	26,000.00
	<b>Total SH- 14</b>				<b>20,53,933.00</b>
	<b>SH:- 15 (EV Charging)</b>				
<b>1</b>	Supplying, Installation, Testing & Commissioning of Electric Vehicle Charger of following specification etc. complete as required. Input Rating :- 230 Vac, single phase, 32 A maximum, 50/60 Hz Output Rating :- 230 Vac, single phase minimum 7.3 kW/ 32 A maximum, 50 / 60 Hz Electrical Protection :- Over current, Under voltage, Over voltage, Residual current, Surge protection, Short circuit, Over temperature, Ground fault, Plug-out protection, DC leakage protection Automatic recovery :- The EVSE will automatically resume charging after a minor fault such as OVP, UVP, OTP or OCP. No user intervention required. Status Indicators :- Power, Status, Charge, Fault. Charger Configuration :- Charging Current Adjustment, Charging Duration Limitation. Network Interface :- WiFi, Ethernet (standard), Bluetooth, RS485, 3G/ 4G (option) for backend communication Ethernet (standard) for local access. Charging Protocol :- OCPP 1.6. Operating Temperature :- -30oC to + 50oC (-22oF to +122oF) Storage Temperature :- -40oC to + 80oC (-40oF to +176oF) Altitude :- Up to 2,000 m (6,000 ft.) Ingress Protection :- IP54 or greater	10	Job	44,313.00	4,43,130.00

	Enclosure Protection :- IK08 or greater Certificate / Compliance :- CE, IEC 61851-1, IEC 61851-2 configurable contacts :- 1 input, 1 output Type 2 cable :- Min. 5 meters User authentication :- RFID, Mobile APP, RS485/P1 for energy meter connection.				
	<b>Total SH- 15</b>			<b>Rs.</b>	<b>4,43,130.00</b>
	<b>SH: - 16 (EFFLUENT TREATMENT PLANT-5 KLD)</b>				
<b>A</b>	Supplying, installation, testing & commissioning of Effluent Treatment Plant for the following duty with on site 3 years warranty:				
	<b>Daily Avg. Flow = 5 cum/Day</b>				
	<b>Reuse of ETP treated water after treatment. Horticulture, Landscaping, irrigation etc. (for flushing after GRA-OUT)</b>				
	<b>Influent Characteristics (considered)</b>				
	pH - 2 to 10				
	BOD5 - 400-500 mg/l S. Solids - 250-300 mg/l				
	COD - 700-1000 mg/l				
	Oil & Grease - 6.5 mg/liter				
	<b>Effluent discharge standard after treatment:</b>				
	pH - 6.5 - 8.0				
	BOD5 - Less than 10 mg/liter				
	S. Solids - Less than 10 mg/liter				
	COD - Less than 50 mg/liter				
	Oil & Grease - < 1 mg/l				
<b>1</b>	Mild Steel Suitable Sized Manually operated Bar Screen made of Mild Steel in RCC screen channel as per following specifications	1	No.	8057.00	8057.00
	Size: 300 mm x400 mm				
	Angle of inclination: 60 degree (Or as per site)				
	Bar spacing: 10-12 mm				
<b>2</b>	Providing and Fixing of compact monoblock dry motor Raw Effluent transfer pumps of suitable rating with non-clog free flow open impeller, solid handling capacity of upto at least 30 mm suitable for operation on 415 V +10% , 3 Phase ,50 Hz, AC supply, speed 2900 rpm including oil chamber, guide wire for lifting & lowering of pump , MS galvanized lifting chain, complete with all aspects.	2	Nos.	18604.00	37208.00
	Flow: 0.5 m3/hr.				
	Head: 8-10 m				
	Power rating: 0.75 KW				

3	Supply, Installation, testing & commissioning of physico-chemical treatment, the system shall be comprising of followings:-				
	<b>Alum Dosing System with Automation</b>				
	(a) Dosing pump, Cap: 0-6 LPH, Pressure: 4 Kg/cm2 with pipes, fitting and accessories for necessary provision of Automatic dosing				
	Type: Metering pumps				
	(b) Dosing Tank, Cap: 100 Litres				
	MoC: HDPE/LDPE				
	<b>Lime Dosing System</b>				
	(a) Dosing pump, Cap: 0-6 LPH, Pressure: 4 Kg/cm2 with pipes, fitting and accessories for necessary provision of Automatic dosing				
	Type: Metering pumps				
	(b) Dosing Tank, Cap: 100 Litres				
	MoC: HDPE/LDPE				
	<b>Poly Dosing System</b>				
	(a) Dosing pump, Cap: 0-6 LPH, Pressure: 4 Kg/cm2 with pipes, fitting and accessories for necessary provision of Automatic dosing				
	Type: Metering pumps				
	(b) Dosing Tank, Cap: 100 Litres				
	MoC: HDPE/LDPE				
	<b>Tube deck media for Pre settling Tank along with supports and structures</b>	1	Job	84450.00	84450.00
4	<b>Piping, Valves and accessories for ETP</b>				
(a)	Providing and fixing uPVC pipes conforming to IS, suitable for hot & cold water supply, including all fittings, including trenching, refilling & testing of joints complete as per direction of Engineer in-Charge.				
(i)	25 mm dia nominal bore	20	Mtr.	77.00	1540.00
(ii)	32 mm dia nominal bore	15	Mtr.	154.00	2310.00
(iii)	40 mm dia Nominal Bore	10	Mtr.	285.00	2850.00
(b)	Providing and fixing of M.S. pipes as per IS:1239 complete with fittings including connection etc. as required on surface/ recess.				
(i)	25 mm dia nominal bore	10	Mtr.	385.00	3850.00
(ii)	32 mm dia nominal bore	30	Mtr.	451.00	13530.00
(iii)	40 mm dia Nominal Bore	20	Mtr.	584.00	11680.00
(c)	Providing and fixing of BUTTERFLY VALVE (MANUAL) with C I body SS disc nitrile sheet & O - ring & PN 16 pressure rating as specified.	6	No.	2262.00	13572.00
(i)	Size : DN 40 mm				

<b>5</b>	Providing and fixing of Gun Metal NON - RETURN VALVE- Horizontal (Screwed End)				
	Size : DN 25 mm	2	No.	564.00	1128.00
	Size : DN 32 mm	2	No.	766.00	1532.00
	Size : DN 40 mm	2	No.	927.00	1854.00
<b>6</b>	Supply, Installation, Testing & Commissioning of compact monoblock dry motor SBR Feed pumps of suitable rating with Self priming fwith adequate solid handling capacity of upto at least 5-10 mm suitable for operation on 415 V +10% , 3 Phase ,50 Hz, 50 Hz FREQUENCY, THREE PHASE A.C. POWER SUPPLY	2	Nos.	10620.00	21240.00
	Flow: 0.5 m3/hr.				
	Head: 8-10 m				
	Casing: CI, Impeller: CI, Shaft: C-40				
	RPM: 2900				
	Power rating: 0.37 KW, 0.5 HP				
<b>7</b>	<b>SBR PACKAGE</b>				
	Supply, Installation, Testing & Commissioning of Twin Lobe type Air Blowers for providing aeration to the SBR tank - 2 Nos				
	Air Flow: 10 m3/hr.				
	Pressure: 4000 mmwc				
	Power Rating: 1.5 KW				
	Supply, Installation, Testing & Commissioning of Air Diffusers for Equalization tank and SBR tank				
	Coarse bubble diffusers - 4 Nos.				
	Fine bubble diffusers - 4 Nos.				
	SBR GRA-Auto Decanting system equipped with Automation features based on times based pre-designed PLC - 1 Nos.				
	Pipes and fittings for Air piping and Air Grid				
	Providing and fixing uPVC pipes complete with fittings				
	25 mm dia nominal bore - 10 Mtr.				
	32 mm dia nominal bore - 10 Mtr.				
	50 mm dia Nominal Bore - 10 Mtr.	1	Job	302317.00	302317.00
<b>8</b>	Supply, Installation, Testing & Commissioning of Horizontal centrifugal type Filter Feed Pumps for feeding water from Intermediate Water tank to filters (MGF and ACF)	2	Nos	10620.00	21240.00
	Flow: 0.25 m3/hr.				
	Head: 20-30 m				
	RPM: 2900				
	Impeller: CI				
	Shaft: CI				

	suitable for operation on 415V				
	Power Rating: 0.75 KW				
9	Supply, Installation, Testing & Commissioning of compact monoblock dry motor Sludge transfer/ recirculation pumps of suitable rating with Self priming with adequate solid handling capacity of upto at least 7-10 mm suitable for operation on 415 V +10% , 3 Phase ,50 Hz, 50 Hz FREQUENCY, THREE PHASE A.C. POWER SUPPLY	1	Nos.	16114.00	16114.00
	Flow: 0.5 m3/hr.				
	Head: 8-10 m				
	Power rating: 0.37 KW, 0.5 HP				
10	Supply, Installation, Testing & Commissioning of Chlorine dosing system, it shall be comprising of dosing pump, dosing tank.				
	<b>1- Chlorine Dosing System</b>				
	a - Dosing pump, Cap: 0-6 LPH, Pressure: 2 Kg/cm2				
	Type: Metering pumps				
	<b>b- Dosing Tank, Cap: 100 Litres</b>	1	Job	10965.00	10965.00
	MoC: HDPE/LDPE				
11	Supplying of <b>Sludge Bag</b> System of suitable size for the dewatering of sludge generated per day.	1	Set	8451.00	8451.00
12	Supplying of <b>FRP vessel</b> filter with distribution system and other required accessories:				
	<b>Multigrade Filter</b>				
	<u>Dia : 200 mm</u>				
	<u>HOS: 1350</u>				
	Filter media: Fine and coarse sand, pebbles and gravels				
	<b>Activated Carbon Filter</b>				
	<u>Dia : 200 mm</u>				
	<u>HOS: 1350</u>				
	Filter media: Fine and coarse sand, Activated Carbon, pebbles and gravels	1	Set	38383.00	38383.00

13	Providing & Fixing, testing and commissioning of indoor Electrical Panel IP42 rating minimum 250mm depth and powder quoted paint with approved shade, for ETP, SEMI compartmentalised fabricated out of 16 gauge CRCA sheet steel minimum 7 tank process with 4 strip 100A aluminium busbar with DMC/ SMC support i/c interconnection with FRLS copper conductor wire, plates shall be provided on top as well as at the bottom of panels along with required cabling and accessories required to complete the system i/c followings switchgears: (Approx. size 1000mm x 1000mm)				
	<b><u>INCOMING</u></b>				
	TPN MCB 63A - 1 No.				
	SP MCB 6A - 3 Nos.				
	METERING CT 60/5A - 1 Set				
	DIGITAL VOLT METER WITH SELECTOR SWITCH - 1 set				
	DIGITAL AMMETER WITH SELECTOR SWITCH - 1 set				
	LED INDICATION LIGHT RYB - 1 set				
	<b><u>OUTGOING</u></b>				
	<b>RAW EFFLUENT TRF. PUMP 0.75KW - 2 Nos.</b>				
	TP MCB 10A - 1 Nos.				
	OVER LOAD RELAY 2.5-4A - 2 Nos.				
	POWER CONTACTOR 9A- 2 Nos.				
	PUSH BUTTON WITH ELEMENT - 4 Nos.				
	INDICATION LIGHTS - 4 nos				
	SPP - 2 Nos.				
	<b>SBR FEED PUMP 0.37 KW - 2 Nos.</b>				
	TP MCB 10A - 1 Nos.				
	OVER LOAD RELAY 1.6-2.5A - 2 Nos.				
	POWER CONTACTOR 9A - 2 Nos.				
	PUSH BUTTON WITH ELEMENT - 4 Nos.				
	INDICATION LIGHTS - 4 nos				
	SPP - 2 Nos.				
	<b>AIR BLOWER 1.5 KW - 2 Nos.</b>				
	TP MCB 10A - 1 Nos.				
	OVER LOAD RELAY 1.6-2.5A - 2 Nos.				
	POWER CONTACTOR 9A - 2 Nos.				
	PUSH BUTTON WITH ELEMENT - 4 Nos.				
	INDICATION LIGHTS - 4 nos				
	SPP - 2 Nos.				
	<b>FILTER FEED PUMP 0.75 KW - 2 Nos.</b>				
	TP MCB 10A - 1 Nos.				
	OVER LOAD RELAY 2.5-4A - 2 Nos.				
	POWER CONTACTOR 9A - 2 Nos.				



