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PART-A

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INFORMATION AND INSTRUCTIONS FOR BIDDERS FOR E-TENDERING FORMING PART OF BID DOCUMENT AND TO BE POSTED ON WEBSITE

(Applicable for inviting open bids)

The **Executive Engineer, Lucknow-I, C.P.W.D., Lucknow** for & on behalf of President of India invites online Percentage rate bids from approved and eligible contractors of CPWD for the following work(s):

S. No.	NIT NO.	Name of work and location	Estimated cost put to bid (Rs.)	Earnest Money	Stipulated Period of Completion of work (in months)	Last date of online submission of bid, copy of receipt of deposition of original EMD and other documents as specified in the bid document.	Time & date of opening of tender
1	2	3	4	5	6	7	8
1	54/EE/Lucknow-I/2026-27	Construction of Multipurpose Hall of GRIHA-5 Star Including IEI & fans, Fire alarm & PA system, Wet Riser & Sprinkler system, VRF/VRV/ Split Air Conditioning system, online UPS system, audio visual system & Lifts etc. at NBSC/BIRD Campus Lucknow (UP) (Package-I).	Civil :- Rs. 29,16,61,147/- Electrical :Rs. 15,52,35,302/- Total Rs. 44,68,96,449/-	Rs. 54,68,964/-	18 Months	Upto 03:00 PM on 23.09.2026	At 03:30 PM on 23.09.2026

- 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.
- Information and Instructions for bidders posted on website shall form part of bid document.
- 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 can be seen and downloaded from website <https://etender.cpwd.gov.in> or www.cpwd.gov.in free of cost.

* To be filled by Executive Engineer.

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4. But 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, CPWD within the period of bid submission and uploading the mandatory scanned documents such as Insurance Surety Bonds, Account Payee Demand draft or Bankers 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/ AE), CPWD and other documents as specified.
5. 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>
6. The intending bidder must have valid Class-III digital signature certificate with encryption key (combo type) to perform any operations / transactions on the e-tendering portal / website and the bidder should download and install the eMsigner on their system as per instructions available on download section of <https://etender.cpwd.gov.in>
7. On opening date, the contractor can login and see the bid opening process. After opening of bids he will receive the competitor bid sheets.
8. Contractor can upload documents in the form of JPG format and PDF format.
9. Contractor must ensure to quote rate in the prescribed column(s) 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.

10. A Pre-Bid meeting shall be held on 16.09.2026 in the office of Chief Engineer (Lucknow) to address the issues, if any, of the bidders related to the work.

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List of Documents to be scanned and uploaded within the period of bid submission:

- (i.) Insurance Surety Bond, Demand Draft/ Account Payee Banker's Cheque / FDR/ Bank Guarantee of any commercial Bank against EMD.
- (ii.) Enlistment Order of the Contractor.
- (iii.) 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 CPWD, 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 CPWD or GST department in this regard".

- (iv) Copy of receipt for deposition of original EMD issued from division office of any Executive Engineer (including NIT issuing EE/AE), CPWD.
- (v) Undertaking on structural stability and soundness as per prescribed format Form 'F'
- (vi) Undertaking on the letter head of the agency mentioning that they have inspected and examined the site and its surroundings and have satisfied 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 have obtained all necessary information as to risks, contingencies and other circumstances, which may influence or affect their bid.

Note: Bidder should ensure himself that above documents are uploaded in correct format and at correct location on the website.

**Executive Engineer
Lucknow-I
CPWD, Lucknow**

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Annexure-I.

RECEIPT OF DEPOSITION OF ORIGINAL EMD

(Receipt No.#..... / date#.....)

Name of Work: Construction of Multipurpose Hall of GRIHA-5 Star Including IEI & fans, Fire alarm & PA system, Wet Riser & Sprinkler system, VRF/VRV/ Split Air Conditioning system, online UPS system, audio visual system & Lifts etc. at NBSC/BIRD Campus Lucknow (UP) (Package-I).

1. NIT No. : **54/EE/Lucknow-I/2026-27**
2. Estimated Cost: **Rs. 44,68,96,449/-**
3. Amount of Earnest Money Deposit: **Rs. 54,68,964/-**

In favour of Executive Engineer, Lucknow Central Division-I, CPWD, Lucknow

4. Last date & Time of submission of Bid : **23.09.2026 Upto 03:00 PM**

Name of Contractor :#.....

1. Form of EMD#.....
2. Amount of Earnest Money Deposit#.....
3. Date of submission of EMD#.....

.....

Signature, Name and Designation of EMD
receiving officer (EE/AE(P)/AE/AAO) alongwith office stamp

* To be filled by EE inviting tender.

To be filled by EMD receiving EE.

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Annexure-II**ON NON-JUDICIAL STAMP PAPER OF MINIMUM RS. 100****(Guarantee offered by Bank to CPWD in connection with the execution of contracts)****Form of Bank Guarantee for Earnest Money Deposit /Performance Guarantee/Security****Deposit/Mobilization Advance**

1. Whereas the Executive Engineer (name of division), CPWD 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), CPWD 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/Mobilization Advance 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 here by 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. (Rupeesonly)
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

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Bank Guarantee shall be a valid discharge of our liability for payment there under and the Contractor shall have no claim against us for making such payment.

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

Date

Witnesses:

1. Signature.....

Authorized signatory

Name and address

Name

Designation

Staff code no.

2. Signature

Bank seal

Name and address

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

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

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Undertaking on structural stability and soundness of already completed buildings and infrastructure projects.

I/we undertake and confirm that any building / infrastructure constructed by our firm /partnership firm/ company has not suffered any failure, making it unfit for intended use, either due to structural design and defects or due to use of sub-standard materials or execution of sub-standard work, poor workmanship or any other reason during the last 25 (twenty five) years.

I/we, further, undertake that if such information comes to the notice of CPWD, then Engineer-in-Charge shall be free to terminate the bid/agreement and to forfeit the entire amount of earnest money deposit, performance guarantee and security deposits.

I/we, also undertake that in addition to above, the Engineer-in-Charge shall be free to debar us forever from tendering in CPWD.

The decision of Engineer-in-Charge or any higher authority shall be final and binding.

Signature of notary with seal

**Signature of bidder or an authorized person of
the firm with stamp**

Note: Affidavit to be furnished on a 'Non-judicial' stamp paper of Rs. 200/- (scanned copy of the notarized affidavit to be uploaded at the time of submission of bid).

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CPWD-6 FOR e-Tendering

1. Percentage rate bids are invited on behalf of President of India from approved and eligible contractors of CPWD for the work of **Construction of Multipurpose Hall of GRIHA-5 Star Including IEI & fans, Fire alarm & PA system, Wet Riser & Sprinkler system, VRF/VRV/ Split Air Conditioning system, online UPS system, audio visual system & Lifts etc. at NBSC/BIRD Campus Lucknow (UP) (Package-I).**

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. 44,68,96,449/-**. This estimate, however, is given merely as a rough guide.
- 1.1.1 The authority competent to approve NIT for the combined cost and belonging to the major discipline will consolidate NITs for calling the bids. He will also nominate Division which will deal with all matters relating to the invitation of bids. For composite bid, besides indicating the combined estimated cost put to bid, should clearly indicate the estimated cost of each component separately. The eligibility of bidders will correspond to the combined estimated cost of different components put to bid.

~~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:-~~

~~Criteria of eligibility for submission of bid documents~~

~~1.2.1 Conditions for Non CPWD registered contractors only, if bids are also open to non CPWD Contractors.~~

~~For works estimated cost upto tendering limit of class I Buildings & Roads (erstwhile Composite/ Building/ infrastructure) category Contractor (However, for Horticulture category, it may be modified as per bidding limit of CPWD class I contractors of Horticulture category).~~

~~(i) Three similar works each of value not less than Rs..... or two similar works each of value not less than Rs..... or one similar work of value not less than Rs..... (all figures rounded to nearest convenient figure) during the last 7 years ending last day of the month previous to the one in which tenders are invited.~~

~~(ii) For EPC tender under Mode I/II only (Applicable for CPWD enlisted contractors of appropriate class also).~~

~~One completed work costing not less than Rs. executed with the structural system technology as proposed by bidder in the letter of transmittal during the last 7 years ending last day of the month previous to the one in which tenders are invited. This work can be part of eligible work at 1.2.1 (i) above or as a separate work.~~

Note:-

~~For works costing above tendering limit of class II Buildings & Roads(erstwhile Composite/ Building/ infrastructure)category contractors but upto tendering limit of~~

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~~Class I Buildings & Roads (erstwhile Composite/ Building/ infrastructure) category Contractor (However, for Horticulture category, it may be modified as per bidding limit of CPWD class II and CPWD Class I contractors respectively of Horticulture Category) when bids are open to non CPWD contractors also, then class II contractors of CPWD registered shall also be eligible if they satisfy the eligibility criteria specified in 1.2.1 above.~~

~~1.2.2 Criteria of eligibility for CPWD as well as non CPWD contractors,~~

~~For works estimated to cost above the tendering limit of class I (Super) Buildings & Roads (erstwhile Composite/ Building/ infrastructure) category Contractor (However for Horticulture category, it may be modified as per bidding limit of CPWD class I contractors of Horticulture Category):~~

- ~~(i) Three similar works each of value not less than Rs..... or two similar works each of value not less than Rs..... or one similar work of value not less than Rs..... (all figures rounded to nearest convenient figure) during the last 7 years ending last day of the month previous to the one in which tenders are invited.~~
- ~~(ii) For EPC tender under Mode I/II only (Applicable for CPWD enlisted contractors of appropriate class also):~~

~~One completed work costing not less than Rsexecuted with the structural system technology as proposed by bidder in letter of transmittal during the last 7 years ending last day of the month previous to the one in which tenders are invited. This work can be part of eligible work at 1.2.2 (i) above or as a separate work.~~

~~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. This is applicable for 1.2.1 as well as 1.2.2 (Para 1.2.1(i) and Para 1.2.2(i) are not applicable for CPWD enlisted contractors of appropriate class. Para 1.2.1(ii) and Para 1.2.2(ii) are also applicable for CPWD enlisted contractors of appropriate class).~~

~~**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 CPWD 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)~~

~~1.2.3 When bids are invited from non CPWD contractors and CPWD class II contractors as per provisions of clause 1.2.1 above, it will be mandatory for non CPWD contractors and CPWD class II contractors to upload the work experience certificate(s) and the affidavit as per the provisions of clause 1.2.2.~~

~~But for such bids, Class I contractors of CPWD are eligible to submit the bids without submission of work experience certificate and affidavit. Therefore, CPWD class I contractors shall upload two separate letters for experience certificate and affidavit that these documents are not required to be submitted by them. Uploading of these two letters is mandatory otherwise system will not clear mandatory fields.~~

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2. Agreement shall be drawn with the successful bidders on prescribed Form No. CPWD 7/8 (or other Standard Form as mentioned), which is available as a Govt. of India Publication and also available on website www.cpwd.gov.in. Bidders shall quote his rates as per various terms and conditions of the said form which will form part of the agreement.
3. The time allowed for carrying out the work will be **18 Months** from the date of start as defined in schedule 'F' or from the first date of handing over of the site, whichever is later, in accordance with the phasing, if any, indicated in the bid documents.
4. (i) The site for the work is available.

OR

~~The site for the work shall be made available in parts as specified below:-~~

.....

- (ii) The architectural and structural drawing for the work is available

OR

~~The architectural and structural drawings 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.~~

5. 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 free of cost.
6. 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.
7. 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.
8. When bids are invited in three stage system and, if it is desired to submit revised financial bid then it shall be mandatory to submit revised financial bid. If not submitted then the bid submitted earlier shall become invalid.
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, Lucknow Central Division-I, CPWD, Lucknow**) shall be scanned and uploaded on 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, 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 90 days for single bid

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works and 180 days for two bid system or more from the last date of receipt of bids which is to be scanned and uploaded by the intending bidders.

The earnest money given by all the tenderers except the lowest tenderer shall be refunded immediately after the expiry of stipulated bid validity period or immediately after acceptance of the successful bidder, whichever is earlier. However, in case of two/ three bid system, earnest money deposit of bidders unsuccessful during technical bid evaluation etc. should be returned within 30 days of declaration of result of technical bid evaluation.

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 and other documents scanned and uploaded are found in order.

The bid submitted shall be opened at 03:30 PM on 23.09.2026.

10. The bid submitted shall become invalid and e-Tender processing fee 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 in favour of **Executive Engineer, Lucknow Central Division-I, CPWD, Lucknow** 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. **The description of the work is as follows: Construction of Multipurpose Hall of GRIHA-5 Star Including IEI & fans, Fire alarm & PA system, Wet Riser & Sprinkler system,**

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VRF/VRV/Split Air Conditioning system, online UPS system, audio visual system & Lifts etc. at NBSC/BIRD Campus Lucknow (UP) (Package-I). The building is (Ground + Mezzanine + 3 Storied, Basic drawings are attached for reference).

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, for & 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 bidders 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, for & on behalf of President of India reserves to himself the right of accepting the whole or any part of the bid and the bidders shall be bound to perform the same at the rate quoted.
16. The contractor shall not be permitted to bid for works in the CPWD Circle (Division in case of contractors of Horticulture/Nursery category) responsible for award and execution of contracts, in which his near relative is posted 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 Central Public Works Department or in the Ministry of Housing and Urban Affairs. Any breach of this condition by the contractor would render him liable to be removed from the approved list of contractors of this Department.
16. 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.

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18. The bids for the work shall remain open for acceptance for a period of 30 (thirty) days from the date of opening of bids in case of single bid system and ~~75 (seventy five) days from the date of opening of technical bids in case bids are invited in 2 or 3 bid system.~~

Further

- (i) If any tenderer withdraws his tender within 7 days after last date and time (15:00 Hrs.) 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 after expiry of 7 days after last date and time (15:00 Hrs.) of submission of bids, then the Government shall without prejudice to any other right or remedy, be at liberty to forfeit 100% of the earnest money absolutely irrespective of letter of acceptance for the work is issued or not.
 - (iii) Withdrawal of the tender, by the tenderer, shall only be made through e-tender portal. Any other method i.e. through letter / e-mail etc. shall not be considered. The tender inviting authority gets intimation through SMS and e-mail in this regard.
 - (iv) In case of forfeiture of earnest money as prescribed in para (i) and (ii) above, the bidders shall not be allowed to participate in the re-bidding process of the same work.
19. 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, specifications and drawings, if any, forming part of the bid as uploaded at the time of invitation of bid and the rates quoted online at the time of submission of bid and acceptance thereof together with any correspondence leading thereto.
 - (b) Standard C.P.W.D. Form 7/8 or other Standard C.P.W.D. Form as applicable.

20. For Composite Bids

20.1.1 The Executive Engineer in charge of the major component will call bids for the composite work. The cost of bid document and Earnest Money will be fixed with respect to the combined estimated cost put to tender for the composite bid.

20.1.2 The bid document will include following three components:

Part A:- CPWD-6, CPWD-7/8 including Schedule A to F for the major component of the work, Standard General Conditions of Contract 2023 Construction works as modified and corrected up to previous day of last date of submission of bids.

Part B:- General / specific conditions, specifications and schedule of quantities applicable to major component of the work.

Part C:- Schedule A to F for minor component of the work (competent authority under Clause 2 and Clause 5 shall be same authority as mentioned in Schedule A to F for major components), General/specific conditions, specifications and schedule of quantities applicable to minor component(s) of the work.

20.1.3 The bidders must associate himself, with agencies as per NIT conditions.

20.1.4 The eligible bidders shall quote rates for all items of major component as well as for all items of minor components of work.

20.1.5 After acceptance of the bid by competent authority, the EE in charge of major component of the work shall issue letter of award for & on behalf of the President of India. After the work is awarded, the main contractor will have to enter into one

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agreement with EE in-charge of major component and has also to sign two or more copies of agreement depending upon number of EE's/DDH in-charge of minor components. One such signed set of agreement shall be handed over to EE/DDH in-charge of minor component(s).

EE of major component will operate Part A and Part B of the agreement.

EE/DDH in charge of minor component(s) shall operate Part- C alongwith Part A of the agreement.

20.1.6 Entire work under the scope of composite bid including major and all minor components shall be executed under one agreement.

20.1.7 Security Deposit will be worked out separately for each component corresponding to the estimated cost of the respective component of works.

20.1.8 The main contractor has to associate agencies 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 of relevant component(s) within prescribed time. Name of the agency(s) to be associated shall be approved by Engineer-in-Charge of relevant component(s).

20.1.9 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 of relevant specialized component(s).

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.

20.1.10 The main contractor has to enter into MoU with agency(s) associated by him. Copy of such MoU shall be submitted to EE/ DDH in charge of each relevant component as well as to EE-in-charge of major component. In case of change of associate contractor, the main agency(s) has to enter into MoU/agreement with the new contractor associated by him.

20.1.11 Running payment for the major component shall be made by EE of major discipline to the main contractor. Running payment for minor components shall be made by the Engineer- in-Charge of the discipline of minor component directly to the main contractor. The CMB shall be maintained independently by Engineer-in-Charge of major and minor components.

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- 20.1.12A. The composite work shall be treated as complete when all the components of the work are complete. The completion certificate of the composite work shall be recorded by Engineer-in-Charge of major component after record of completion certificate of all other components.
- 20.1.12B. Final bill of whole work shall be finalized and paid by the EE of major component. Engineer(s) in charge of minor component(s) will prepare and pass the final bill for their component of work and pass on the same to the EE of major component for including in the final bill for composite contract.
21. 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 the concerned Executive Engineer/ Assistant Engineer (Phone no 0522-2329438, e- mail Id eeecd1.cpwdlu-up@nic.in) or ERP helpline no. 18001803286 or e-mail Id 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.
22. Price Preference to SC/ST individual contractor for item rate/percentage rate tender:
Price preference in quoted item rate/percentage rate tender shall be applicable to the individual enlisted/non-enlisted SC/ST contractor as under:-
- (i) For work(s) upto and equal to an estimated cost of Rs. 2.70 lakh a price preference upto 5% (with reference to the lowest valid tender) may be allowed in favor of individual SC/ST enlisted/non-enlisted contractor. No earnest money is required in such case(s).
 - (ii) For work(s) beyond an estimated cost of Rs. 2.70 lakh and upto and equal to estimated cost of Rs. 6.20 lakh, the price preference upto 5% (with reference to the lowest valid tender) may be allowed in favour of individual enlisted SC/ST contractor. However, earnest money at a reduced rate of ½% may be accepted in such cases.

The price preference upto 5% (with reference to the lowest valid price bid) may be allowed in favour of individual SC/ST contractor only. The above concession shall be allowed only after verification of the individual contractor's claim of belonging to SC/ST community

**Executive Engineer
Lucknow-I
CPWD, lucknow**

*To be filled in by Executive Engineer.

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**GOVERNMENT OF INDIA
CENTRAL PUBLIC WORKS DEPARTMENT**

CPWD-7

PERCENTAGE RATE TENDER & CONTRACT FOR WORKS

- (A) Tender for the work of: **Construction of Multipurpose Hall of GRIHA-5 Star Including IEI & fans, Fire alarm & PA system, Wet Riser & Sprinkler system, VRF/VRV/ Split Air Conditioning system, online UPS system, audio visual system & Lifts etc. at NBSC/BIRD Campus Lucknow (UP) (Package-I).**
- (i) To be uploaded by **03:00 PM** on **23.09.2026** at <https://etender.cpwd.gov.in> or www.cpwd.gov.in
- (ii) To be opened in presence of tenderers who may be present at **03:30 PM** on **23.09.2026** in the office of **Executive Engineer, Lucknow-I, C.P.W.D., Lucknow.**

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 “**Construction of Multipurpose Hall of GRIHA-5 Star Including IEI & fans, Fire alarm & PA system, Wet Riser & Sprinkler system, VRF/VRV/ Split Air Conditioning system, online UPS system, audio visual system & Lifts etc. at NBSC/BIRD Campus Lucknow (UP) (Package-I).**”

I/We hereby tender for the execution of the work specified for the President of India with in 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.

I/We agree to keep the tender open for **Thirty (30)** days from the date of opening of technical bid and not to make any modification in its terms and conditions.

I/We have deposited EMD for the prescribed amount in the office of concerned Executive Engineer as per the bid document.

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 (strike out as the case may be). 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

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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.

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

I/We undertake and confirm that eligible similar work(s) has/have not been got executed through another contractor on back-to-back basis. Further that, if such a violation comes to the notice of Department, then I/We shall be debarred for tendering in CPWD in future forever. Also, if such a violation comes to the notice of Department before date of start of work, the Engineer-in-Charge shall be free to forfeit the entire amount of Earnest Money Deposit / Performance Guarantee.

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

Dated

Signature of Contractor

Witness:

Postal Address

Address:

Occupation:

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ACCEPTANCE

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

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

- (a)
- (b)
- (c)

For & on behalf of President of India

Signature

Dated:

Designation

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PROFORMA OF SCHEDULES

(Separate Performa for Civil, Elect. & Hort. Works in case of Composite Tenders) (Operative Schedules to be supplied separately to each intending tenderer)

SCHEDULE 'A'**Schedule of quantities**

(Attached Page No. 90 to 156)

SCHEDULE 'D'

Extra schedule for specific requirements/document for the work, if any. Nil

SCHEDULE 'E'

Reference to General Conditions of contract – Applicable GCC is GCC for Construction works 2023, as modified and corrected up to previous day of last date of submission of bids.

Name of Work: Construction of Multipurpose Hall of GRIHA-5 Star Including IEI & fans, Fire alarm & PA system, Wet Riser & Sprinkler system, VRF/VRV/ Split Air Conditioning system, online UPS system, audio visual system & Lifts etc. at NBSC/BIRD Campus Lucknow (UP) (Package-I).	
Estimated cost of the work:	
Civil Items of Work	Rs. 29,16,61,147/-
Electrical Items of Work	Rs. 15,52,35,302/-
Total	Rs. 44,68,96,449/-
Earnest money	Rs. 54,68,964/- (to be returned after receiving Performance Guarantee)
Performance Guarantee	a) 5% of the tendered value or Estimated Cost Put to Tender (ECPT) (whichever is higher) b) Where the tendered amount is less than eighty percent (80%) of the Estimated Cost Put to Tender (ECPT), the Performance Guarantee, in addition to the requirement under (a) above, shall be increased by an amount equal to the difference between eighty percent (80%) of the ECPT and the tender amount.
Security Deposit	2.5% of the tendered value

SCHEDULE 'F'**GENERAL RULES & DIRECTIONS:**

Officer inviting tender	Executive Engineer, Lucknow-I, CPWD, lucknow
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Definitions:

2(vii) **Engineer-in-Charge**

For Civil items of work

Executive Engineer, Lucknow-I, CPWD, Lucknow.

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Clause 5.4

(i)	Authority to convey the decision of shifting of mile stone and extension of time- Executive Engineer, Lucknow-I, CPWD, Lucknow.
(ii)	Authority to decide rescheduling of mile stone and extension of time- Chief Engineer (Lucknow), CPWD, Lucknow or successor thereof or Higher authority.
(iii)	Shifting of date of start in case of delay in handing over of site- Chief Engineer (Lucknow), CPWD, Lucknow or successor thereof or Higher authority.

PROFORMA OF SCHEDULE clause 5 Schedule of handing over the site

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

Clause 6 : Computerized Measurement Book/ Electronic Mode of Measurement : EMB through CPWD ERP Portal.

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. 160 lakh**

Clause 7A Whether Clause 7A shall be applicable **Yes**

(No Running Account Bill shall be paid for the work till the applicable labour licences, registration with EPFO, ESIC and BOCW Welfare Board, whatever applicable are submitted by the contractor to the Engineer-in-charge).