	PUSH BUTTON WITH ELEMENT - 4 Nos.				
	A/M SELECTOR SWITCH - 2 Nos.				
	INDICATION LIGHTS - 4 nos				
	ADDON BLOCK - 2 Nos.				
	SPP - 2 Nos.				
	<b>SLUDGE REC. PUMP 0.37 KW - 1 No.</b>				
	TP MCB 10A - 1 Nos.				
	OVER LOAD RELAY 1.6-2.5A - 1 Nos.				
	POWER CONTACTOR 9A - 1 Nos.				
	PUSH BUTTON WITH ELEMENT - 2 Nos.				
	INDICATION LIGHTS - 2 nos				
	A/M SELECTOR SWITCH - 1 Nos.				
	SPP - 1 Nos.				
	<b>Spare - 1 No.</b>				
	TP MCB 10A - 1 Nos.				
	OVER LOAD RELAY 1.6-2.5A - 1 Nos.				
	POWER CONTACTOR 9A - 1 Nos.				
	PUSH BUTTON WITH ELEMENT - 2 Nos.				
	INDICATION LIGHTS - 2 nos				
	A/M SELECTOR SWITCH - 1 Nos.				
	SPP - 1 Nos.				
	<b>Provision for fixing PLC SYSTEM - 1 No. i/c wiring, programming, testing &amp; commissioning.</b>				
	PLC-DI/DO-30 - 1 No.				
	HMI 7" - 1 No.				
	POWER SUPPLY 1.1A - 1 No.				
	PLC PROGRAMMING AT YOUR OFFICE				
	RELAY CARD - 2 No.				
	EMG STOP - 1 No.				
	FAN 4" - 1 No.	1	<b>Job</b>	43947.00	43947.00
	<b>Cabling</b>				
14	Supply, installation, testing and commissioning of Copper Cable of following specification				
a	3C X 6 sqmm	25	Mtr	237.00	5925.00
15	Supply, installation, testing and commissioning Copper Cable of the following specification				
a	2C x 1.5 sqmm	15	Mtr	46.00	690.00
16	<b>MS TANKS</b>				
	Supply of following Tanks In MSEP/HDPE				
	<b>MSEP Tanks</b>				
	<b>Physico-chemical Treatment with Flash Mixer/Flocculation Tank/Settling Tank+SBR</b>				

	Total Weight app. 3500 Kgs - 1 No.				
	<b>HDPE tanks</b>				
	Intermediate water tank - 1000 Ltr. - 1 No.				
	Break Tank - 1000 Ltr. - 1 No.				
	Treated Water Tank - 1000 Ltr. - 1 No.	1	Job	342239.00	342239.00
	<b>Total SH-16</b>				<b>995072.00</b>
	<b>SH:- 17 (Audio-Video Conferencing system)</b>				
<b>A</b>	<b>Conference Hall -126 Seater</b>				
	<b>Display</b>				
1	Supply, Installation, Testing & commissioning of LED Indoor Video wall with 1.5 mm - 1.6 mm Pixel pitch, size of 3000 x 1688 mm., aspect ratio 16:9, Brightness: 600 Nits or better, Pixel Configuration: 3in1 SMD or better, Pixel density: 4,00,000 pixels/m <sup>2</sup> or better, Contrast Ratio: 5000:1 or better, 4 Trillion Colours or better, LED lifespan:100,000 hrs or better, 14/16-bit processing or better, Brightness Uniformity 97% or better, Viewing angle 160° both horizontal and vertical or better, Refresh rate 3840Hz or better, IP 20 rating, 100% front serviceable, Average Power consumption <225 W/m <sup>2</sup> . Should have redundant inbuilt power. (Certification : CE/UL/BIS) Video Wall Controller: Should be supplied with video wall controller/ processor. Should be certified/complied with provided LED wall proposed make. The Video Wall controller should have minimum 4xHDMI inputs , 2xHDMI scaled outputs supporting resolution upto 4K@60Hz, aspect ratio 16:9 or better. The video wall controller should have capability to provide Picture In Picture, Picture by Picture on the video wall etc complete as required. The LED Video wall should be supplied with minimum 6% spares at site. Should be supplied with mounts and interconnecting cables and other installation accessories as required. (With 5 year on site warranty for complete item)	1	nos.	3256650.00	3256650.00
2	SITC 65" or Higher, LED Back Lit Panel, Panel Technology -(IPS/ VA), Native Resolution- 3840 x 2160 (UHD),Brightness -440cd/m <sup>2</sup> or better,Contrast Ratio-1000 : 1 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(3), 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, SNMP Support, Temperature Sensor, Auto Brightness Sensor, Local Key Operation, USB Plug & Play, Fail over, Wake on LAN, Media Player, Picture in Picture (Optional), Environment Conditions ,Operation Temperature- 0 °C to 40 °C or better, Operation Humidity - 10 % to 80 % or	2	nos.	75001.00	150002.00

	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, FCC, BIS, Warranty - 5 years, Wall/ Floor mount accessories as per site requirement, Remote control, Standard cable etc complete as required.				
3	SITC 43" or Higher, LED Back Lit Panel, Panel Technology -(IPS/ VA), Native Resolution- 3840 x 2160 (UHD), Brightness -440cd/m2 or better, Contrast Ratio- 1000 : 1 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(3), 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, SNMP Support, Temperature Sensor, Auto Brightness Sensor, Local Key Operation, USB Plug & Play, Fail over, Wake on LAN, Media Player, 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, FCC, BIS, Warranty - 5 years, Wall/ Floor mount accessories as per site requirement, Remote control, Standard cable etc complete as required.	1	nos.	46236.00	46236.00
	<b>Audio</b>				
4	Supply, Installation, Testing & Commissioning of 2-way Ceiling-mount loudspeaker. Frequency Range-65 Hz to 20 kHz or better, Rated RMS power - 60 watts or better, Sensitivity- 86 dB SPL or better, Coverage- 130°conical or better, Maximum Peak SPL-110dB or better, LF Transducer - 6-6.5-inch woofer or better, HF Transducer- 0.75-1-inch metal dome tweeter or better, Nominal impedance- 16Ω/8Ω, IP-34 or better, Grille Material - Powder coated steel or similar, Enclosure - Steel back can or similar. Ceiling Mounting accessories included Note: All required hardware / perpetual software should be added to meet the requirement and match the compliance. All hardware / software should be from the same OEM for interoperability.	12	nos.	18271.00	219252.00
5	Supply, Installation, Testing & Commissioning of Quad Channel Class-D amplifier. Per Channel Power 180 @8Ω/4Ω/70V/100V or better. Power Sharing or Bridge/Parallel modes for better power distribution. Frequency Response- 20Hz – 20kHz or better. Signal to Noise ratio -> 100 dB or better, Input impedance - >8K- 10k Ohms, balanced or unbalanced or better, Front and Rear panel indicators for Power, signal (per channel), limit / mute / protect etc. or better. Better to have Remote standby and Power saving features - Auto-standby. Note: All required hardware / perpetual software should be added to meet the requirement and match the compliance.	1	nos.	150643.00	150643.00

	All hardware / software should be from the same OEM for interoperability.				
6	<p>SITC of Digital Signal Processor with minimum 12 Mic/Line inputs and 8 Line outputs. Shall support phantom power on each microphone input. AEC channels - 12 or more . Minimum 8x8 Dante channels or more and support for 32x32 Network or more audio channels via Dante /AES67 or similar protocol. POTS and SIP Softphone integration for Audio conferencing. USB-B port supporting AV USB Bridging for software or web-based conferencing applications emulating 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 20 Hz to 20 kHz or better, Input dynamic range &gt; 109 or better. Ports - RS232, 2 or More LAN ports for Redundancy. (With 5 year on site warranty).</p> <p>The DSP should have features like conference room routers, input equalizers, router, band pass filter, output equalizer, delay, limiters, gates, source selectors etc. Note : Required hardware / perpetual software should be added to match the compliance. All items should be from the same OEM as of Digital Signal Processor for compatibility etc complete as required.</p>	1	nos.	304420.00	304420.00
7	<p>Supply, Installation, Testing &amp; Commissioning of Gooseneck microphone with programmable mute button. Surface mounted, black, electret condenser microphone with a cardioid polar pattern. Microphone should include a programmable mute button with a touch-sensitive functionality for muting the microphone. The microphone shall include a logic controlled, bi-coloured status indicator ring. The microphone shall be resistant to RF interference from portable mobile and handheld devices. Frequency response - 50Hz to 17kHz or better, Sensitivity - 18 mV/Pa or better. Maximum SPL - 118dB - 122dB or better. Equivalent Output Noise: 29 dB SPL or better. Signal-to-Noise Ratio - 65 dB or better. Dynamic Range - 91dB or better.</p> <p>Note: All required hardware / perpetual software should be added to meet the requirement and match the compliance. All hardware / software should be from the same OEM for interoperability.</p>	1	nos.	31816.00	31816.00
8	<p>SITC of Wireless Handheld microphone Having Modulation Mode - FM, Frequency Response - 50/60 Hz - 16 kHz, Microphone shall have minimum eight or mores simultanious channels, Total Harmonic Distortion- &lt;1%, Handheld Transmitter- RF Power Output - 10 mW or better, Microphone Element - Cardioid condenser, Receiver : Sensitivity-10dBuV/&lt;3uV @ 52dB, Output Connectors complete with Handheld transmitter and Receiver etc. as required at site. Note:- All license/ software/ hardware/ any associated attachment to make the item fully functional/ compatible with system is deemed included in the item.</p>	4	nos.	23742.00	94968.00

9	SITC of Wireless Lavilier microphone Having Modulation Mode - FM, Frequency Response - 50/60 Hz - 16 kHz, Microphone shall have minimum eight or mores simultaneous channels, Total Total Harmonic Distortion-<1%, Body Pack - RF Power Output- 10 mW, Reciever : Sensitivity-10dBuV/<3uV @ 52dB, Output Connectors complete with Body Packtransmitter, Reciever and Lavilier mic etc. as required at site.Note:- All license/ software/ hardware/ any associated attachment to make the item fully functional/ compatible with system is deemed included in the item. Note: All required hardware / perpetual software should be added to meet the requirement and match the compliance. All hardware / software should be from the same OEM for interoperability.	2	nos.	21916.00	43832.00
<b>Video, switching &amp; Interface system</b>					
10	SITC of customisable Digital Interactive Podium in Metallic Frame with option of Tilting of the Interactive Panel, provision to install Gooseneck Microphone (Sennheiser, Shure, Audio-Technica), Keyboard Tray and space to store AV equipment. Top connectivity plate with Min. 1 No. HDMI, USB x 2, VGA + Audio and Power socket for external Laptop connectivity. OPS (HP,Dell,Lenovo) should be Core i5 Processor, 8GB RAM and 256GB SSD Storage complete as reqd at site. Interactive LED/TFT display should be full HD resolution of 1920x1080, Brightness min. 250 cd/m2 Interactive LED/TFT shall be from LG, Samsung, HP. (Make :- Fidato FD 22G or Equivalent in Globus/Ordain.) Note:- All license/ software/ hardware/ any associated attachment to make the item fully functional/ compatible with system is deemed included in the item.	1	nos.	198862.00	198862.00
11	Supply, Installation, Testing and Comissioning of multiformat matrix switcher with inbuilt scaler supporting resolution upto 4K @60HZ 4:4:4. Should have minimum two USB-C and two HDMI/USB inputs. USB-C should support transmission of 4K video, audio and charging of devices upto 60 watts. Should support switching of both AV inputs and USB host ports, for concurrent connection to AV outputs and room USB devices during VC meetings. Should have minimum 2 matrix / independent outputs - 1x HDMI and 1xHDBT Cat 6, supporting resolution upto 4K @60HZ 4:4:4. HDMI Signal Switching — HDCP 2.2 compliant, CEC, HDMI uncompressed audio channels, Dolby TrueHD, DTS-HD, 2K, 4K, and 3D as specified in HDMI 2.0.Built-in Intelligent Control Gateway ,Audio De-embedding,Bi-directional RS-232 Extension With Input: 3HDMI, 2 TYPE C, 1 Mic/Unbalanced Stereo Audio:1 AUX Unbalanced Stereo Audio,3 USB (HUB): On USB type A connectors 2 USB (Host): On USB type B connectors: OUTPUTS 1 HDMI: On a female HDMI connector 1 HD BaseT: On an RJ-45 connector	1	nos.	279150.00	279150.00