Clause 8 Competent Authorities to inspect and issue Part/ Final Completion Certificate **Chief Engineer (Lucknow), CPWD, Lucknow or successor thereof or Higher authority**

Clause 8A Authority to decide compensation on account if contractor fails to submit completion plans. **Chief Engineer (Lucknow), CPWD, Lucknow**

Clause 10A List of testing equipment to be provided by the contractor at site lab. **See as on Page 29 & 30**

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Clause 10 B (ii) Whether clause 10-B (ii) shall be applicable. **Not Applicable**

Clause 10C **Not Applicable**

Component of Labour expressed as percent of total value of work	25%
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Clause 10CC **Applicable**

Clause 10CC to be applicable in contracts with stipulated period of completion exceeding the period shown in next column. Schedule of component of other Materials, Labour, POL etc. for price escalation	12 Months
1. Cement component	10%
2. Labour component	25%
3. Civil component of other construction materials,	26%
4. E&M (Electrical and Mechanical) component of Construction Materials	26%
5. POL (Diesel) component.	Nil
6. Reinforcement steel based/TMT bars/structural steel (including strands and cables) component.	13%
7. Bitumen component	Nil
Total	100%

Clause 11	Specification to be followed for execution of work:
For Civil items of work	CPWD Specifications 2019 Vol. 1 and Vol. 2 with correction slips issued up to day previous to last date of submission of tender (Hereinafter called CPWD specifications also)
For Electrical items of work	As per electrical component
For Hort. items of work	As per Hort. Component

(i) Building Information Model (BIM) is applicable and

BIM professional to be deployed by contractor- : **Applicable**

Clause 12		
Type of work	Construction Work	
12.2	Deviation limit beyond which Clause 12.2 shall apply	100%

Clause 16	Competent Authority for Deciding reduced rates:	
	For Civil items of work	Chief Engineer (Lucknow), CPWD, Lucknow or successor thereof or Higher authority.

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	For Electrical items of work	Chief Engineer (Lucknow), CPWD, Lucknow or successor thereof or Higher authority.
	For Horticulture items of work	Chief Engineer (Lucknow), CPWD, Lucknow or successor thereof or Higher authority.

Clause 18	List of machinery, tools & plants to be deployed by the contractor at site as & when required	As per Page No. 77
Clause 19C	Authority to decide penalty for each default	Chief Engineer (Lucknow), C.P.W.D., Lucknow or successor thereof.
Clause 19D	Authority to decide penalty for each default	
Clause 19G	Authority to decide penalty for each default	
Clause 19K	Employment of skilled / semi skilled workers.	Applicable

Clause 25 Conciliator /Arbitrator

(i) Conciliator	:	ADG(Lucknow), CPWD, Lucknow
(ii) Arbitrator Appointing Authority	:	Chief Engineer (Lucknow)
(iii) Place of Arbitration	:	Lucknow

Clause 32		Requirement of Technical Representative(s) and Recovery Rate					
Sl. No.	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	
						Figures	Words
1	Graduate Engineer	Civil	Project Manager	20 (and having experience of one similar nature of work)	1	Rs. 60,000/- per month per person	Rs. Sixty Thousand per month per person
2	Graduate Engineer	Civil	Deputy Project Manager	12 (and having experience of one similar nature of work)	1	Rs. 40,000/- per month per person	Rs. Forty Thousand per month per person
3	Graduate Engineer Or Diploma Engineer	Civil	Project/ Site Engineer	5 Or 10 respectively	1	Rs. 25,000/- per month per person	Rs. Twenty five Thousand per month per person
4	Graduate Engineer Or Diploma Engineer	Civil	Planning /quality/billing Engineer	2 Or 5 respectively	1	Rs. 15,000/- per month per person	Rs. Fifteen Thousand per month per person

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5	Graduate Architect Conversant with BIM software	Architect	Project Planning	5	1	Rs. 40,000/- per month per person	Rs. Forty Thousand per month per person
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Assistant Engineers retired from Government services that are holding Diploma will be treated at par with Graduate Engineers.

Diploma holder with minimum 10 years 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 **Delhi Schedule of Rates 2023** printed by CPWD **D.S.R. 2023 with** correction slips up to day previous to the last date of submission of bids
- ii) **Variations permissible on theoretical quantities**
- a) Cement for works with estimated cost put to tender not more than Rs. 25 lakhs. **3% plus/minus**
- For works with estimated cost put to Tender is more than Rs. 25 lakhs **2% plus/minus**
- b) Bitumen all works **2.5% plus & nil on minus side.**
- c) Steel reinforcement and structural steel Sections for diameter, section and category. **2% plus/minus.**
- d) All other materials **Nil**

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GENERAL REQUIREMENTS FOR THE TENDER

Name of Work: Construction of Multipurpose Hall of GRIHA-5 Star Including IEI & fans, Fire alarm & PA system, Wet Riser & Sprinkler system, VRF/VRV/ Split Air Conditioning system, online UPS system, audio visual system & Lifts etc. at NBSC/BIRD Campus Lucknow (UP) (Package-I).

- 1 The tenderer is advised to read and examine the tender documents for the work and the set of drawings available with Engineer-in-charge. He should inspect and examine the site and its surroundings by himself before submitting his tender.
- 2 Separate schedule of quantity is included in this tender for civil and electrical items of work. If the tenderer wants to offer any unconditional rebates on their rates, the same should also be offered in the respective components of civil and electrical schedule separately. The contractor shall quote the percentage rates in figures and words accurately so that there is no discrepancy in rates written in figures and words.
- 3 Time allowed for the execution of work is **18 Months**.
- 4 The contractor(s) shall submit a detailed program of execution in accordance with the master programme/milestone within ten days from the date of issue of award letter.
- 5 Contractor has to arrange and install **Fully-Automatic batching plant** in case, concrete is prepared at site during the currency of work and nothing extra will be paid on this account.
- 6 Quality of the project is of utmost importance. This shall be adhered to in accordance with the provisions of CPWD specifications and guidelines given in the relevant paras.
- 7 The contractor (s) shall make his own arrangements for electricity and water required for the execution of work.
- 8 **Cement shall be arranged by the contractor himself.**
- 9 **Steel Reinforcement shall be arranged by the contractor himself.**
- 10 Contractor has to use specialized agencies for specialized items of works such as water proofing treatment work, sewage treatment plant, effluent treatment plant, BIM Services and other specialized items as mentioned in the tender documents. Only those specialized agencies/firms who have satisfactorily executed works as per following criteria during last seven years are eligible for the specialized works-

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- (a) Three similar works each costing not less than 40% of estimated cost for concerned sub head.
Or
 (b) Two similar works each costing not less than 60% of estimated cost for concerned sub head.
Or
 (c) One similar work costing not less than 80% of estimated cost for concerned sub head.

Approval of the specialized agencies for each specialized work shall be obtained from the Engineer-in-Charge within one month of award of work. Even if, such specialized items of work shall be executed by the specialized agencies, 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.

- 11 Contractor has to deploy required Plant and machinery on the project. **Minimum number of plant and machinery to be deployed by him is indicated at Page No. 77.** In case the contractor fails to deploy the plant and machinery whenever required and as per the direction of the Engineer-in-charge, he (Engineer-in-charge) shall be at a liberty to get the same deployed at the risk and cost of the contractor.
- 12 The contractor shall submit the running bills in the shape of the computerised MB in pages of A-4 size as per the standard format of department and shall act as per modified clause 6 of CPWD-7
- 13 Contractor has to provide reinforcement cover blocks made of approved proprietary pre packed free flowing mortars (Conbe extra as manufactured by M/s Fosroc Chemical India Ltd. or approved equivalent) of high early strength.
- 14 The contractor shall comply with the provisions of the Apprentices Act 1961, and the rules and orders issued there under from time to time.

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PART-B

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MATERIAL AND QUALITY ASSURANCE

1. The contractor shall ensure quality control measures on different aspects of construction including materials, workmanship and correct construction methodologies to be adopted. He shall have to submit quality assurance programme within two weeks of the award of work. The quality assurance programme should include method statement for various items of work to be executed along with check lists to enforce quality control.
2. The contractor shall get the source of all other materials, not specified else where in the document, approved from the Engineer-in-Charge. The contractor shall stick to the approved source unless it is absolutely unavoidable. Any change shall be done with the prior approval of the Engineer-in-Charge for which tests etc. shall be done by the contractor at his own cost. Similarly, the contractor shall submit brand/ make of various materials not specified in the agreement, to be used for the approval of the Engineer-in-Charge along with samples and once approved, he shall stick to it.
3. The contractor shall submit shop drawings of staging and shuttering arrangement, aluminum work, Steel truss work and other works as desired by Engineer In Charge for his approval before execution. The contractor shall also submit bar bending schedule for approval of Engineer –in – charge before execution.

4. Test Laboratories :

A) Laboratory at site : As per requirement and direction of Engineer-in-Charge.

The contractor shall at his on expense establish a testing lab at site and provide testing equipment and materials for the field tests mentioned in the list of mandatory tests given in CPWD Specifications 2019 Vol. 1 & 2. Nothing extra shall be payable to him on this account.

The representatives of the department shall be at liberty to inspect the testing facilities at site and conduct testing at random in consultation with Engineer in charge. The contractor shall provide all necessary facilities for the purpose. The laboratory shall be equipped, inter alia, with the following equipments:

a) Balances:

- i) 7 kg to 10 kg capacity, semi-self indicating type – Accuracy 10 gm.
- ii) 500 gm capacity, semi-self indicating type Accuracy 1 gm.
- iii) Pan Balance- 5 kg Capacity- Accuracy 10 gm.

b) Ovens- Electrically operated, thermostatically controlled upto 1100C- Sensitivity 10C.

c) Sieves: as per IS: 460

- i) IS Sieves – 450 mm internal dia of sizes 100 mm, 80 mm, 63 mm, 50 mm, 40 mm, 25 mm, 20 mm, 12.5 mm, 10 mm, 6.3 mm, 4.75 mm, complete with lid and pan.

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ii) IS Sieves – 200 mm internal dia (brass frame) consisting of 2.36 mm, 1.18 mm, 500 microns, 425 microns, 300 microns, 212 microns, 150 microns, 90 microns, 75 microns with lid and pan.

d) Sieve shaker capable of 200 mm and 300 mm dia sieves, manually operated with timing switch assembly.

e) Equipment for slump test- slump cone, steel plate, tapping rod, steel scale, scoop.

f) Equipment for concrete testing

- | | |
|--|---------|
| i) Concrete cube moulds 15x15x15cm. | 18 Nos. |
| ii) Pruning Rods 2Kg weight length 40cm and ramming face 25mm | 1 No. |
| iii) Extra Bottom plates for 15cm cube mould | 6 Nos. |
| iv) Standard Vibration table for cubes | 1 No |
| v) Dial gauges 25 mm travel- 0.01 mm/division Least count- | 1 No. |
| vi) Fully automatic compression testing machine of 100 tonne capacity. | 1 No. |
| vii) Construction water testing kits | 1 No. |

Not less than 90% tests for material be performed at site lab with above stated equipment's, however at least 10% testing of materials shall be got done from external laboratories. However, for the tests to be carried out by the external laboratories, the contractor shall supply free of charge all the materials required for testing, including transportation. If the tests which were to be conducted in the site laboratory are conducted in other laboratories for any the reasons the cost of such tests shall be borne by the contractor.

B) Other Laboratories :

- B1 The contractor shall arrange carrying out all tests required under the agreement through the laboratory as approved by the Engineer-in-Charge and shall bear all charges in connection therewith including charges for testing for all materials which shall be borne by the contractor.