	1 Balanced Stereo Audio Note: All required hardware / perpetual software should be added to meet the requirement and match the compliance. All hardware / software should be from the same OEM for interoperability.				
12	Supply, Installation, Testing and Comissioning of Reciever supporting resolution upto 4K@60HZ 4:4:4. Should have INPUTS:1 HDBaseT: On an RJ-45 connector,1 HDMI: On a female HDMI connector, Minimum 2 x USB-A for VC peripherals. OUTPUTS:,1 HDMI: On a female HDMI connector. Should have 1 Balanced Stereo Audio: On a 5-pin terminal block connector Note: All required hardware / perpetual software should be added to meet the requirement and match the compliance. All hardware / software should be from the same OEM for interoperability.	1	nos.	126578.00	126578.00
13	SITC of 1:4 distribution amplifier for up to 4K HDR, HDMI signals that comply with HDCP 2.2 content protection standard. The unit takes one HDMI input, equalizes and reclocks the signal and distributes it to four identical outputs. It shall support Advanced EDID Management at site.(Make:- Cypress (CPLUS-V4T) or Equivalent in Kramer/ Lightware/ Extron/ Crestron/ QSC). Note:- All license/ software/ hardware/ any associated attachment to make the item fully functional/ compatible with system is deemed included in the item.	1	no.	48702	48702
14	Supply, installation, testing and commissioning of HDMI transmitter and Reciever with HDMI1.4 + RS-232 HDBaseT transmitter over CATx cable, HDCP , 4K @30Hz RGB 4:4:4 , 60Hz YCbCr 4:2:0 compliant, Min. 70 mtr extension distance. etc all complete(Make:- Kramer (TP-580T+ 580R) or Equivalent in Lightware/ Extron/ Cypress/ Crestron/ QSC.) Note:- All license/ software/ hardware/ any associated attachment to make the item fully functional/ compatible with system is deemed included in the item.	3	set	54790	164370
	<b>Video Conferencing</b>				
15	SITC of 4K Network PTZ Conference camera with minimum 20X optical zoom & 60-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 - ±170°, Vertical Rotation Range - -30° to +90° 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.	1	nos.	303203.00	303203.00

16	SITC of 4K Network PTZ Conference camera with minimum 12X optical zoom & 80-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 - ±170°, Vertical Rotation Range - -30° to +90° 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.	1	nos.	219182.00	219182.00
	<b>Control System</b>				
17	Supply, Installation, Testing & Commissioning of A master/space controller (Control brain) that can operate over Ethernet with control interfaces that include: three or more bidirectional RS-232, three or more IR, three or more GPI/O, and three or more or more relays. Should control devices such as scalers, video displays, audio amplifiers, Blu-ray players, sensors, screens, shades, door locks, and lights. Multiple Ethernet control gateways can be used to add remote I/O ports.PROCESSOR SPEED, 1GHz, MEMORY: 512MB RAM, 4GB Flash	1	nos.	114534.00	114534.00
18	Supply, Installation, Testing & Commissioning of 10-inch, IPS, multi-touch, touch panel with 1920x1200 resolution, with the latest Android 11, supports wired PoE (Power over Ethernet) and advanced Wi-Fi connectivity options. Powerful Processing — i.MX8M Plus Quad Core A53, 2GB RAM or more, 16/ 32GB ROM / emmc processing performance, smoothly running complicated media and graphics-rich applications, such as H.265 video, audio streams encoding and decoding, and seamless hi-resolution. 5 megapixel FF camera operation (Optional) .Versatile Powering Options — PoE and power adapter	1	nos.	237730.00	237730.00
19	SITC of 16 port L3 Gigabit POE+ Network Switch. PoE Budget - 480W 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.	1	nos.	121668.00	121668.00
	<b>Wiring &amp; Rack</b>				
20	Supply, Installation, Testing & Commissioning of 12U Equipment Rack with standard accessories, etc complete as required.	1	nos.	5386.00	5386.00

21	SITC of following cables for all conference halls (i) 4K HDMI to HDMI (M) of lengths 1.8 mtr & 3 mtr (ii) USB cable (C to C and A to B and A to A) of 3 mtr length. (iii) Active USB - 15 mtr (iii) 2 core shielded Audio microphones cables as per desire length. (iii) STP Cat 6.0 cable i/c all mounding accessories like cable management system of suitable size wherever required, connectors, brackets, sleeves etc. complete as required Note: The bidder has to quote the rate of the item considering the all cabling required for commissioning the system.	1	Job	52509.00	52509.00
22	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 Single pair, 2-core, 1.5 sqmm	200	mtr	61.00	12200.00
<b>B</b>	<b>Small Conference Halls</b>				
	<b>Display</b>				
1	SITC 85/ 86" or Higher, LED Back Lit Panel, Panel Technology -(IPS/ VA), Native Resolution- 3840 x 2160 (UHD),Brightness -440cd/m2 or better, Contrast Ratio-1100 : 1 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- 16 ms or better, Operation Hours- 24 Hrs , Connectivity - Input Ports -Digital HDMI(3), 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, SNMP Support, Temperature Sensor, Auto Brightness Sensor, Local Key Operation, USB Plug & Play, Fail over, Wake on LAN, Media Player, 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, FCC,BIS, Warranty - 5 years, Wall mount accessories as per site requirement, Remote control, Standard cable etc complete as required.	1	nos.	231491.00	231491.00
	<b>Audio</b>				



2	SITC of Full Range, Ceiling-mount loudspeaker. Frequency range - 83 Hz to 16 kHz or better, Rated RMS Power - 16 Watts or better, Sensitivity-86 dB SPL or better, Coverage Angle-140° conical or better, Maximum SPL Continuous/Peak- 99dB/107dB or better, Rated Impedance - 8 Ohms. Transformer Tapping - 70V/100V(16/8/4/2 watts) or better. Transducer - 4-inch or better, Material - Painted ABS polymer Baffle and Power coated steel grille or better. UL/CE Certified. Mounting rails and C-Ring for ceiling tile included / as required. (With 5 year on site warranty) etc complete as required.	16	nos.	9223.00	147568.00
3	Supply, Installation, Testing & Commissioning of Quad Channel Class-D amplifier. Per Channel Power 60W @8Ω/4Ω or better. Support for 70V/100V or better. Power Sharing or Bridge/Parallel modes for better power distribution. Frequency Response- 20Hz – 20kHz or better. Signal to Noise ratio -> 100 dB or better, Input impedance - >8K-10k Ohms, balanced or unbalanced or better, Front and Rear panel indicators for Power, signal (per channel), limit / mute / protectetc. or better. Better to have Remote standby and Power saving features - Auto-standby. Note: All required hardware / perpetual software should be added to meet the requirement and match the compliance. All hardware / software should be from the same OEM for interoperability.	1	nos.	79933.00	79933.00
4	Supply, Installation, Testing & Commissioning of fixed or modular chassis Digital Signal Processor with minimum 8 Mic/Line inputs and 4 Line outputs. Shall support phantom power on each microphone input. AEC channels - 8 or more with 300ms tail length or better . Minimum 8x8 Dante channels and support for up to 32x32 Network audio channels via Dante /AES67 or similar protocol. SIP Softphone integration for Audio conferencing. USB-A /USB-C, USB-B port supporting for software or web-based conferencing applications emulating 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 20 Hz to 20 kHz or better, Input dynamic range > 108 or better. Note: All required hardware / perpetual software should be added to meet the requirement and match the compliance. All hardware / software should be from the same OEM for interoperability.	4	nos.	243537.00	974148.00
5	Supply, Installation, Testing & Commissioning of five pin boundary microphone with mute and unmute button. Should be Programmable, silent membrane switch. Polar Pattern - Cardioid, LED Indicator for Status. Low-Profile design. Frequency Response - 50 Hz – 17 kHz or better, Sensitivity - 29dB or better, Signal to Noise Ratio - 71dB or better, Dynamic Range - 95 dB or better. Note: All required hardware / perpetual software should be added to meet the requirement and match the compliance. All hardware / software should be from the same OEM for interoperability.	20	nos.	47020.00	940400.00

6	SITC of Wireless Handheld microphone Having Modulation Mode - FM, Frequency Response - 50/60 Hz - 16 kHz, Microphone shall have minimum eight or mores simultaneous channels, Total Harmonic Distortion- <1%, Handheld Transmitter- RF Power Output - 10 mW or better, Microphone Element - Cardioid condenser, Receiver : Sensitivity-10dBuV/<3uV @ 52dB, Output Connectors complete with Handheld transmitter and Receiver etc. as required at site. Note:- All license/ software/ hardware/ any associated attachment to make the item fully functional/ compatible with system is deemed included in the item.	4	nos.	23742.00	94968.00
<b>Video, switching &amp; Interface system</b>					
7	Supply, Installation, Testing & Commissioning of Table Mount enclosure with 1xHDMI, 1xUSB-C and 1xUSB-A with F-pigtail connectors and 2 x Power sockets. Manually open and close lid with Black and Clear anodize color options. (With 5 year on site warranty) etc complete as required.	2	nos.	25145.00	50290.00
8	Supply, Installation, Testing and Commissioning of multiformat matrix switcher with inbuilt scaler supporting resolution upto 4K @60HZ 4:4:4. Should have minimum two USB-C and two HDMI/USB inputs. USB-C should support transmission of 4K video, audio and charging of devices upto 60 watts. Should support switching of both AV inputs and USB host ports, for concurrent connection to AV outputs and room USB devices during VC meetings. Should have minimum 2 matrix / independent outputs - 1x HDMI and 1xHDBT Cat 6, supporting resolution upto 4K @60HZ 4:4:4. HDMI Signal Switching — HDCP 2.2 compliant, CEC, HDMI uncompressed audio channels, Dolby TrueHD, DTS-HD, 2K, 4K, and 3D as specified in HDMI 2.0.Built-in Intelligent Control Gateway ,Audio De-embedding,Bi-directional RS-232 Extension With INput: 3HDMI, 2 TYPE C, 1 Mic/Unbalanced Stereo Audio:1 AUX Unbalanced Stereo Audio,3 USB (HUB): On USB type A connectors 2 USB (Host): On USB type B connectors: OUTPUTS 1 HDMI: On a female HDMI connector 1 HDBaseT: On an RJ-45 connector 1 Balanced Stereo Audio Note: All required hardware / perpetual software should be added to meet the requirement and match the compliance. All hardware / software should be from the same OEM for interoperability.	2	nos.	279150.00	558300.00
9	Supply, Installation, Testing and Comissioning of Reciever supporting resolution upto 4K@60HZ 4:4:4. Should have INPUTS:1 HDBaseT: On an RJ-45 connector,1 HDMI: On a female HDMI connector, Minimum 2 x USB-A for VC peripherals. OUTPUTS:1 HDMI: On a female HDMI connector. Should have 1 Balanced Stereo Audio: On a 5-pin terminal block connector Note: All required hardware / perpetual software should be added to meet the requirement and match the	2	nos.	126578.00	253156.00

	compliance. All hardware / software should be from the same OEM for interoperability.				
	<b>Video Conferencing</b>				
10	SITC of 4K Network PTZ Conference camera with minimum 20X optical zoom & 60-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.	303203.00	606406.00
	<b>Control System</b>				
11	SITC 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 year on site warranty) etc complete as required.	2	nos.	162536.00	325072.00
12	Supply, Installation, Testing & Commissioning of 10–inch, IPS, multi–touch, touch panel with 1920x1200 resolution, with the latest Android 11, supports wired PoE (Power over Ethernet) and advanced Wi–Fi connectivity options. Powerful Processing — i.MX8M Plus Quad Core A53, 2GB RAM or more, 16/ 32GB ROM / emmc processing performance, smoothly running complicated media and graphics–rich applications, such as H.265 video, audio streams encoding and decoding, and seamless hi–resolution. 5-megapixel FF camera operation (Optional). Versatile Powering Options — PoE and power adapter	2	nos.	237730.00	475460.00
13	SITC of 16 port L3 Gigabit POE+ Network Switch. PoE Budget - 480W 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.	121668.00	243336.00
	<b>Wiring &amp; Rack</b>				
14	Supply, Installation, Testing & Commissioning of 12U Equipment Rack with standard accessories, etc complete as required.	2	nos.	5386.00	10772.00

15	SITC of following cables for all conference halls (i) 4K HDMI to HDMI (M) of lengths 1.8 mtr , 3 mtr & 15 mtr. (ii) USB cable (C to C and A to B and A to A) of 3 mtr lengths. (iii) Active USB cables of 15 mtr lengths (C to C , A to B , A to A) (iii) 2 core shielded Audio microphones cables as per desire length. (iii) STP Cat 6.0 cable i/c all mounding accessories like cable management system of suitable size wherever required, connectors, brackets, sleeves etc. complete as required Note: The bidder has to quote the rate of the item considering the all cabling required for commissioning the system.	2	Job	79427.00	158854.00
22	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 Single pair, 2-core, 1.5 sqmm	200	mtr	61.00	12200.00
	<b>Total SH-17</b>				<b>1,13,44,247.00</b>
	<b>Total (SH:- 1 to 17)</b>				<b>11,81,17,434.60</b>
	<b>Add Labour Cess @ 1% on (total SH- 1 to 16 i.e. Rs. 10,67,73,187.60)</b>				<b>10,67,731.88</b>
	<b>Grand Total</b>				<b>11,91,85,166.48</b>
	<b>Say</b>				<b>11,91,85,166.00</b>

# FINANCIAL BID

<b>CIVIL CONSTRUCTION UNIT</b>					
<b>NIT NO. 14/2023-24/CE/CCU/CED-I/Delhi</b>					
<b>Name of work : Construction of New Building in the Existing Premises of Parivesh Bhawan, CPCB, Delhi</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</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>68,44,70,924/-</b>	*	*	*

:-\* - To be filled online in bid document.