C) Sampling of Materials:

- C1 Sample of building materials fittings and other articles required for execution of work shall be got approved from the Engineer-in-Charge. Articles manufactured by companies of repute and approved by the Engineer-in-Charge shall only be used. Articles bearing BIS certification mark shall be used in case the above are not available, the quality of samples brought by the contractor shall be judged by standards laid down in the relevant BIS specifications. All

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- materials and articles 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.
- C2 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.
- C3 BIS marked materials except otherwise specified shall be subjected to quality test at the discretion of the Engineer-in-Charge besides testing of other materials as per the specifications described for the item/materials. Wherever BIS marked materials are brought to the site of work, the contractor shall if required, by the Engineer-in-Charge furnish manufacturers test certificate to establish that the material produced by the contractor for incorporation in the work satisfies the provisions of BIS codes relevant to the material and/or the work done.
- C4 The contractor shall procure all the materials in advance so that there is sufficient time to testing and approving of the materials and clearance of the same before use in work.
- C5 All materials brought by the contractor for use in the work shall be got checked from the Engineer-in-Charge or his authorized representative of the work on receipt of the same at site before use.
- C6 The contractor shall be fully responsible for the safe custody of the materials issued to him even if the materials are in double lock and key system.
- C7 The Stone aggregate/stone, sand shall be brought from any quarries subjected to the said materials confirm CPWD specifications.
- 5 The day to day receipt and issue accounts of different grade/brand of cement shall be maintained separately in the standard proforma by the Engineer-in-Charge of work and which shall be duly signed by the contractor or his authorised representative.
- 6 The contractor shall render all help and assistance in documenting the total sequence of this project by way of photography, slides, audio-video recording etc. Nothing extra shall be payable to the contractor on this account. However cost of photographs, slides, audio/videography etc shall be born by the department.

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- 7 The contractor shall be fully responsible for the safe custody of materials brought by him issued to him even though the materials are under double lock key system.
- 8 Separate cement registers showing the receipt of the OPC and PPC shall be maintained at site. The contractor shall construct separate godowns for storage of OPC & PPC at site and nothing extra on this account shall be payable.
- 9 Cement issued shall be for consumption at site only. No cement for factory made items and those not manufactured at site shall be issued.
- 10 In case there is any discrepancy in frequency of testing as given in the list of mandatory test and that in the individual sub-head of work as per CPWD Specifications 2019 Vol. 1 & 2 the higher of the two frequencies of testing shall be adopted.

11 Maintenance of Works Register:

- (i) All the register of tests to be carried out at construction site or in outside laboratories shall be maintained by the contractor which shall be issued to the contractor by Engineer-in-Charge in the same manner as being issued to CPWD field staff.
- (ii) The test registers to be issued to the contractor are :
 - a) Materials at site account register.
 - b) Cement register.
 - c) Master test registers.
 - d) Cube test register.
 - e) Paint register.
 - f) Drawing register.
- (iii) All the entries in the register will be made by the designated engineering staff of the contractor and same should be regularly reviewed by JE/AE/EE.
- (iv) Contractor shall be responsible for safe custody of all the test registers.
- (v) Submission of copy of all test registers, material at site register along with each alternate running account bill and final bill shall be mandatory. These registers should be duly checked by AE(P) in division office.

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ADDITIONAL CONDITIONS FOR CEMENT

- 1 The contractor shall procure PPC conforming to IS: 1489 (Part 1) as required in the work from reputed manufacturers of cement such as ACC, Ultratech, Shree Cement, JK Cement, Century Cement, Prism Cement, Ambuja or from any other reputed cement manufacturer having a production capacity not less than 1 million tons per annum as approved by Chief Engineer / ADG, CPWD, Lucknow.
- 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 week's time of written order from the Engineer- in-charge to do so.
- 3 The cement shall be brought at site in bulk supply of approximately 50 tonnes or as decided by the Engineer- in- charge. The cement godown of the capacity to store a minimum of 2000 bags of cement or decided by NIT approving authority in case less than 100 MT cement is required for work, shall be constructed by the contractor at site of work for which no extra payment shall be made.
- 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 authorized representative and the keys of the other lock shall remain with the contractor. The contractor shall be responsible for the watch and ward and safety of the cement godown. The contractor shall facilitate the inspection of the cement godown by the Engineer-in-Charge at any time.
- 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. The contractor shall supply free of charge the cement required for testing including its transportation cost to testing laboratories. **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.**
- 6 The actual issue and consumption of cement on work shall be regulated and proper accounts maintained as provided in clause 10 of the contract. The theoretical consumption of cement shall be worked out as per procedure prescribed in clause 38 of the contract and shall be governed by conditions laid therein. In case the cement consumption is less than theoretical

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consumption including permissible variation, recovery at the rate so prescribed shall be made after ensuring structural soundness and stability on the basis of testing. In case of excess consumption, no adjustment shall be made.

- 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.
- 8 The damaged cement shall be removed from the site immediately by the agency 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.

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SPECIAL CONDITION FOR STEEL REINFORCEMENT BARS

1. The contractor shall procure TMT bars /Low Alloy Steel of Fe 500 D (BAR SET-I) or more grade from steel producers such as **SAIL, Tata Steel Ltd, RINL, Jindal Steel & Power Ltd and JSW Steel Ltd** or their authorized dealers.
 - 1.1 TMT bars (BAR SET-I) shall meet the provisions of IS 1786 (latest version) (Indian Standard specifications for high strength deformed steel bars and wires for concrete reinforcement) pertaining to Fe 500 D (BAR SET-I) or more grade of steel. (DG, CPWD, New Delhi OM vide No. CSQ/SE(TAS)/Steel/2024/262-H dated 14-08-2024 may be referred copy attached)
2. The contractor shall have to obtain manufactures certificate stating the process of manufacture, chemical composition and test sheet giving results of each mechanical test applicable to the materials and submit and furnish to the Engineer-in-charge in respect of all supplies of steel brought by him to the site of work. Each test certificate shall indicate the number of cast to which it applies, corresponding to the number or identification mark to be found on the material.
3. Steel bars brought by the contractor for use in the work shall be got checked from the Engineer-in-Charge or his authorized representative of the work on receipt of the same at site before use. Samples of each confinement shall be taken and got tested by the Engineer-in-charge for chemical composition and physical properties (including bend and re-bend test) as per the provisions in this regard in the relevant BIS codes from any Govt. or approved laboratory. In case the test results indicate that the 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 of written orders from the Engineer-in-charge to do so.
4. The steel reinforcement shall be brought to the site in bulk supply of 30 tonnes or more or as directed by the Engineer-in-charge.
5. The steel reinforcement bars shall be stored by the contractor at site of work in such a way as to prevent distortion & 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.
6. 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 at frequency not less than that specified below:

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Size of bar	For consignment below 100 tonnes	For consignment over 100 tonnes
Under 10 mm dia bars	One sample for each 25 tonnes or part thereof	One sample for each 40 tonnes or part thereof
10 mm to 16 mm dia bars	One sample for each 35 tonnes or part thereof	One sample for each 45 tonnes or part thereof
Over 16 mm dia bars	One sample for each 45 tonnes or part thereof	One sample for each 50 tonnes or part thereof

7. **All the 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.**
8. If the quantity of steel actually used in the work is found to be more than the theoretical quantity of steel including authorised variation, nothing extra shall be payable to the contractor on this account. In the event of it being discovered that at any stage or after the completion of the work the quantity of steel used is less than the quantity ascertained as herein before provided (allowing variation on the minus side as stipulated in clause 38). The cost of quantity of steel so less used shall be recovered from the contractor at rate as specified in schedule 'F'. Decision of the Engineer-in-Charge in regard to theoretical quantity of steel which should have been actually used and recovery of the rate specified shall be final and binding on the contractor. In case the contractor brings surplus quantity of steel the same after completion of the work will be removed from the site by the contractor at his own cost after approval of the Engineer-in-Charge.
9. The standard sectional weights referred to as in Table 5.4 under para 5.3.4 in CPWD specifications for works 2019 Vol. 1 will be considered for conversion of length of various sizes of MS bars, Tor steel bars and TMT bars into standard weight.
10. Records of actual sectional weight shall also be kept dia-wise & 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

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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.

11. If the derived weight as in para 10 above is lesser than the standard weight as in para 9 above, the derived actual weight shall be taken for payment.

If the derived actual weight is found more than the standard weight then the standard weight as worked out in para 9 above shall be taken for payment. In such case nothing extra shall be paid for the difference between the derived actual weight and the standard weight.

12. Mixing of different type of steel/different grades of steel shall not be allowed in the same structural members as main reinforcement to satisfy clause 26.1 of IS:456.
13. Tolerances on Nominal Mass (individual sample) shall be as under:-

Sl. No.	Nominal size mm	Tolerances on the Nominal Mass, percentage
1	Upto and including 10	-8%
2	Over 10 upto& including 16	-6%
3	Over 16	-4%

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	 भारत सरकार केंद्रीय लोकनिर्माण विभाग तकनीकी अनुसंधान एवं मानक एकाई कमरा सं. 418 ए-विंग, निर्माण भवन, नई दिल्ली। टैलीफोन-011-23262339 ईमेल-delsetascsq.cpwd@nic.in	
S-0156762 No. CSQ/SE(TAS)/Steel/2024/ 262- <i>Red</i>		
Dated: 4/08/2024		

OFFICE MEMORANDUM

Subject:- Guidelines for use of TMT steel /Low Alloy Steel reinforcement Bars in CPWD works and enlistment of the steel manufactures in respect of TMT steel /Low Alloy Steel reinforcement Bars in CPWD.

1. The Ministry of Steel, through notification dated 12.05.2016 and order dated 9.8.2016, abolished classification of steel producers as Integrated steel producers, primary steel producers, secondary steel producers, main producers, major producers or others as well as on the basis of process route of steel manufacturing in India.
2. The Ministry of Steel, vide Circular No. 4(13)/2016-SD(I) dated 14.12.2016, reiterated their Notification dated 12.05.2016. They further issued an order dated 09.08.2016, asking the users to ascertain the quality of the steel products, to be procured, as per relevant BIS standards.
3. Para 27.2 of Works Manual 2014 was modified through OM No. DG/MAN/382 dated 06.02.2019. In this OM, under the heading "Special Condition of Steel reinforcement bars", eligibility criteria and other technical parameters were set for steel manufactures. In the eligibility criteria, incorporation details of the company, various licences, certifications, in house testing facility at plant, and refining technologies used for manufacturing of steel and TMT bars (like BF-BOF route, COREX-BOF Route, DRI-EAF route) were cited. Those manufacturers, who met the aforesaid eligibility criteria, could be included in the preferred make list of Notice Inviting Tenders (NITs) of CPWD works.
4. However, CPWD Works Manual 2014 was replaced by CPWD Works Manual 2019 and came into force with effect from 07.03.2019. In CPWD Works manual 2019, para 4.10.1 deals with use of steel and cement in works and states that "Special conditions shall be incorporated by the NIT approving authority keeping in view the guidelines issued by the Directorate from time to time in this regard which are available on CPWD website".
5. Since no Criteria /guidelines were available for approval of TMT bars manufacturer after release of the CPWD works manual 2019, an Office Memorandum No. CE(CSQ /SE(TAS) /EE(TAD) /Steel/ 2019/ 497-H dated 27.12.2019 was issued. This OM specified that (i) only ISI marked TMT bars of various grades shall be procured for use in CPWD works, (ii) SDG/ADG shall approve the steel manufactures based on eligibility criteria and other technical parameters as per OM No. DG/MAN/382 dated 06.02.2019.
6. The OM 497-H dated 27.12.2019 was withdrawn and modified guidelines for use of reinforcement bars in structures was issued vide OM No. 50-H dated 17.02.2021. The use of corrosion resistant steel (CRS) reinforcement bars in structures was also mandated vide OM No. 50-H dated 17.02.2021. Further,

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clarification regarding corrosion resistant steel was issued vide OM No. 257-H dated 23.06.2022.