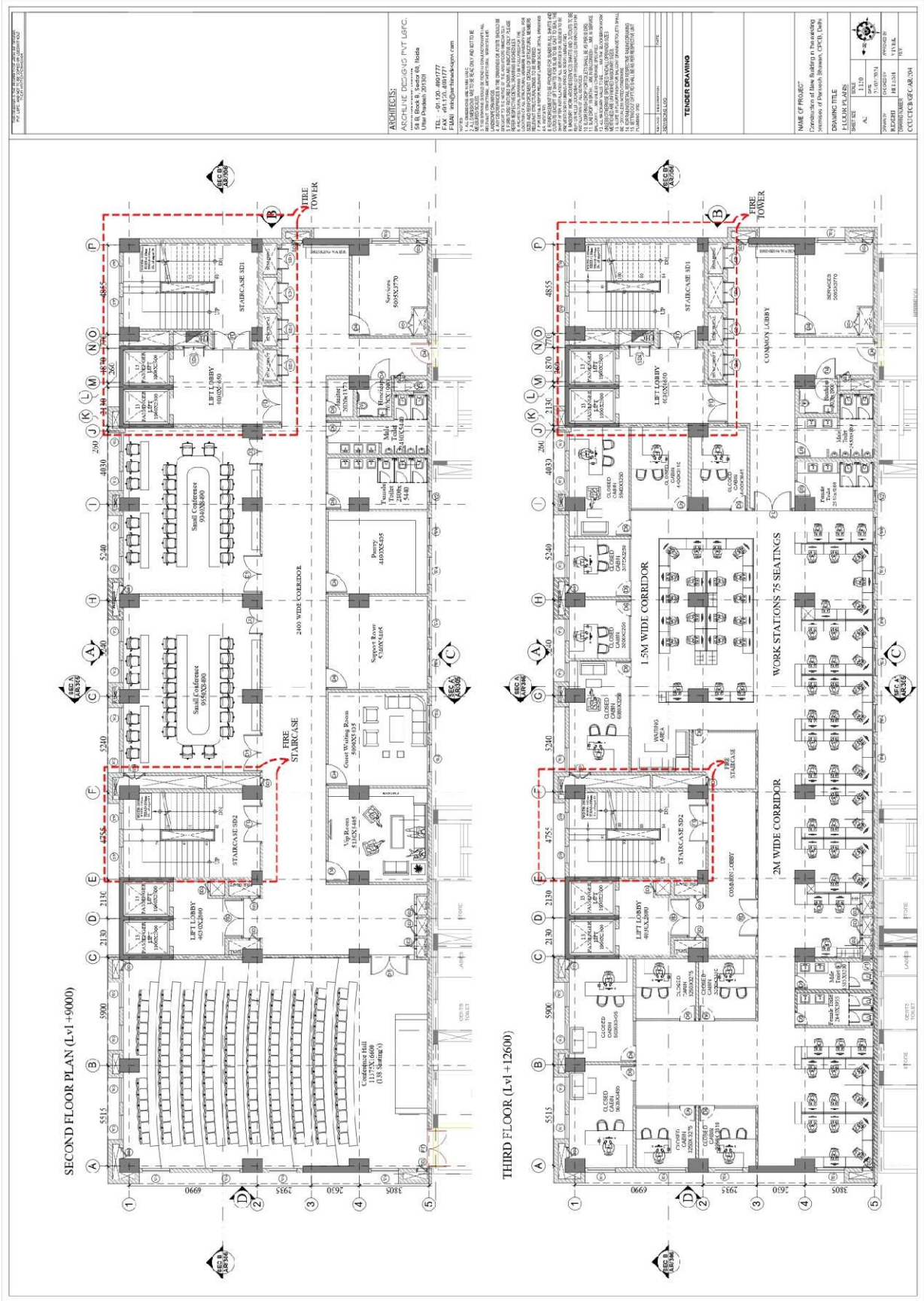
- 1) The Column Nos. 4 & 5 are mandatory to be filled by the bidders / tenderers. If these columns are left blank, the tender become invalid.
- 2) The amount in figures in column No.6 shall appear automatically corresponding to the percentage quoted in column No.4 & 5.
- 3) The tenderer is required to 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

# Drawings









ARCHITECTS:  
 ARCHLINE DESIGN PVT. LGFC.  
 5th B, Block B, Sector 68, Indira  
 Udaipur Pradesh-301001  
 TEL: +91-151-4897777  
 FAX: +91-151-4897778  
 EMAIL: info@archlinegroup.com

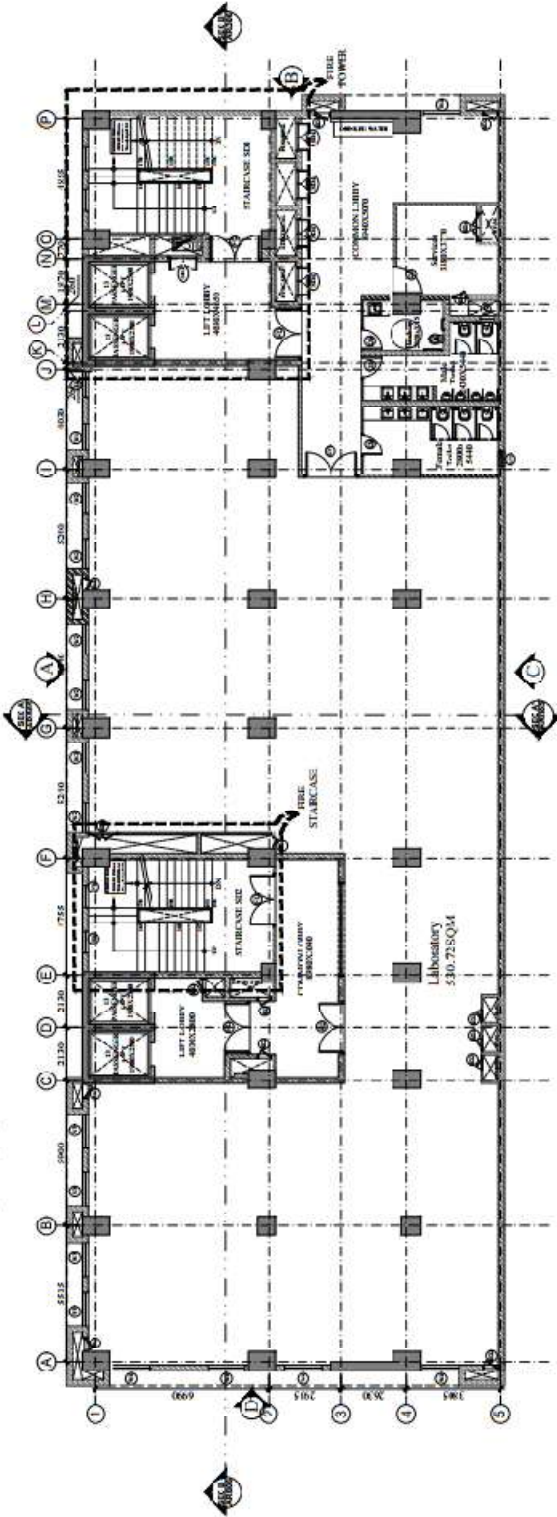
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 DRAWING NO: 11/10  
 SHEET NO: 11/10  
 PROJECT NO: 11/10  
 CLIENT: M/s. J.S. JAIN  
 PROJECT: 11/10  
 DRAWING: 11/10  
 SHEET: 11/10

TENDER DRAWING

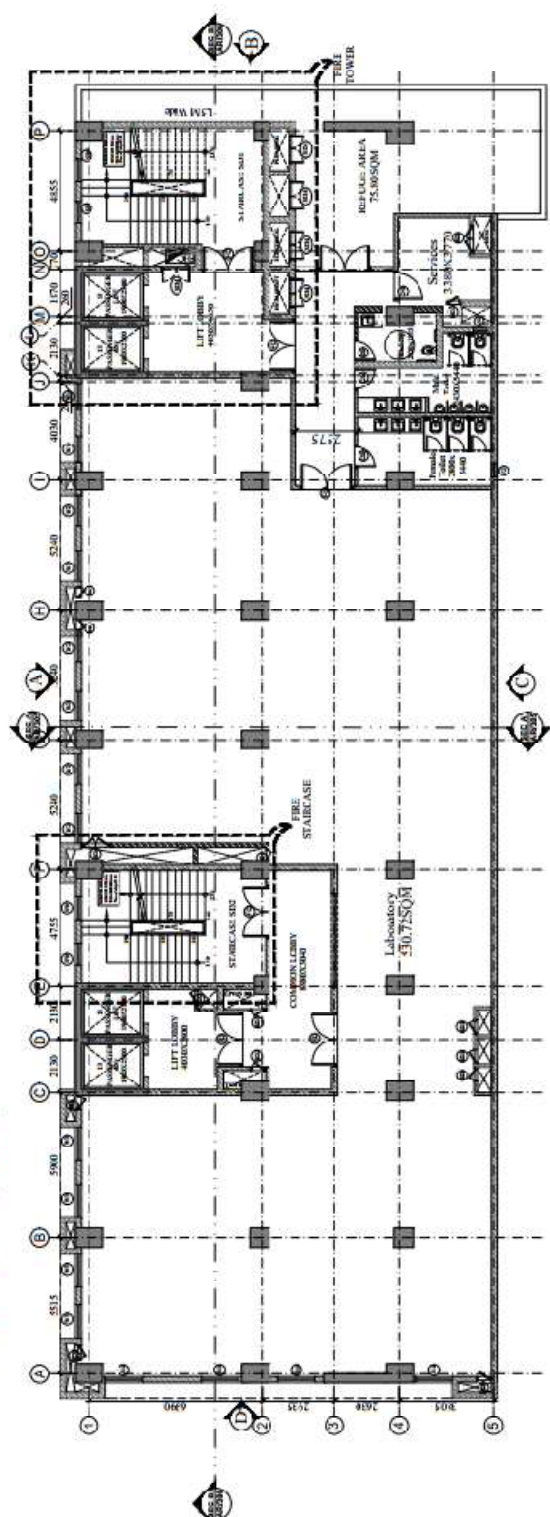
NAME OF PROJECT:  
 Construction of New Building at the Banking  
 premises of Parvathi Bhawan, CPWD, Jaipur  
 DRAWING TITLE:  
 FLOOR PLANS  
 SHEET NO:  
 11/10  
 PROJECT NO:  
 11/10  
 CLIENT:  
 M/s. J.S. JAIN  
 PROJECT:  
 11/10  
 DRAWING:  
 11/10  
 SHEET:  
 11/10



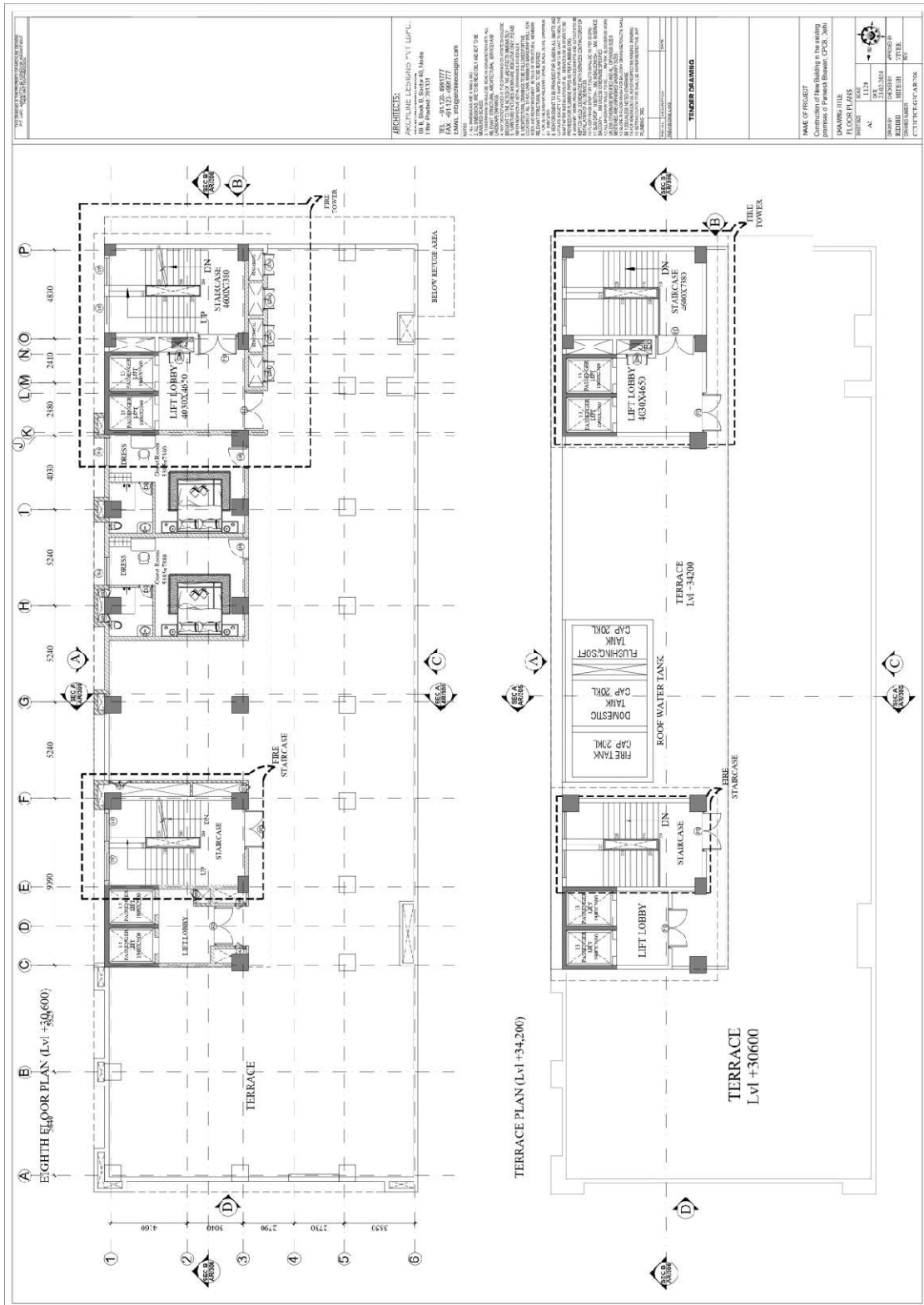
SIXTH FLOOR PLAN (Lvl +23,400)