7. The single bench of Hon'ble High Court at Calcutta in the case of SRMB Srijan Private Limited & others Vs Union Of India & Others (W.P.A 9990 of 2020) SRMB Srijan Private Limited & others Vs. Union of India & others With (W.P.A 24267 of 2019) has quashed the modified Clause 27.2 of the CPWD Works Manual of 2014, para 4.10.1 of the CPWD Works Manual of 2019, and consequential Memorandums issued by the CPWD and directed to implement the Notification of the Ministry of Steel, Government of India dated May 12, 2016, the Order dated August 9, 2016 and the reminders of the said Ministry dated December 14, 2016 and February 7, 2017.
8. Subsequently an appeal was filed in Division Bench (DB) of Hon'ble High court at Calcutta by CPWD. In the said case, Hon'ble High court at Calcutta, passed the judgment dated 15.04.2024. The operative part of this judgement reads as *'Accordingly we find no grounds to interfere with the order passed by the Learned single bench except with regard to the direction issued in paragraph 53 of the impugned order whereby the modified clause 27.2 of the CPWD Works Manual has been quashed and instead of quashing the said modified clause 27.2 we direct the CPWD to appropriately amend their Works Manual to be in consonance with the notification issued by the Ministry of Steel, Govt. of India as done by the notifications referred to above.'*
9. In compliance of the above directions of the Hon'ble High Court at Calcutta, an Expert Committee was constituted by DG CPWD vide OM No. CSQ/SE(TAS)/EE(TAD)/Steel/2024/190-H dated 10.06.2024 for deciding the criteria for the selection of steel manufacturers for CPWD works. The expert committee has conveyed their final recommendation {enclosed as annexure I(d)} vide Minutes of Meeting dated 24th July 2024 and the same has been accepted by DG, CPWD. The brief of these recommendations are as follows:

Steel Bars shall be classified as:

- a) Bar Set I, if it complies with the requirements given in the latest version of IS 1786, and additional requirement (e.g. Chemical Composition Requirement for Manganese and Copper, Tempered Martensite (TM) Ring Requirement, Marking Requirement and compliance of the provisions of ISO 9001:2015 and ISO 14001:2004) mentioned in the recommendations.

And

- (b) Bar Set II, if it complies with the requirements given in the latest version of IS 1786.

The committee has also recommended use of above mentioned Steel Bar sets considering the importance of quality in construction of public structures in different projects of CPWD, on the basis of (a) earth quake zones, (b) environment conditions (coastline and exposure condition), (c) Structure category, and (d) heights of buildings and structures.



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10. Accordingly, it is decided that the reinforcement steel bars produced by plants of SAIL, RINL, TATA, JSW & JSPL which are in wider use in CPWD may be continued to be used as preferred make in the NIT in respect of Bar Set-I mentioned in para no. 9 above and Annexure-1(c). Further, it has also been decided that DG, CPWD may enlist more manufacturer plants for TMT steel/Low Alloy Steel reinforcement Bars on the basis of selection criteria recommended by the Expert Committee. These enlisted manufacturers plants for particular bar set may also be considered for stipulation as preferred make in the NIT depending upon their use.
11. The procedure for enlistment of the steel manufactures in respect of TMT steel /Low Alloy Steel reinforcement Bars in CPWD works is also enclosed herewith as Annexure-I and I (a) to I (f)

This issues with the approval of DG, CPWD.

Encl: As above


 (Dinesh Kumar Ujjainia)
 Superintending Engineer (TAS)
 16/10/24

Copy to (Through CPWD Website):

The SDG (Chennai) / SDG (Chandigarh) / SDG (Kolkata) / SDG (Mumbai) for information please.

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Annexure-I

PROCEDURE FOR ENLISTMENT OF THE STEEL MANUFACTURES IN RESPECT OF TMT STEEL / LOW ALLOY STEEL REINFORCEMENT BARS IN CPWD WORKS.

1. The following procedure shall be adopted for enlistment of the manufacturers, in respect of TMT steel / Low Alloy steel reinforcement bars of different diameter and grades for use in CPWD works.
 - i. All manufacturers having their manufacturing plants in India are eligible for enlistment in CPWD subject to the condition that they are producing steel bars of different grades conforming to the latest version of IS 1786.
 - ii. The Thermo Mechanically Treated (TMT) steel / Low Alloy steel reinforcement bars conforming to IS:1786 must be manufactured using iron ore, virgin or processed with necessary refining facilities. The rolling / processing facilities, from iron making to finished steel reinforcement bar, may be owned by the same company or its subsidiary company (ies). In this regard the necessary proof may be submitted along with application.
 - iii. The eligible manufacturer shall apply online to CPWD website portal to **SDG (Chennai, Chandigarh, Kolkata, & Mumbai)** on their letter head along with requisite details in prescribed application (**as per Annexure-I(a)**) along with documents (**as per Annexure-I (b)**). The manufacturer shall mention name and location of plants to be enlisted for supply of steel reinforcement bar and shall pay enlistment fee of Rs. 1,00,000.00 (Rs. One Lac Only) per plant. The manufacturer is required to pay total enlistment fees to CPWD through e-payment in **Account Number 244189- AE(Cash), CSQ, NirmanBhawan, New Delhias per Annexure-I (f)** and receipts of payment shall be enclosed with the application form.
 - iv. The enlistment fee, once paid, is non-refundable due to any reason. Therefore, manufacturers are advised to ensure that they fulfil the eligibility requirements and possess all necessary documents for enlistment before payment.
 - v. The online application submitted along with documents will be scrutinized by the **CE (Works & TLQA) O/oSDG (Chennai,**



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Chandigarh, Kolkata, & Mumbai) and shortcoming (s) or deficiency (ies) in the submitted application, if any, will be communicated to the applicants through online portal. The applicants will be allowed to submit clarifications or information online within a period of one month from the date of intimation of shortcomings.

- vi. If the manufacturer fails to submit the required clarifications or information within one month from the date of intimation of shortcomings, the application shall be summarily rejected and no further communication shall be entertained. The enlistment fees shall be forfeited.
- vii. All the relevant clarifications and/or information received within the time period shall be considered and if found in order, such manufacturer shall be informed about the dates of plant (s) visit by the team of CPWD officers consisting of **one SE, one EE and one AE (to be nominated by respective SDG)**.
- viii. On site verification of documents, submitted at the time of application, will be done by the CPWD team, during the plant(s) visit. Further, the testing of individual bars of particular grade (s), at each plant, shall be carried out in the lab available at plant in presence of CPWD team and representative of manufacturer **(as per Annexure-I(c))**. The entire testing process shall also be video recorded.
- ix. CPWD team, at each plant, shall also collect the samples (i.e. one sample consist of three bars) of each diameter of different grades and sealed in presence of manufacturer's representative. The type testing of these samples shall be done in one of the designated lab of National Test House, IITs, NITs and NCCBM in presence of CPWD representatives. The dates of testing of samples in the designated laboratory shall be decided by the manufacturer in consultation with the lab authorities and CPWD team. The entire testing process, including opening of sealed samples, shall be video recorded.
- x. After plant visit by the CPWD team, a report along with photographs / video of the plants and results of the tests conducted during visit shall be uploaded on the portal within 5 working days.
- xi. The results of the type tests, conducted in the designated lab, shall be uploaded on the portal within 5 working days of receipt of the same.

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- xiii. After getting all the test reports, complete case along with documents and recommendation of respective SDG (**Chennai, Chandigarh, Kolkata, & Mumbai**) will be sent to CE, CSQ (Civil), CPWD, Nirman Bhawan, New Delhi.
2. A committee comprising of following officers will evaluate the case received from SDG (**Chennai, Chandigarh, Kolkata, & Mumbai**) for the enlistment of steel manufacturers' plant for reinforcement bar of different grades on the basis of criteria given in **annexure-I(d)** in CPWD Directorate, Nirman Bhawan, New Delhi.

ADG (Tech)	-	Chairman
CE (Project)	-	Member (to be nominated by ADG (Tech))
CE, CSQ (Civil)	-	Member
SE (Design)	-	Member (to be nominated by ADG (Tech))
SE (TAS)	-	Member Secretary

The committee will recommend the steel manufacturers' plant for enlistment or otherwise to DG, CPWD for his approval.

3. The approval of the competent authority shall be intimated to the respective manufacturer in respect of a particular plant for each diameter of different grades of steel under category Bar Set I / Bar Set-II
4. If, no bar diameter of specific grade of steel of the particular plant of a manufacturer is found suitable, then he will be intimated accordingly. The manufacturer may apply afresh next time when applications are re-invited for enlistment. In case of rejection of application, the decision of the CPWD shall be final and binding on the applicants.
5. **Validity of Enlistment:** The enlistment of manufacturer's plant for particular bar diameter and grade of steel shall be valid for a period of 3 (three) years from the date of issue of enlistment order. The enlistment shall be open to review by the enlisting authority i.e. Director General, CPWD at any time. In case any adverse report is received against the manufacturer, the enlistment is liable to be suspended/cancelled/or manufacturer can be black listed for future enlistment in CPWD or any other action as deemed fit (as per **Annexure-I(e)**).



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Annexure-I(a)

Application for Enlistment OF THE STEEL MANUFACTURES IN RESPECT OF
TMT STEEL / LOW ALLOY STEEL REINFORCEMENT BARS and re-enlistment
(Supporting documents annexed with the application form should be uploaded
as per Annexure-I(b))

1. (a) Name of the applicant

(b) Status of entity (Limited Liability Partnership/Ltd. Company)

2. Address

(a) Registered Office

(b) Head Office (if different from Registered office)

3 Contact Details

(a) Name of contact person and Designation

(b) Telephone Number

(c) Mobile Number

(d) Email Id

(e) Website URL (if any)

4 Detail of Plant (s) for which Enlistment applied:

i. (a) Name of Plant

(b) Location

ii. (a) Name of Plant

(b) Location

5. Enlistment fee(s) detail (Fees Rs. 1,00,000.00 per Plant) :

(a) Transactions Reference Number

(b) Transaction Date

(c) Amount

6. Certificates (Strike out whichever is not applicable)

- a. I/We (including all partners) certify that I/we have read the Rules for
Enlistment of steel manufacturer in CPWD as amended upto date and shall
abide by them.



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- b. I/We certify that I/we are not enlisted and will not get myself / ourselves registered as steel manufacturer in the Department under more than one name.
- c. I/We have neither employed nor shall we employ any person within one year of his retirement from the Government except with the prior permission of the Government.
- d. I/We will not make changes in the owner ship of the company without prior intimation to department.
- e. I/We have not declared or is in the process of being declared bankrupt, insolvent, wound up, dissolved or partitioned.
- f. I/We have not been removed/suspended/blacklisted/debarred/restrained from the business by any central /state government department/PSUs.

I/We certify that the information given above is true to the best of my/our knowledge. I/We understand that if any information is found incorrect, our enlistment is liable to be cancelled and I may be blacklisted / suspended / debarred for future enlistment in CPWD.

Place :

Signature of applicant

Date:

(Authorized Signatory)



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Annexure-I (b)

A. Documents required to be submitted with application:

1. Documents regarding Ownership / Promoters of the manufacturing plant, its head office address, location and address of steel manufacturing facility.
2. If any subsidiary company(ies) exists, then documents regarding Ownership / Promoter ship of the subsidiary company, Subsidiary company's address and its relation with main company, location and address of manufacturing units of subsidiary company.
3. Copies of Certificate of Incorporation & Memorandum of Article of Association of Main Company.
4. Approval/ enlistment of manufacturer company by CPWD (in past), or any other Central/State Government departments/PSUs for use of steel reinforcement bars.
5. Document and Production process flow diagram / chart of steel making for production of TMT and Low alloy steel (Corrosion Resistant Steel) Reinforcement bars for Fe 415D, Fe 500D, and Fe 550D of bar sizes 8 mm to 45 mm dia.
6. Document related to Quality Assurance Plan adopted in manufacturing of steel and calibration record of measuring and testing equipments.
7. Authenticated copies of BIS certificate for billets (IS 2830 : 2012) & BIS certificate for TMT bars (IS 1786 :2008) (with up to date Amendment)
8. Copy of ISO-9001:2008 (Quality Management System), Quality Management System, ISO-14001:2004 (Environment Management System).
9. The CO2 emission per kg of steel production.
10. Whether manufacturer is blacklisted/suspended/debarred/restrained from business by any Central / State Government Department or PSU for poor quality of reinforcement steel bar (if any) supplied by the company.
11. Test results of bars as per Annexure-I(c).



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Annexure- I(c)

Testing requirement for individual reinforcement bar diameter of Particular Grade of steel:

Tests required for Fe 415D, Fe500D, Fe550D grade of steel and Low alloy steel reinforcement bars:

A. FOR BAR SET- I

1. Tests as per IS 1786 (latest version) and specified therein

1.1 Chemical Properties

Ladle analysis of steel for above grades for maximum percentage of constituents

- i. Carbon (C), (ii) Sulphur (S) and (iii) Phosphorous (P) and (iv) Nitrogen and Carbon Equivalent.

1.2 Physical Properties

- (i) 0.2 percent proof stress / yield stress, minimum, N/mm².
- (ii) Ratio of Tensile Strength (Ts) to Actual Yield Strength (or 0.2 % of yield stress (Ys)) of the test piece N/mm².
- (iii) Elongation, percent, Minimum, on gauge length $5.65\sqrt{A}$, where A is the cross-sectional area of the test piece.
- (iv) Total elongation at maximum force, percentage, minimum on gauge length $5.65\sqrt{A}$, where A is the cross-sectional area of the test piece.
- (v) Bend test and re-bend test.
- (vi) The mean area of ribs (in mm²) per unit length (in mm) above the core of the bar, projected on a plane normal to the axis of the bar.
- (vii) Pull-out testing in accordance with IS 2770 (Part 1)

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2. Additional requirement

2.1 Permissible limit for Manganese and Copper as follows:

Constituent	Permissible Limit (% of cast metal quantity)		
	Fe 415 D	Fe 500 D	Fe 550 D
Manganese (Mn)			
Maximum	1.60	1.60	1.60
Copper (Cu)			
Maximum	0.80	0.80	0.80
Minimum	0.20	0.20	0.20
Notes: The above composition shall be obtained as per latest version of IS 228 1. Manganese using Periodate Spectrophotometric Method (Part 12), and 2. Copper using Thiosulphate Iodide Method (Part 15) or Spectrophotometric (Diethyl Dithiocarbonate) Method (Part 21)			

2.2 Tempered Martensite Ring Test as per Annexure-I (d).

2.3 The process of manufacturing steel shall comply with the provisions of ISO9001: 2015 and ISO14001: 2004.

(B)FOR BAR SET-II

1. The test requirements given in para 1.1 and 1.2 above.

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Annexure-I(d)

1. CRITERIA FOR CLASSIFICATION OF BARS

The steel bars manufactured in India shall be classified as specified hereunder for the purposes of their use in works of CPWD.

1.1 Process of Classification

Steel Bars shall be classified as *Bar Set I* and *Bar Set II*. The bars shall be placed under one of these categories based on *Type Test* (the test performed to select the bars) performed as specified hereunder. These tests to be performed are those specified in the latest version of **IS 1786** published by the Bureau of Indian Standards, and the additional tests mentioned in Para 2 of this document.

The *Type Test* shall be performed at any one of the National Test Houses, IITs, NITs, and NCCBM, subject to:

- (a) The test samples being collected from the manufacturing facility by the representative engineer of CPWD,
- (b) The availability of the required test facility at the said laboratory, and
- (c) The test being witnessed by representative engineer of CPWD.

1.2 Classification of Steel Bars

The bar shall be classified as:

- (1) *Bar Set I*, if it complies with the requirements given in the latest version of **IS: 1786**, and those given in Para 2 of this document, and
- (2) *Bar Set II*, if it complies with the requirements given in the latest version of **IS 1786**.

2. ADDITIONAL REQUIREMENTS

Four additional requirements as specified hereunder.

2.1 Chemical Composition Requirement

The permissible limits of additional elements shall be as per **Table 1**.

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Table 1: Permissible limits of additional elements

Constituent	Permissible Limit (% of cast metal quantity)		
	Fe 415 D	Fe 500 D	Fe 550 D
Manganese (Mn)			
Maximum	1.60	1.60	1.60
Copper (Cu)			
Maximum	0.80	0.80	0.80
Minimum	0.20	0.20	0.20
Notes:			
The above composition shall be obtained as per latest version of IS 228:			
(1) Manganese using Periodate Spectrophotometric Method (Part 12), and			
(2) Copper using Thiosulphate Iodide Method (Part 15) or Spectrophotometric (Diethyl Dithiocarbonate) Method (Part 21).			

2.2 TM Ring Requirement

The following two requirements shall be met with:

- (1) Does the *Tempered Martensite(TM)* Ring satisfy the visual analysis as per **Step 1** of **Table 2**, and
- (2) The thickness of the TM Ring obtained as per **Step 2** of **Table 2** shall be between $0.07f$ and $0.15f$, where f is the *original nominal diameter* of the bar.

(a) Test Procedure

The following is the procedure:

- (1) The test setup to capture the *Cross-Sectional Phase Distribution (CSPD)* of the TMT bars shall be as shown in **Figure 1**.
- (2) Steel bars may be cut using handsaw or an abrasive cutter with continuous supply of coolant to limit the temperature of steel, and thereby avoid any transition or changes in *Tempered Martensite(TM)* and *Ferrite-Pearlite (FP)* phases (**Figure 2**). The sharp edges of cut bars should be smoothened using

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silicon carbide abrasive sheets. A metal polishing machine can be used to achieve effective smoothening.

- (3) The smoothened steel specimen shall be moulded in cold setting epoxy with good surface finish. Setting time of epoxy is about 10-15 minutes.
- (4) The moulded specimen surface shall be course polished using abrasive sheets of 80, 150, 220, 320, and 600 grit sizes in sequence. Specimens shall be micro-etched using Nital (5% Nitric acid in alcohol) to capture the CSPD.

(b) Measurements

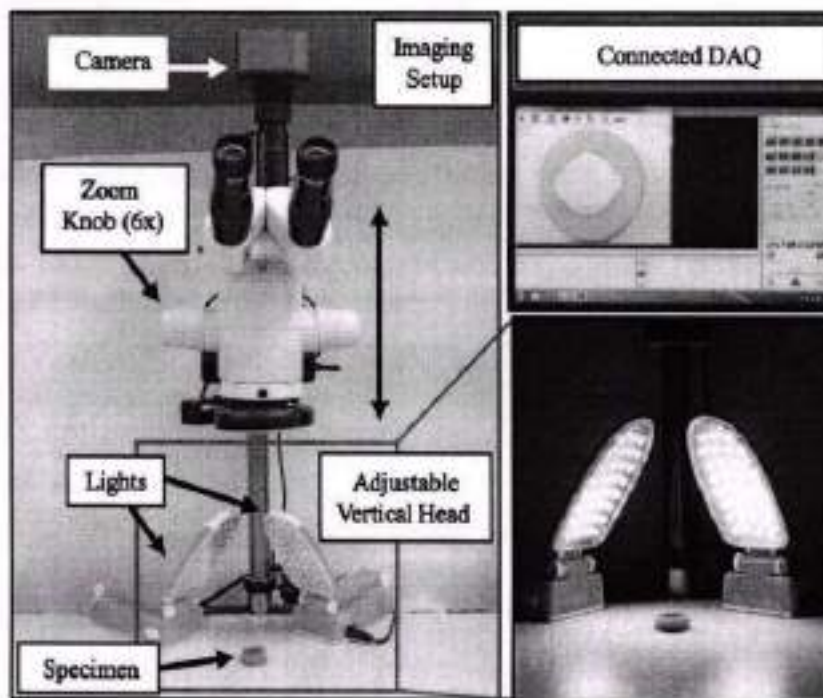
The procedure for obtaining the CSPD of the TM Ring along the perimeter shall be as per Table 2.

2.3 Marking Requirement

All bars shall have marks introduced during rolling, which indicate the *name of manufacturer or brand name, and grade of steel.*

2.4 Manufacturing Process Requirement

The process of manufacturing steel shall comply with the provisions of ISO 9001:2015 and ISO 14001:2004.



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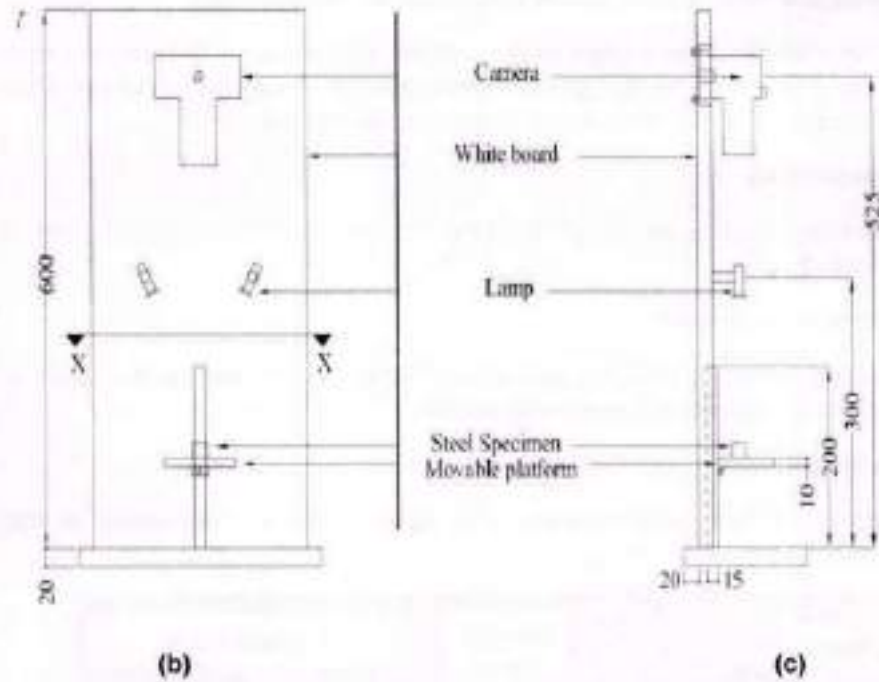


Figure 1: Test setup for CSPD of the TMT bars: (a) Imaging Setup, (b) Schematic Front View (c) Schematic Side View

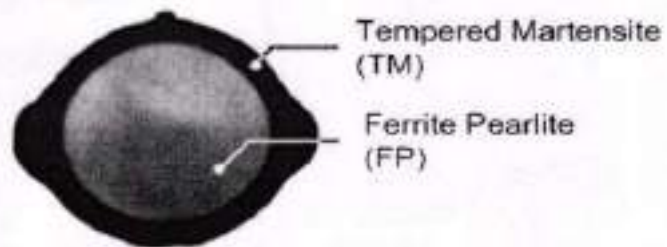


Figure 2: Cross-section of the steel bar showing the TM and FP areas

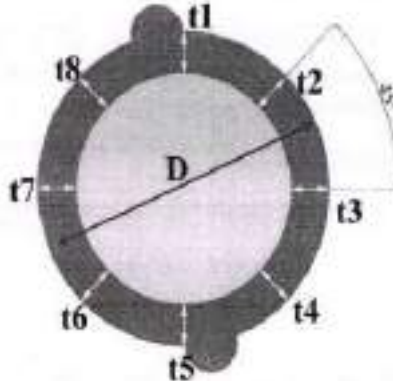
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Table 2: Method of obtaining CSPD of TM Ring

Step 1: Visual Analysis of etched Cross-Section			
			
	Acceptable	Not acceptable	Not acceptable
1.	Is a dark grey peripheral region and light grey core seen as in Case A?		Yes/No
2.	Does the dark grey peripheral region form a continuous outer ring?		Yes/No
Step 2: Dimension Analysis of TM-Ring thickness			
3.	Diameter D (mm) of the steel bar		
4.	Geometry		
			t_1
			t_2
			t_3
			t_4
			t_5
			t_6
			t_7
			t_8
			Measured t_{max} (mm)
			Measured t_{min} (mm)
5.	Is the measured $t_{min} \geq 0.07 f$?		Yes / No
	Is the measured $t_{max} < 0.15 f$?		Yes / No

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3. GUIDELINES FOR USE OF STEEL BARS IN DIFFERENT PROJECTS

Considering the importance of quality in construction of public structures, the basis for use of bars in different projects of CPWD shall be as given in Table 3.