SEVENTH FLOOR PLAN (Lvl +27000)



<p><b>ARCHITECTS</b>  <b>ASCENDE DESIGNS PVT.LTD.</b>                  36 C, Block B, Sector 46, Noida,                  Uttar Pradesh 201301                  TEL : +91-0522-4897777                  FAX : +91-0522-4897777                  EMAIL : ascendesigns@gmail.com</p>		<p><b>CLIENT PERFORMANCE A</b></p>	
<p><b>NAME OF PROJECT</b>                  Building in the vicinity                  of Pratap Sweets, CPDCL, Delhi</p>		<p><b>PROJECT NO.</b>                  234000004</p>	
<p><b>PROJECT TITLE</b>                  BLOCK D, ASIS</p>		<p><b>DATE</b>                  11/08/2024</p>	
<p><b>SCALE</b>                  AS SHOWN</p>		<p><b>PROJ. NO.</b>                  234000004</p>	
<p><b>DESIGNER</b>                  ARCHITECT</p>		<p><b>DATE</b>                  11/08/2024</p>	
<p><b>CHECKER</b>                  ARCHITECT</p>		<p><b>DATE</b>                  11/08/2024</p>	
<p><b>APPROVER</b>                  ARCHITECT</p>		<p><b>DATE</b>                  11/08/2024</p>	
<p><b>TELEVISION DRAWING</b></p>			



**TERRACE**  
 1. ALL WORK SHALL BE IN ACCORDANCE WITH THE BUILDING REGULATIONS AND THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) CODES.  
 2. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) CODES.  
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 10. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) CODES.

**SCALE** 1:500  
**DATE** 07/20/2023  
**PROJECT** Construction of New Building in the building premises of Parkview Estate, CPB, 2nd Fl.  
**DRAWING TITLE** FLOOR PLANS  
**NO.** 113  
**DATE** 27/02/2024  
**DESIGNED BY** [Signature]  
**CHECKED BY** [Signature]  
**APPROVED BY** [Signature]  
**DATE** [Signature]  
**CITY/STATE/COUNTRY** [Signature]

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**ARCHITECTS:**  
**ARCHITECTURE DESIGNERS PVT. LTD.**  
 208, BANGA D. SAKTHI CO. ROAD,  
 Ulur, Pudukottai 605 001  
 TEL: +91 824 4961777  
 FAX: +91 824 4961777  
 EMAIL: info@archdesign.com

**NOTES:**  
 1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.  
 2. ALL DIMENSIONS ARE TO BE TAKEN FROM FACE UNLESS OTHERWISE SPECIFIED.  
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REVISIONS:  
 NO. DESCRIPTION  
 001  
 002  
 003