Table 3: Use of Bar Sets I and II in CPWD Projects

S.No.	Consideration	Bar Set I	Bar Set II
1.	Earthquake Zones	All zones	Only Earthquake Zone II
2.	Environment Conditions		
	(a) Coastline	All conditions	Beyond 10 km from the coastline of India
	(b) Exposure Conditions	All exposure conditions as per IS 456 (latest version)	Only Mild and Moderate Exposure Conditions as per IS 456 (latest version)
3.	Structure Category	All categories	Only Normal Buildings as per Table 4 and standalone Normal Structures as per Table 5.
4.	Heights of Buildings and Structures	All heights	Only structures up to 12 m height excluding staircase headroom and liftmachine rooms

Table 4: List of Normal Buildings

Residential or Non-Residential Buildings with occupancy less than 100 persons, excluding:
(1) Educational buildings,
(2) Buildings of strategic importance,
(3) Buildings and structures identified by Government of India and State Governments to be critical for governance or Disaster Management,
(4) Hospital buildings,
(5) Buildings that house the control or operations of utilities (for example, water, power, and sewage disposal), and lifeline (for example, communication and transportation facilities) structures,
(6) Buildings related to defense and space applications,
(7) Buildings identified by Government of India, State Governments and UT Administrations to be of Special Importance, and
(8) Any other building identified with the approval of DG, CPWD.

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Table:5 List of Standalone Normal Structures

Water Tanks and Water Sumps up to 50,000 liters, and Pump Rooms of area less than 20 m ²
Septic Tanks, Sewage Treatment Plants, and Effluent Treatment Plants up to 10,000 liters/day
Bridges and Culverts of spans up to 6 m
Earth Retaining Structures up to 4 m
Compound Walls, Entry Gates, and Small Reception Rooms
Storm Water Drains
Cable Trenches
Parking Structures of single storey
Security Cabins and Sentry Post
Any other structure identified with the approval of Technical Sanctioning Authority of CPWD

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Annexure-I(e)

Grounds for Removal/ Suspension/ Blacklisting/ Debarring of manufacturer from CPWD

1. The manufacturer may be removed/suspended/blacklisted/debarred, if any of the following is established:
 - i. If found to have given false particulars at the time of Application; or
 - ii. Has indulged in any type of forgery or falsification of records; or
 - iii. Changes in the owner ship of the company without prior intimation to department.
 - iv. Declared or is in the process of being declared bankrupt, insolvent, wound up, dissolved or partitioned or
 - v. Violates the labour rules and regulations or
 - vi. Is involved in complaints of serious nature received from any source which have been proved; or
 - vii. Ceases to fulfil eligibility criteria based on which manufacturer's name was approved; or
 - viii. Is considered as not required to be in list of CPWD enlisted manufacturer for any other reason considered fit by the enlisting authority; or
 - ix. Received reports from field units of CPWD for supply of sub-standard quality of steel in more than one occasion; or
 - x. Has been removed/suspended/blacklisted/debarred/restrained from the business by any central /state government department/PSUs.

2. Whenever, any type of complaint mentioned above at serial number (i) to x), is received against a manufacturer. The manufacturer will be served with suitable show cause notice to give reply within a period of 15 days. After considering the reply/non-reply of the Show cause notice and other facts on records, further action will be taken as deemed fit. In case of Removal/ Suspension/ Blacklisting/ Debarring of the manufacturer, the minimum period will not be less than three years from the date of issue of the order. The re-application/application already under consideration for fresh enlistment of such manufacturer shall not be processed till the period of Removal/ Suspension/ Blacklisting/ Debarring is over. The manufacturer has to apply afresh for enlistment after period of Removal/ Suspension/ Blacklisting/ Debarring is over.



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Annexure-I (f)

Procedure for online payment of enlistment fee

1. Log on to home page of NTR portal on <https://bharatkosh.gov.in>.
2. Go to "Quick Payment" link on the home page.
3. Select the Ministry/Department "030-Housing and Urban Affairs" from the drop-down menu.
4. Select the purpose as "Enlistment fee from contractor" from the drop-down menu.
5. Click NEXT and Select the DDO as "244189-AE(CASH),CSQ, NIRMAN BHAWAN, NEW DELHI" from the drop-down menu.
6. Enter the amount of enlistment fee(s) in the amount window.
7. Under Remarks write "enlistment fee for enlistment of steel manufacturer for the plants (i)...., (ii)...., (iii)...., "".
8. After filling all the mandatory fields in "Depositor's detail", click "Next".
9. Confirm the information entered in the preview and click the "Confirm" button.
10. After confirmation, the portal will open the Payment Gateway.
11. Make payment using the Payment Gateway and download the system generated electronic receipt.



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GENERAL TERMS AND CONDITIONS

1 The order of preference in case of any discrepancy may be read as the following:

- i) Nomenclature of items as per schedule of quantities.
- ii) Particular specification and special condition, if any.
- iii) CPWD specifications.
- iv) Architectural Drawings
- v) Indian standard specifications of B.I.S.
- vi) Sound Engineering Practice

A reference made to any Indian Standard specification in these documents, shall imply to the latest version of that standard. Including such revision/amendments as issued by the bureau of Indian standard upto last date of receipt of tenders. The contractor shall keep at his own cost all such publications of relevant Indian standard applicable to the work at site.

2 Except for the items, for which particular specifications are given or where it is specifically mentioned otherwise in the description of items in the schedule of quantities the work shall generally be carried out in accordance with the “CPWD Specifications 2019 Vol. 1 and Vol. 2 (with upto date corrections slips). (Hereinafter to be referred to as CPWD specifications) and instructions of Engineer-in-Charge. Wherever CPWD specifications are silent the latest IS codes/specification shall be followed.

3 Unless otherwise provided in the Schedule of Quantities/Specifications, the rates tendered by the contractor shall be all inclusive and shall apply to all heights, lifts, leads and depths of the work and nothing extra shall be payable to him on account of the same. Extra payment for centering/shuttering, if required to be done for heights greater than 3.5 m shall however be admissible at the rates arrived at in accordance with clause 12 of the agreement, if not already specified.

4 The proposed building is a prestigious project and quality of work is 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 stone masonry & stone cladding works, stone flooring, structural glazing, PVDF coating aluminium composite panel and other specialised flooring work, Wood work will specially require engagement of skilled workers having experience particularly in execution of such items.

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- 5 a) The contractor (s) shall inspect the site of work before tendering and acquaint himself with the site conditions and no claim on this account shall be entertained by the department.
- b) The contractor (s) shall get himself acquainted with nature and extent of the work and satisfy himself about the availability of materials from kiln or approved quarries for collection and conveyance of materials required for construction.
- 6 The contractor (s) shall study the soil investigation report for the site, available in the office of the Engineer-in-Charge and satisfy himself about complete characteristics of soil and other parameters of site. However, no claim on the alleged inadequacy or incorrectness of the soil data shall be entertained.
- 7 The tenderer shall see the approaches to the site. In case any approach from main road is required by the contractor, the same shall be made good, improved and maintained by the contractor at his own cost. No payment shall be made on this account.
- 8 The contractor (s) shall give to the Municipality, 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 leviable on account of these operations in executing the contract. He shall make good any damage to the adjoining property whether public or private and shall supply and maintain light and other illumination on for cautioning the public at night.
- 9 The contractor shall take all precautions to avoid accidents by exhibiting necessary caution boards day and night speed limit boards red flags, red lights and providing barriers. He shall be responsible for all dangers and incidents caused to existing / new work due to negligence on his part. No hindrances shall be caused to traffic during the execution of the work.
- 10 Contractor shall provide permanent bench marks and other reference points for the proper execution of work and these shall be preserved till the end of work. All such reference points shall be in relation to the levels and locations, given in the Architectural and plumbing drawings
- 11 The contractor shall make his own arrangement for obtaining electric connection(s) if required and make necessary payments directly to the department concerned.
- 12 Other agencies doing works related with this project may also simultaneously execute their works and the contractor shall afford necessary facilities for the same. The contractor shall

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- leave such necessary holes, openings etc. for laying/burying in the work, pipes cables, conduits, clamps, boxes and hooks for fan clamps etc. as may be required for the other agencies. Nothing extra over the Agreement rates shall be paid for doing these.
- 13 Some restrictions may be imposed by the security staff etc. on the working and for movement of labour, materials etc. The contractor shall be bound to follow all such restrictions/instructions and nothing extra shall be payable on account of the same.
 - 14 The contractor shall fully comply with all legal orders and directions of the Public or local authorities or municipality and adhere by their rules and regulations and pay all fees and charges for which he may be liable in this regard. Nothing extra shall be paid/reimbursed for the same.
 - 15 The building work shall be carried out in the manner complying in all respects with the requirements of the relevant bylaws and regulations of the local body under the jurisdiction of which the work is to be executed or as directed by the Engineer-in-charge and nothing extra shall be paid on this account.
 - 16 The contractor shall give a performance test of the entire installation(s) as per standing specifications before the work is finally accepted by making his own arrangements for water supply, electricity etc. and nothing extra whatsoever shall be payable for the same.
 - 17 It shall be ensured by the contractor that no electric live wire is left exposed or unattended to avoid any accidents in this regard.
 - 18 The structural and architectural drawings shall at all times be properly co-related before executing any work. However, in case of any discrepancy in the item given in the schedule of quantities appended with the tender and Architectural drawings relating to the relevant item, the former shall prevail unless otherwise given in writing by the Engineer-in-charge.
 - 19 The contractor shall maintain in perfect condition, all portions executed till completion of the entire work allotted to him. Where however phased delivery of work is contemplated these provisions shall apply separately to each phase.
 - 20 The entire royalty at the prevalent rates shall have to be paid by the contractor on all the boulders, metals, shingle sand etc. collected by him for execution of the work, directly to the Revenue authority or authorized agents of the State Government concerned or the Central Government, as the case may be.

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21 PROGRAMME CHART

- i) The contractor shall prepare an integrated programme chart 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 fulfillment of the programme within the stipulated period or earlier as indicated in the mile stones under clause 5 of the contract and submit the same for approval to the Engineer-in-Charge within ten days of the award of the contract.
- ii) The programmes chart should include the following:-
- Descriptive note explaining sequence of various activities.
 - Net work (PERT/CPM/BAR CHART)
 - Programme for procurement of materials by the contractor
 - Programme of procurement of machinery/equipment's having adequate capacity commensurate with the quantum of work to be done within the stipulated period by the contractor.
 - Programme for engagement of labourers (skilled /unskilled) in number.
- 22 If it appears to the Engineer-in-Charge that the actual progress of work does not conform to the approved programme referred above the contractor shall produce a revised programme showing the modifications to the approved programme to ensure completion of the work within the stipulated time for completion.
- 23 The submission for approval by the Engineer-in-Charge of such programme 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 agreement.
- 24 If the work is carried out in more than one shift or during night no claim on this accounts shall be entertained.
- 25 Existing drains, pipes, cables, over-head wires, sewer lines, water lines and similar services encountered in the course of the execution of work shall be protected against the damage by the contractor at his own expense. 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.