**TENDER DRAWING**

**NAME OF PROJECT:**  
 Government Buildings in the village  
 Government of 'Narasim' District, CTCD, Dindigul

**DRAWING TITLE:**  
 BASEMENT PLAN

**SCALE:**  
 1:100

**DATE:**  
 18.07.2014

**DESIGNER:**  
 SURESH K

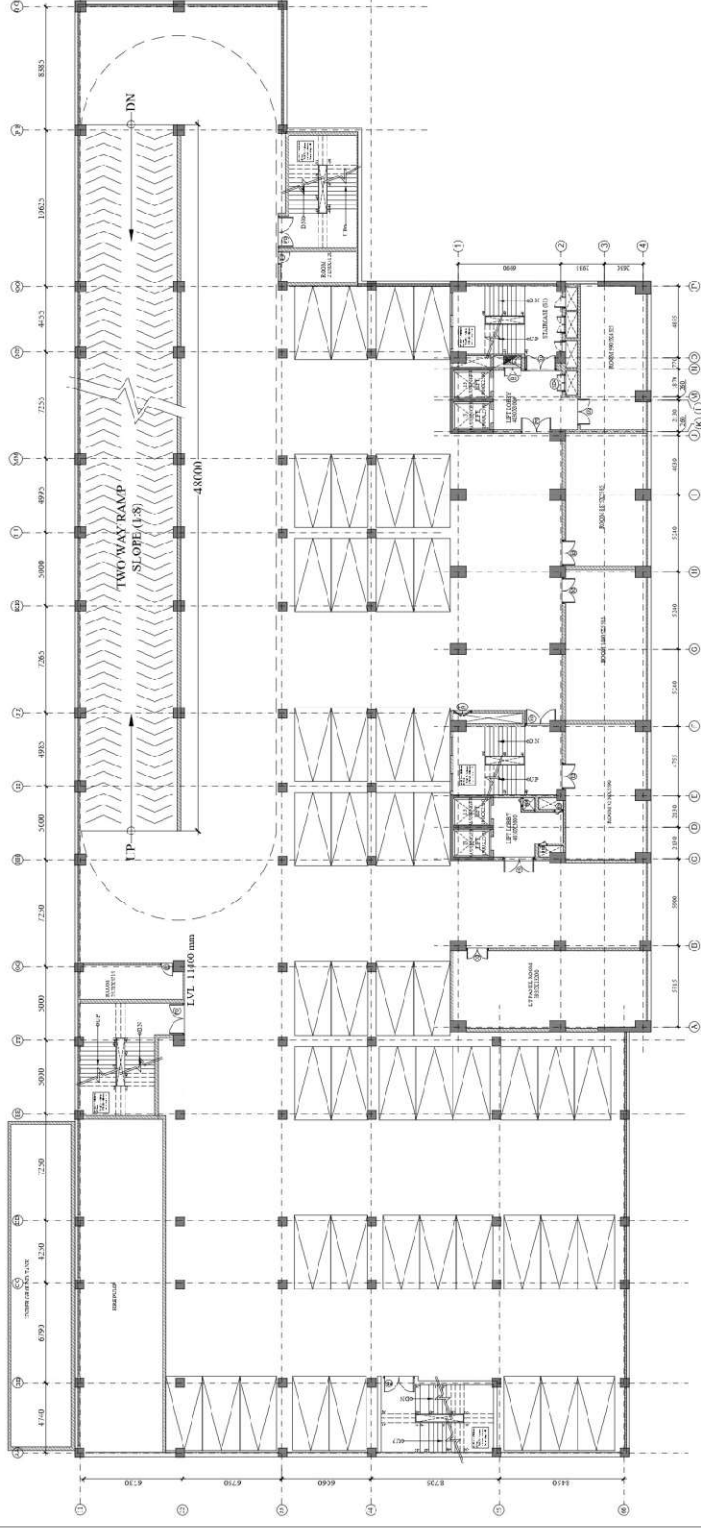
**CHECKED BY:**  
 SURESH K

**DATE:**  
 18.07.2014

**PROJECT NO.:**  
 CTCD/CP/GR/CP/MP/201

**SCALE:**  
 1:100

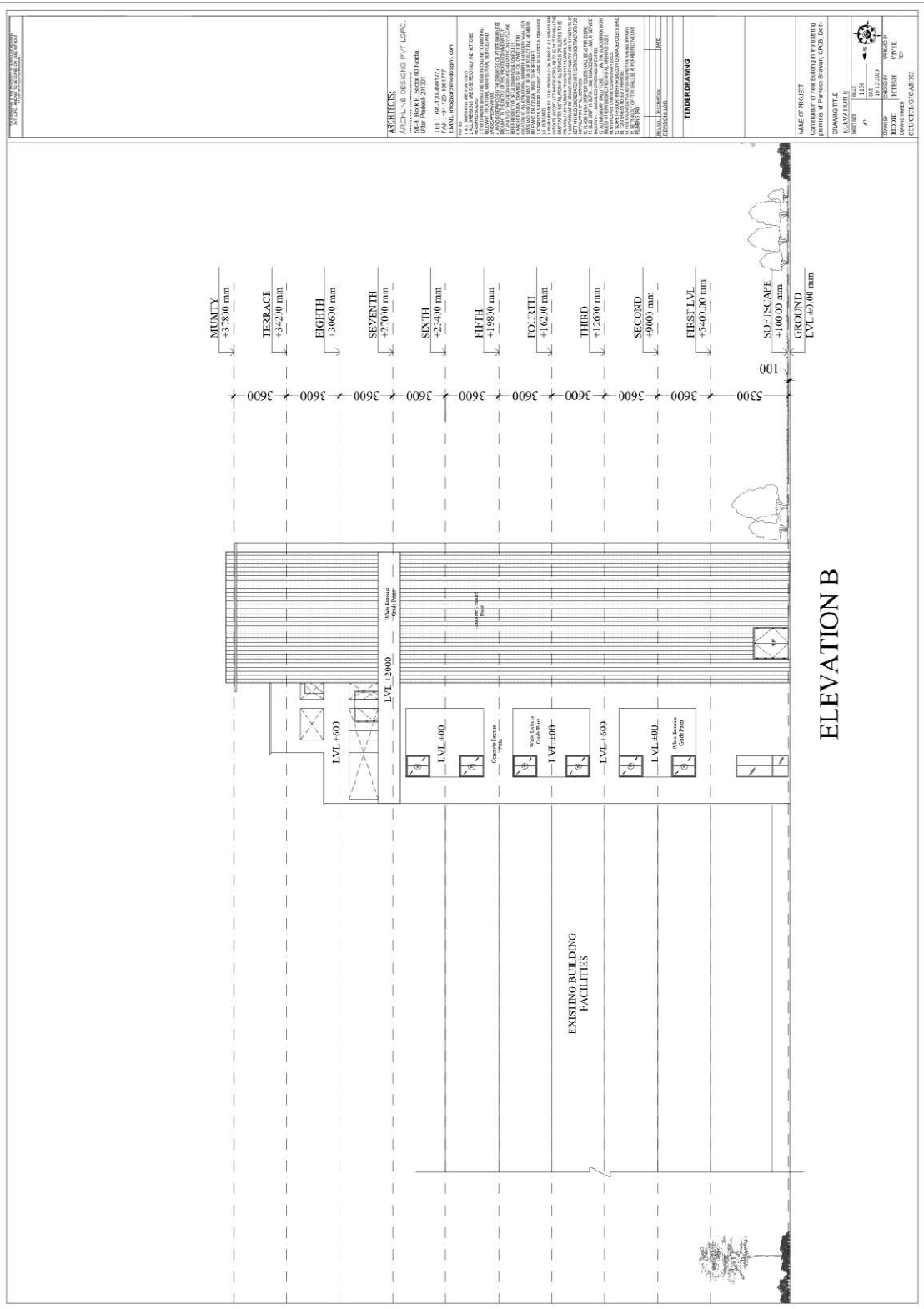
**UPPER BASEMENT PLAN**

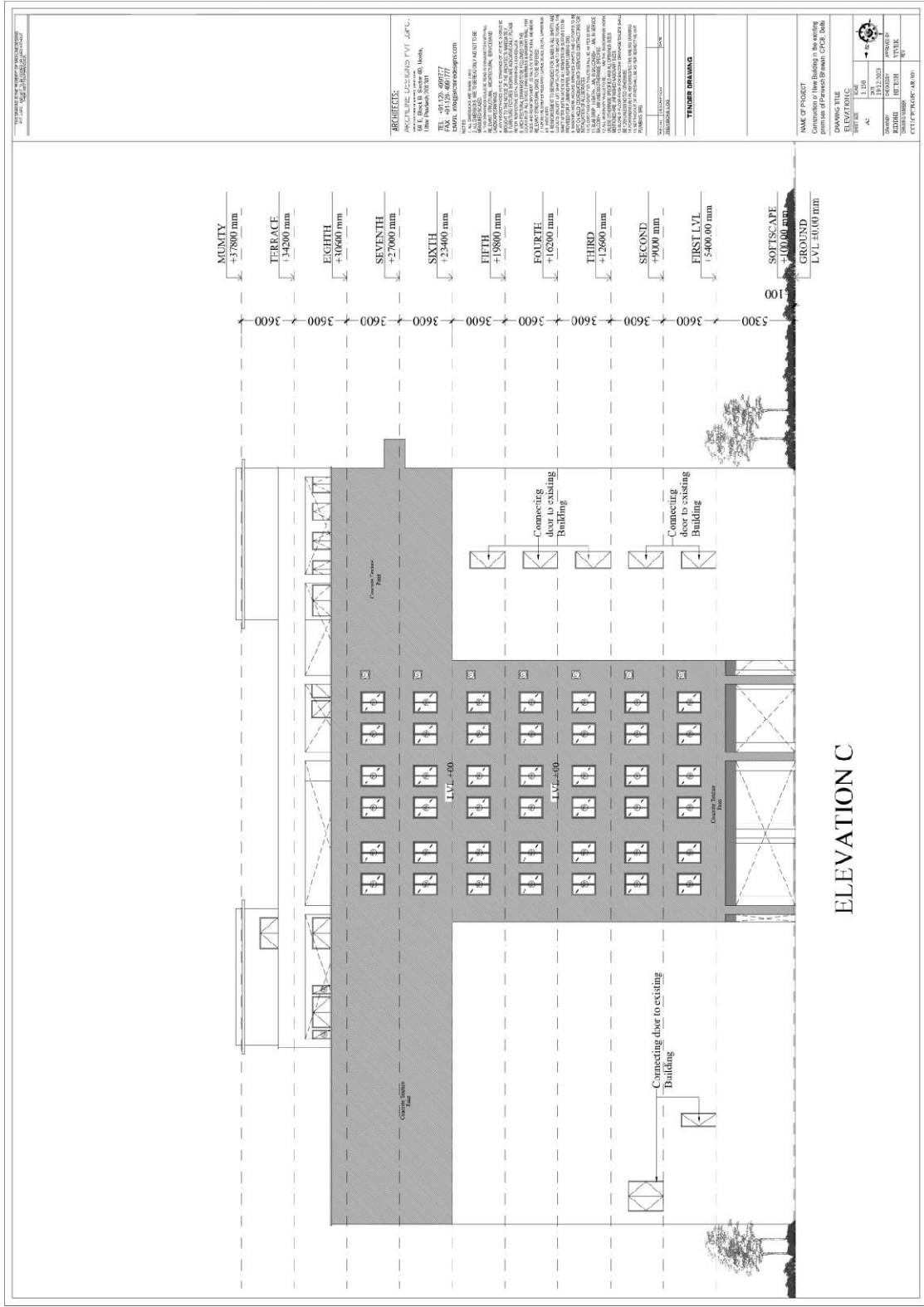












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**ARCHITECTS**  
 ANGLICAN LIVING FMV LLP  
 111, Bock B Road, Bost, TX 75008  
 TEL: +91 936 609777  
 FAX: +91 936 609777  
 www.tensor-engineers.com

**NOTES**  
 1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.  
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**TENSOR DRAWING**

**NAME OF PROJECT**  
 Correction to New Building - 111, Bock B Road, Bost, TX 75008

**DRAWING TITLE**  
 ELEVATION C

**SCALE**  
 1:100

**DATE**  
 2023/08/01

**DESIGNED BY**  
 ARCHITECT

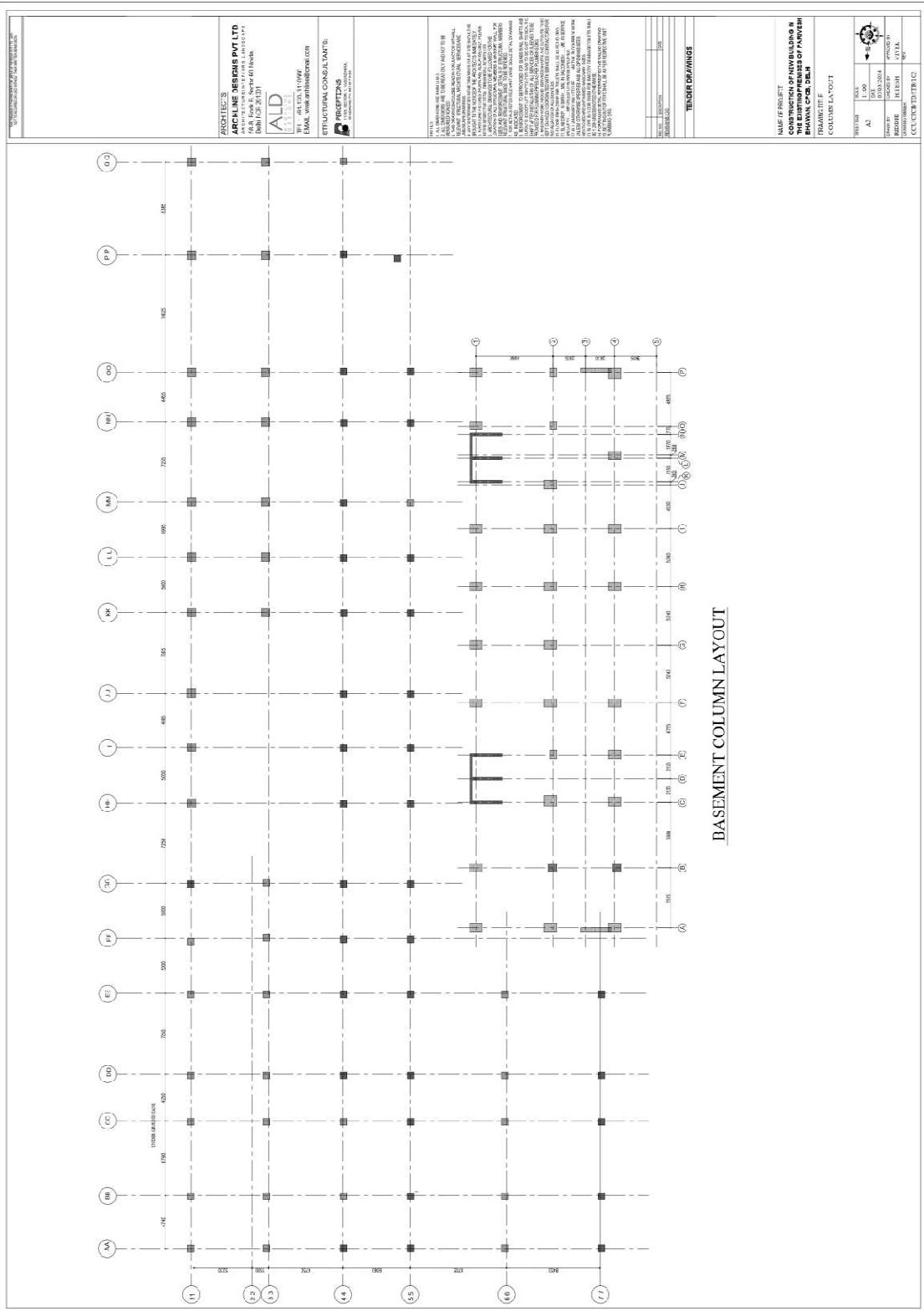
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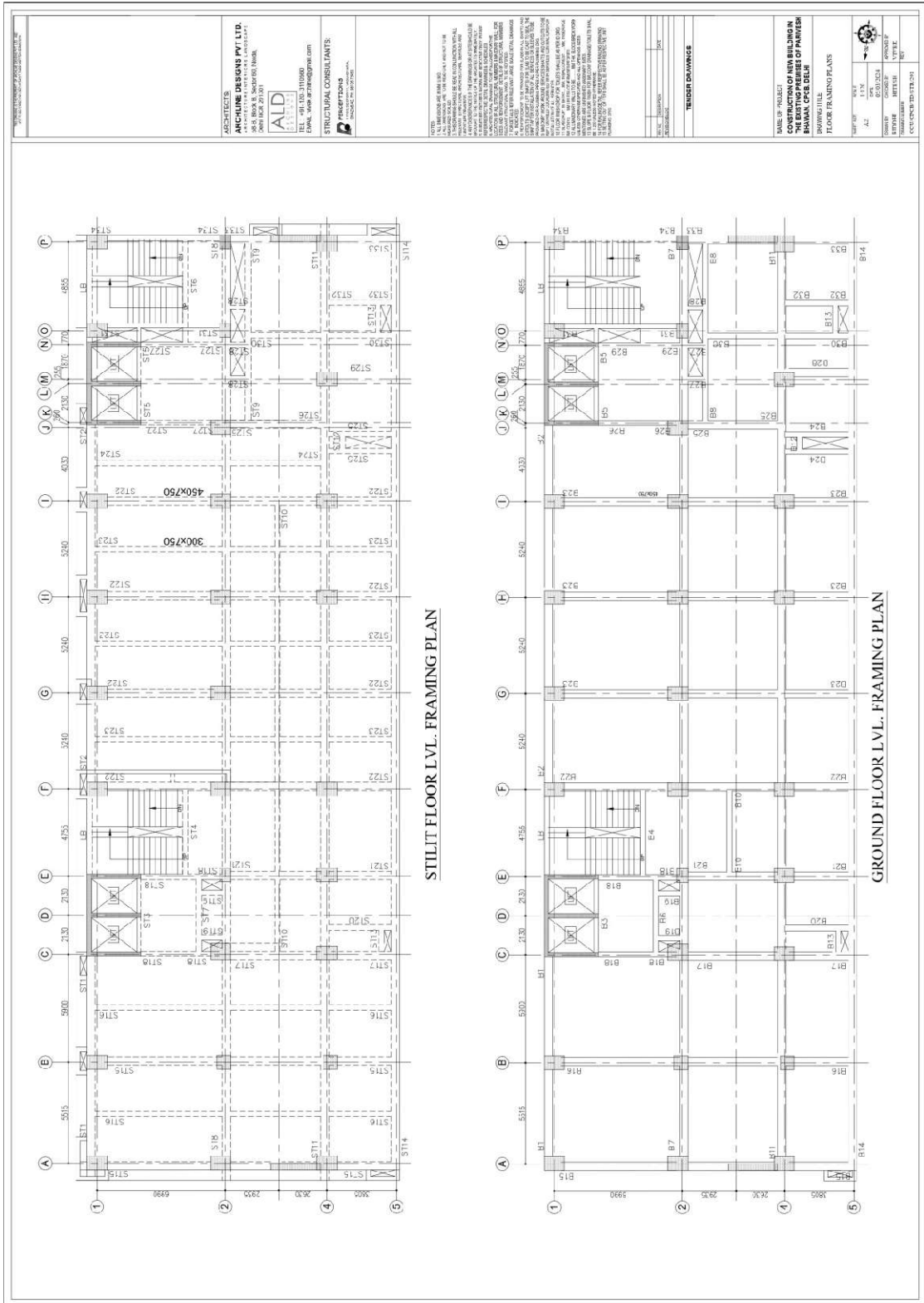
**DATE OF PROJECT**  
 2023/08/01

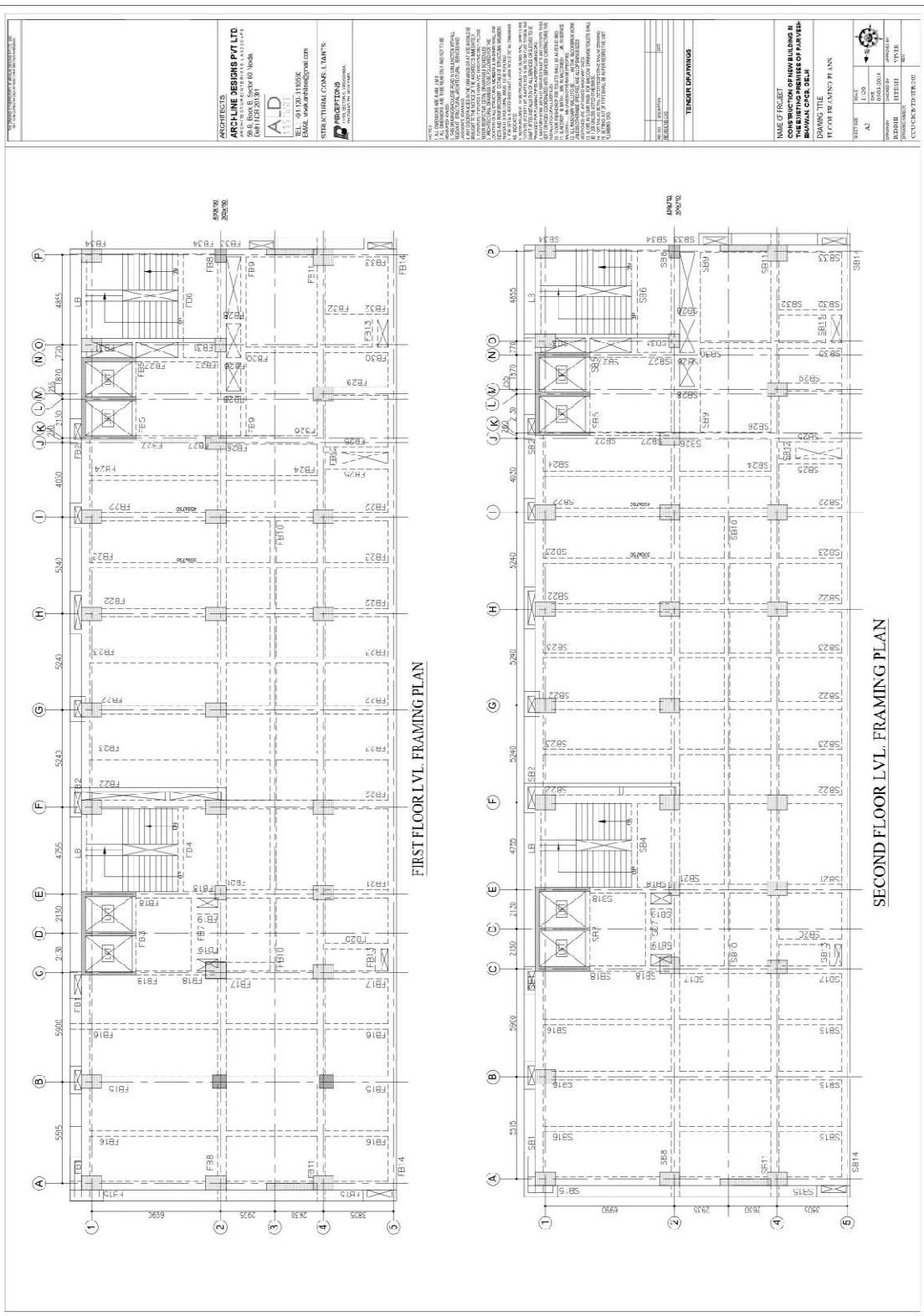










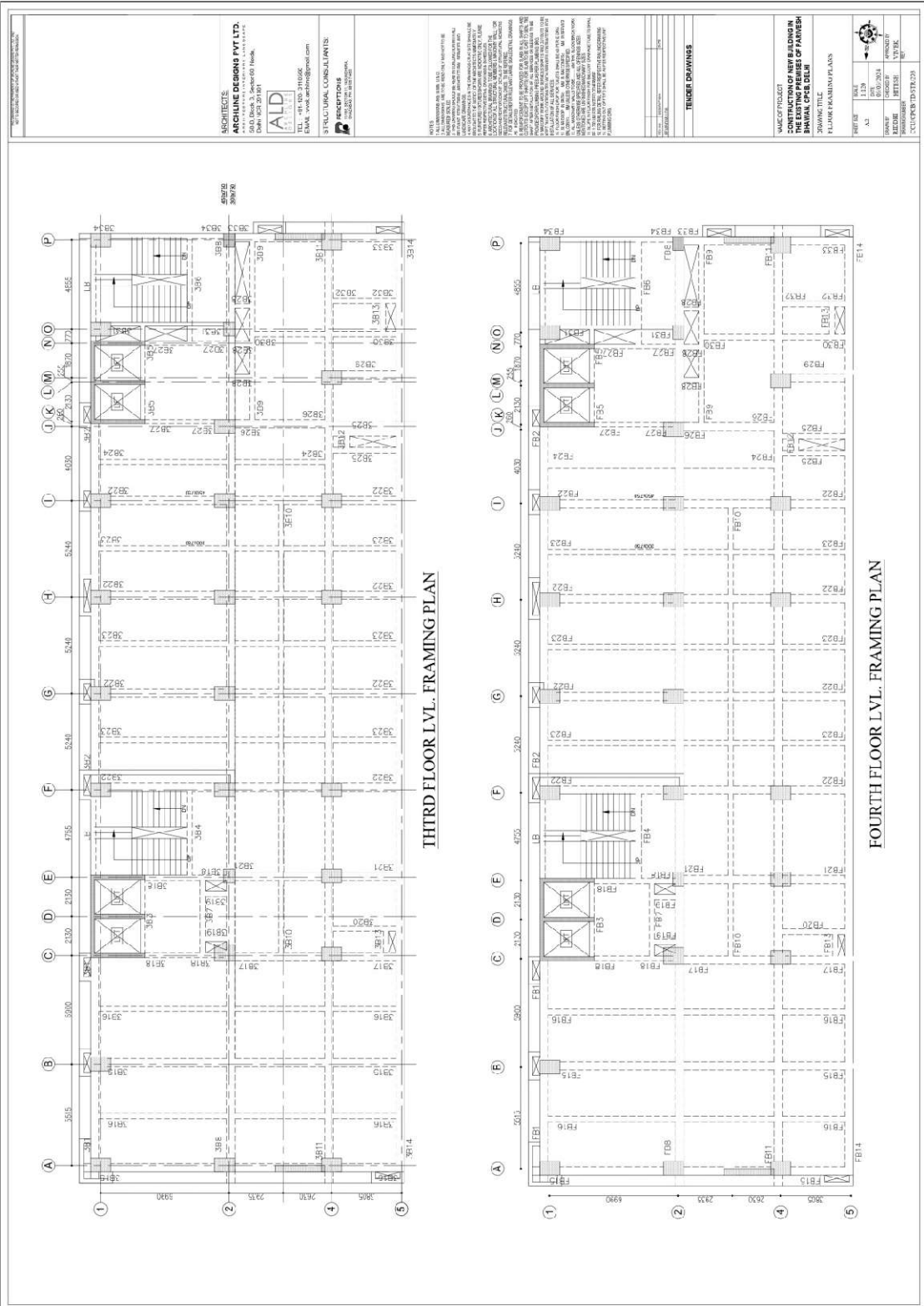


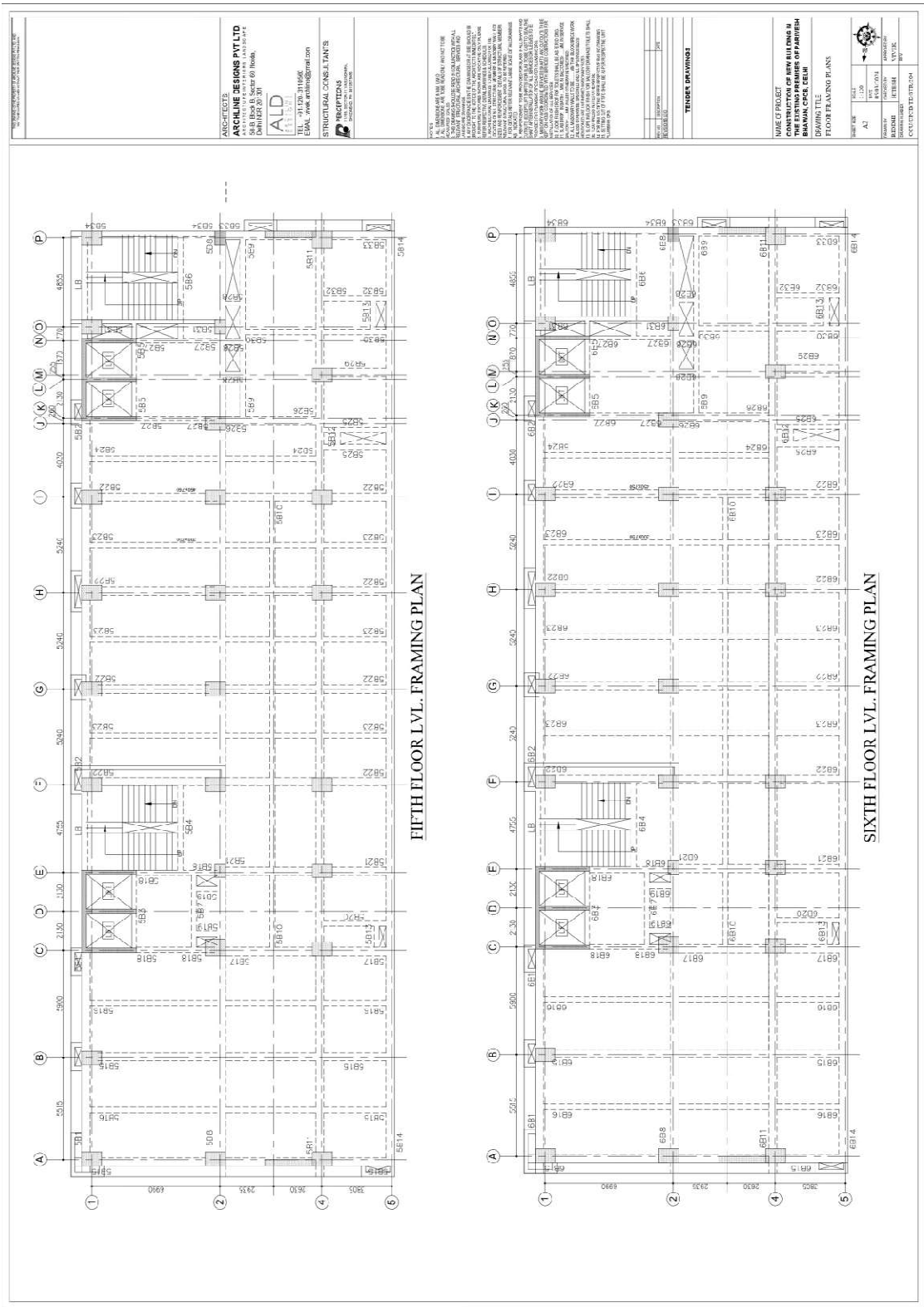
<p>ARCHITECTS  <b>ARCHLINE DESIGNS PVT LTD</b>          5/8, Block E, Sector 10, Gurgaon          GURGAON, HARYANA          TEL: 011-26111800          EMAIL: info@archline.com</p>		<p>STRUCTURAL CONSULTANTS  <b>ADP</b>          101, Sector 10, Gurgaon          GURGAON, HARYANA          TEL: 011-26111800          EMAIL: info@adp.com</p>	
<p>NAME OF PROJECT  <b>CONSTRUCTION OF AN INDEPENDENT 4          STOREY APARTMENT BUILDING IN          PHASE 2 OF PROJECT          DRAWING TITLE  <b>FLOOR PLANNING PLANS</b></b></p>		<p>DATE: 10/01/2018          SCALE: AS SHOWN          DRAWN BY: [Signature]          CHECKED BY: [Signature]          APPROVED BY: [Signature]</p>	

**GENERAL NOTES:**

1. ALL DIMENSIONS ARE IN METERS.
2. ALL DIMENSIONS ARE TO FACE UNLESS SPECIFIED OTHERWISE.
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FIFTH FLOOR LVL. FRAMING PLAN

SIXTH FLOOR LVL. FRAMING PLAN

NO. OF SHEETS: 01 OF 01 SHEETS

ARCHITECTS  
**ARCLINE DESIGN PVT LTD**  
 50 B, Block B, Sector 46, Gurgaon,  
 Delhi 122 0031  
**ALD**  
 ARCHITECTS  
 E-MAIL: [arc@arcindia.com](mailto:arc@arcindia.com)

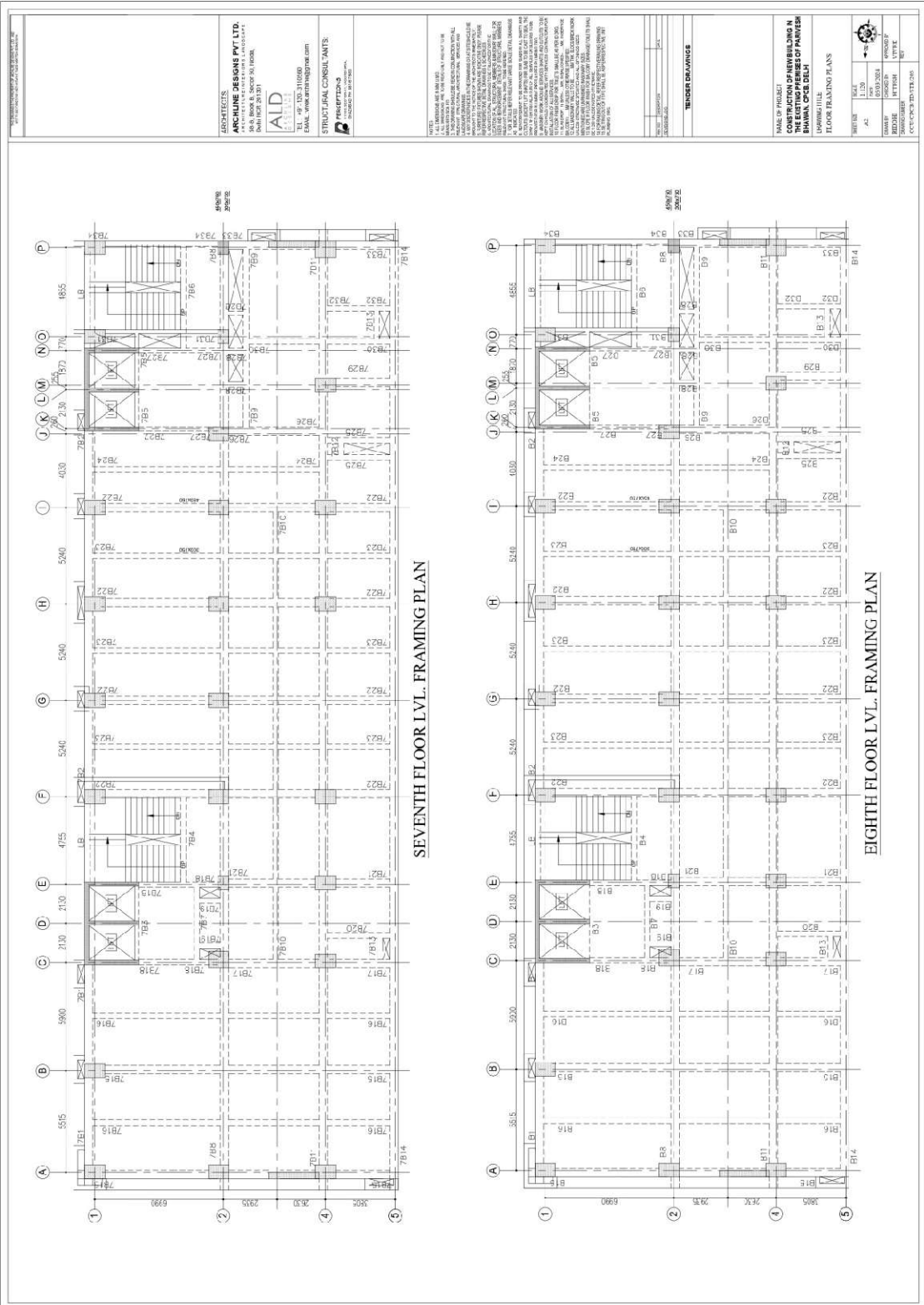
STRUCTURAL CONSULTANTS  
**ARCLINE DESIGN PVT LTD**  
 50 B, Block B, Sector 46, Gurgaon,  
 Delhi 122 0031

NOTES:  
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TENDER DRAWINGS

NAME OF PROJECT  
**CONSTRUCTION OF NEW BUILDING  
 IN SECTOR 46, GURGAON**  
 DRAWING TITLE  
**FLOOR FRAMING PLANS**

SCALE	AS SHOWN
DATE	15/07/2024
PROJECT NO.	ARC/2024/001
DRAWING NO.	FRM/001
REVISED DATE	15/07/2024



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**GENERAL NOTES:**  
 1. ALL DIMENSIONS ARE IN METERS.  
 2. ALL DIMENSIONS ARE TO FACE UNLESS SPECIFIED OTHERWISE.  
 3. ALL DIMENSIONS ARE TO BE CHECKED AT THE TIME OF CONSTRUCTION.  
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 9. ALL DIMENSIONS ARE TO BE CHECKED AT THE TIME OF CONSTRUCTION.  
 10. ALL DIMENSIONS ARE TO BE CHECKED AT THE TIME OF CONSTRUCTION.

**REVISIONS:**

NO.	DESCRIPTION	DATE

**TENDER DRAWING**

**NAME OF PROJECT:**  
**CONSTRUCTION OF REHABILITATION  
 BUILDING FOR THE  
 BHAWAN CHS DELHI**

**WORKING TITLE:**  
**FLOOR FRAMING PLANS**

DATE	BY	CHECKED	APPROVED

SCALE: 1/4" = 1'-0"

DATE: 15/07/2020

PROJECT NO: 18/8

PROJECT NAME: BHAWAN CHS DELHI

PROJECT ADDRESS: 18/8, BROADWAY, SAKET, NEW DELHI

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PROJECT LINKEDIN: /archline

PROJECT TWITTER: @archline

PROJECT YOUTUBE: /archline

PROJECT GITHUB: /archline

PROJECT MEDIUM: /archline

PROJECT DEVIANART: /archline

PROJECT PINTEREST: /archline

PROJECT TUMBLR: /archline

PROJECT SLACK: /archline

PROJECT DISCORD: /archline

PROJECT TELEGRAM: @archline

PROJECT INSTAGRAM: @archline

PROJECT FACEBOOK: /archline

PROJECT LINKEDIN: /archline

PROJECT TWITTER: @archline

PROJECT YOUTUBE: /archline

PROJECT GITHUB: /archline

PROJECT MEDIUM: /archline

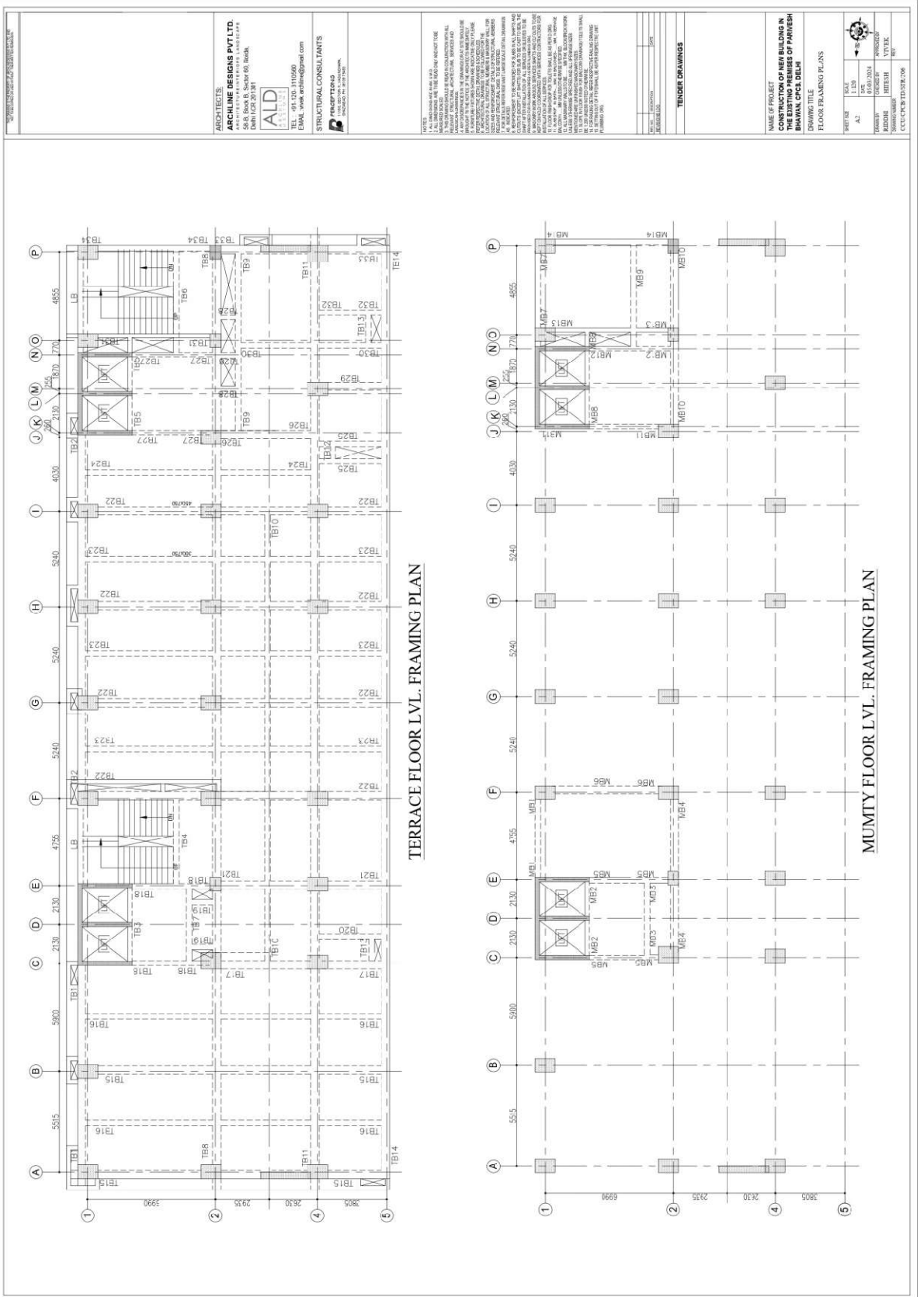
PROJECT DEVIANART: /archline

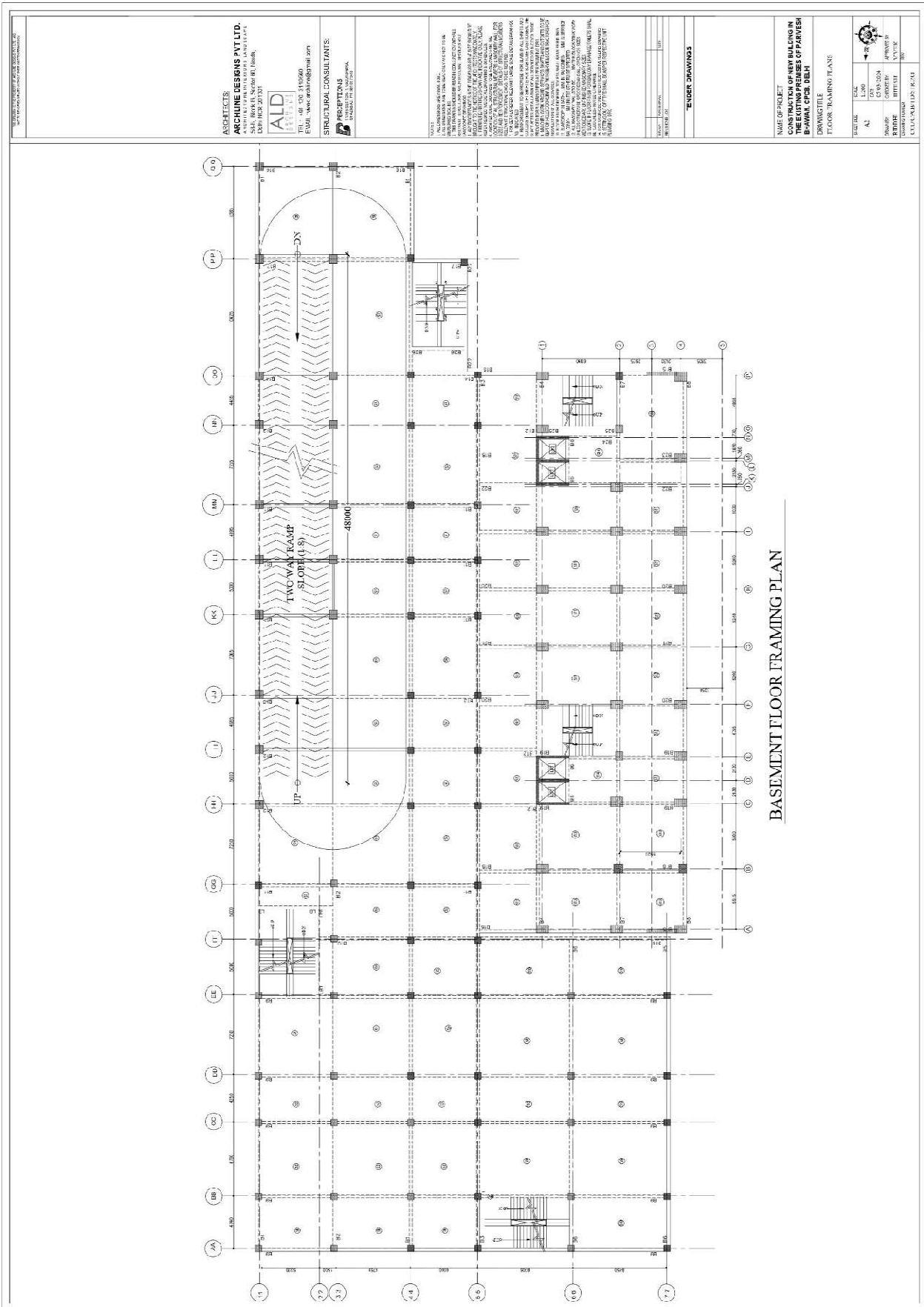
PROJECT PINTEREST: /archline

PROJECT TUMBLR: /archline

PROJECT SLACK: /archline

PROJECT DISCORD: /archline





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**PROJECTIONS**  
 DRAWING NO. 10/2024

**NAME OF PROJECT:**  
**NEW 10000 SQ.M. BANGLOW IN  
 THE ESTATE OF PRAJESH OFFICERS  
 BANGLOW OFFICER DELHI**

**DRAWING TITLE:**  
**FLOOR FRAMING PLAN**

SCALE	1:200
DATE	10/01/2024
DESIGNED BY	CHITRA
CHECKED BY	CHITRA
APPROVED BY	CHITRA
DATE	10/01/2024

**NOTES:**  
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