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- 26 The contractor shall 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.
- 27 The contractor shall bear all incidental charges for cartage, storage and safe custody of materials issued by department.
- 28 Any cement slurry added over base surface for continuation of concreting for better bond is deemed to have been built in the items and nothing extra shall be payable for extra cement considered in consumption on this account.
- 29 The contractor shall take instructions from the Engineer-in-charge for stacking of materials. No excavated earth or building materials etc. shall be stacked/collected in areas where other buildings, roads, services, compound walls etc. are to be constructed.
- 30 Any trenching and digging for laying sewer lines/water lines/cables etc. shall be commenced by the contractor only when all men, machinery's and materials have been arranged and closing of the trench(s) thereafter shall be ensured within the least possible time.
- 31 The contractor shall submit for the approval of Engineer-in-Charge names of specialized agencies of repute along with their technical capacity proposed to be engaged by him, who must have executed satisfactorily works of value as specified in mandatory conditions.
- 32 The works shall be carried out in accordance with the Architectural drawings and structural drawings, to be issued from time to time by the Engineer-in-Charge. Before commencement of any item of work, the contractor shall correlate all the relevant architectural and structural drawings issued for the work and satisfy himself that the information available there of 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 executing by the commencement of work on the basis of any erroneous and or incomplete information.
- 33 The contractor shall take all precautions to avoid accidents by, exhibiting caution boards day and night, speed limit boards, red flags, red light and providing necessary barriers and other measures required from time to time. The contractor shall be responsible for all damages and accidents due to negligence on his part.

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- 34 Other agencies will also simultaneously execute and install the works of electrification, air conditioning, lifts, fire-fighting etc. for this work and the contractor shall provide necessary facilities for the same. The contractor shall leave such recesses, holes openings etc. as may be required for the electric, air-conditioning and other related works (for which inserts, sleeves, brackets, conduits base pinion, clamps etc. shall be supplied free of cost by the department unless otherwise specifically mentioned) and the contractor shall fix the same at time of casting of concrete, stone work & brick work, if required and nothing extra shall be payable on this account.
- 35 The contractor shall conduct 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 possible arrange his work and shall place and dispose off the materials being used or removed so as not to interfere with the operations of other contractor or he shall arrange his work with that of the others in an acceptable and coordinated manner and shall perform it in proper sequence to the complete satisfaction of others.
- 36 All Architectural drawings given in the tender other than those indicated in nomenclature of items are only indicative of the nature of the work and materials/fixings involved unless and otherwise specifically mentioned. However, the work shall be executed in accordance with the drawings duly approved by the Engineer-in-Charge.
- 37 Samples of all materials and fittings to be used in the work in respect of brand manufacturer and quality shall be got approved from the Engineer-in-Charge, well in advance of actual execution and shall be preserved till the completion of the work. Articles bearing BIS certifications mark shall only be used unless no manufacturer has got BIS mark for the particular material. Any material/fitting whose sample has not been approved in advance and any other unapproved material brought by the contractor shall be immediately removed as soon as directed.
- 38 Unless otherwise specified in the schedule of quantities the rates for all items shall be considered as inclusive of pumping/baling out water, if necessary, for which no extra payment shall be made. Those conditions shall be considered to include water from any source such as inflow of flood, surface and sub-soil water etc. and shall apply to the execution in any season.
- 39 On completion of work, the contractor shall submit at his own cost four prints of "as built" drawings to the Engineer-in-Charge within 30 days of completion of work. These drawings shall have the following information:

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- a) Route of all piping and their diameters including soil waste pipes & vertical stacks.
- b) Ground and invert levels of all drainage pipes together with locations of all manholes and connections upto outfall.
- c) Route of all water supply lines with diameters, location of control valves, access panels etc.
- 40 The contractor shall provide site office of 02 rooms having minimum size of 15x10 ft. and 20x10 ft. including required furniture's A/C & attached toilet at location as specified by Employer" 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, all office utilities, and complete wiring, water supply, sewerage and drainage etc. along with services of one MTS (multi-tasking services) employee. The contractor shall provide the office accommodation within 01 (One) month from the date of commencement of work failing which the compensation @ Rs. 30,000/- per month shall be recovered from the contractor.
 - (ii) The contractor shall arrange to maintain the site offices which includes watch and ward, day to day up keeping of the office and surroundings, periodic whitewashing/ color washing of the building including utilities, payment of telephone/electrical/water supply bills etc.
 - (iii) The cost of construction, cost of all furniture, fittings/fixtures /electrical fittings etc. and cost of maintenance and the related service charges of the building, payment of telephone bills/electricity bills/water charges etc. (till completion of project) is deemed to be included in the quoted rates of work and nothing extra shall be payable. Six months after completion of work, the site office accommodation shall be dismantled and removed from the site after due approval of Engineer-in-Charge and nothing extra shall be paid to the agency on account of this. This site office accommodation shall be maintained properly till completion of work and no claim what so ever shall be entertained on the ground whether the delay in completion of work has been attributable to the Department or to the contractor.
- 41** No extra payment will be made for operation/activity mentioned at Sl. No. 1 to 40 above unless specifically mentioned otherwise.

42 Condition regarding secured advance :-

Secured advance shall be admissible only on those bonafide materials which are likely to be used in the work in a period not exceeding six months from the date of secured advance payment. If agency fails to use the material (in respect of which secured advance have been paid) in the work in this specified period of six month, the said component of secured advance shall be recovered from next running account bill paid to the agency. Secured advance on the same material shall not be paid again.

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PARTICULAR SPECIFICATION

1. EARTH WORK

Any trenching and digging for laying sewer lines/water lines/cables etc. shall be commenced by the contractor only when all men, machinery's and materials have been arranged and closing of the trench(s) thereafter shall be ensured within the least possible time.

2. RCC WORK

The work shall be done as per CPWD specifications.

2.1 If the quantity of cement actually used in the work is found to be more than the theoretical quantity of cement including authorised variation, nothing extra shall be payable to the contractor on this account. In the event of it being discovered that after the completion of the work, the quantity of cement used is less than the quantity ascertained as herein before provided (allowing variation on the minus side as stipulated in clause 38) the cost of quantity of cement so less used shall be recovered from the contractor at the rate as specified in schedule 'F'. Decision of the Engineer-in-Charge in regard to the quantity of cement which should have been actually used as per the schedule and recovery at the rate specified shall be final and binding on the contractor.

2.2 For non-scheduled items, the decision of the Superintending/Chief Engineer regarding theoretical quantity of the cement which should have been actually used shall be final and binding on the contractor.

2.3 Cement brought to site and cement remaining unused after completion of work shall not be removed from site without written permission of the Engineer-in-Charge.

2.4 In case the contractor brings surplus quantity of cement the same after completion of the work will be removed from the site by the contractor at his own cost after approval of the Engineer-in-Charge.

2.5 Cement register for the cement shall be maintained at site.

Cement bags shall be stored in separate godowns to be constructed by the contractor at his own cost as per sketch (which is only indicative and actual size will depend on the site requirements) given in CPWD specifications with weather proof roofs and walls. Each godown shall be provided with a single shutter door with two locks. The key of one lock shall remain with Engineer-in-charge or his authorized representative and that of the other lock with the authorized agent of the contractor at the site of work so that the cement is issued from the godown according to the daily requirements with the knowledge of both parties and proper account for the same is maintained in the standard proforma.

PROFORMA FOR THE CEMENT REGISTER

PARTICULARS OF RECEIPT

Date of receipt	Quantity received	Progressive total	Date of issue	Quantity issued	Items of work for which issued
1	2	3	4	5	6

PARTICULARS OF ISSUE

Qty. returned at the end of the day	Total issued	Daily balance in hand	Contractor's initial	JE's initial	Remarks (AE/EE's periodical check)
7	8	9	10	11	12

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2.6 DESIGN MIX CONCRETE:

The contractor shall be required to submit two separate design mix of concrete with and without using plasticizers, separately. The decision of the engineer-in-charge to specify the design mix of concrete based on above shall be final.

2.6.1 Coarse aggregate: As per CPWD Specifications

2.6.2 Fine Aggregate: As per CPWD Specifications.

2.6.3 Water: It shall conform to requirements laid down in IS:456 : 2000 and CPWD specifications.

2.6.4 Cement: Cement arranged by the contractor will be PPC (in bags) conforming to IS: 1489-Part-I. If for any reasons, cement other than that specified in this para for example OPC of grade 43 or higher grade is brought to site by contractor, the issue, payments rate as well as the quantity to be used in the design mix concrete will remain unchanged.

2.6.5 Slump: Design slump should be clearly specified in the mix design.

2.6.6 Admixtures shall not be used without approval of Engineer-in-charge. Wherever required, admixtures of approved quality shall be mixed with concrete as specified. The admixtures shall conform to IS: 9103. The contractor shall not be paid anything extra for admixture required for achieving desired workability without any change in specified water cement ratio for RCC/CC work.

2.6.7 The concrete mix design/laboratory tests with and without admixture shall be got done by contractor at his own cost and will be carried out by the contractor through one of the following laboratory/Test houses:

- (i) IIT- BHU, Roorkee
- (ii) IET- Lucknow
- (iii) HBTI- Kanpur
- (iv) MNNIT- Allahabad
- (v) KNIT- Sultanpur
- (vi) Approved Lab/Govt. Engineering Institutions as directed by the Engineer-in-charge.
- (vii) MMM Engineering College, Gorakhpur (UP)

The various ingredients for mix design / laboratory tests shall be sent to the test houses through the Engineer-in-Charge and the samples of such aggregate & cement shall be preserved at site by the department

2.6.8 The contractor shall submit the mix design report from any of above approved laboratory for approval of Engineer-in-Charge with in 30 days from the date of issue of letter of acceptance of the tender. No concreting shall be done until the mix design is approved by the Engineer-in-charge. In case of white cement and the likely use of admixtures in concrete with PPC/white cement the contractor shall design and test the concrete mix by using trial mixes with white cement and/or admixtures also for which nothing extra shall be payable.

2.6.9 In case of change of source or characteristic properties of the ingredients used in the concrete mix during the work, a revised laboratory mix design report conducted at laboratory established at site shall be submitted by the contractor as per the direction of the Engineer-in-Charge.

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2.7 APPROVAL OF DESIGN MIX

The mix design for a specified grade of concrete shall be done for a target mean compressive strength $T_{ck} = F_{ck} + 1.65 s$.

Where F_{ck} = Characteristic compressive strength of 28 days

s = Standard deviation which depends on degree of quality control

The degree of quality control for this work is “good” for which the standard deviation (s) obtained for different grades of concrete shall be as below:

Grade of Concrete	For “Good” quality of control
M 25	4.00
M 30	5.00
M 35	5.00
M 40	5.00

Of the six specimen of each set three shall be tested at seven days and remaining three at 28 days. The preliminary tests at seven days are intended only to indicate the strength to be attained at 28 days

- 2.8 All cost of mix designing and testing connected therewith including charges payable to the laboratory shall be borne by the contractor.
- 2.9 The batching plant shall conform to IS:4925. It shall have the facilities of presetting the quantity to be weighed with automatic cutoff when the same is achieved. Concreting at places may have to be resorted to through concrete pump for which nothing extra shall be paid.
- 2.10 All other operations in concreting work like Mixing, Slump, Laying Placing of concrete, compaction curing etc. not mentioned in this particular specification for Design Mix of concrete shall be as per CPWD specification.

2.11 WORK STRENGTH TEST**TEST SPECIMEN**

Work strength test shall be conducted in accordance with IS: 456 on random sampling. Each test shall be conducted on six specimens, three of which shall be tested at 7 days and remaining three at 28 days.

TEST RESULTS OF SAMPLE

The test result of the sample shall be the average of the strength of three specimen. The individual variation shall not be more than 15 percent of the average. If more, the test results of the sample are invalid. 90% of the total test shall be done at the laboratory established at site by contractor and remaining 10% in the laboratory of CPWD or in any other laboratory as directed by the Engineer-in-Charge.

Lot size

The minimum frequency of sampling of concrete of each grade shall be according to the following:-

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Quantity of concrete in the work cubic metre per day	Number of samples.
1-10	1
11-30	2
31-60	3
61-100	4
101 & above	4 + one additional sample for additional 50 cubic metre or part thereof.

Note: At least one sample shall be taken from each shift.

2.12 STANDARDS OF ACCEPTANCE- As per CPWD specifications/IS 456 Code

- 2.13 In case of rejection of concrete on account of unacceptable compressive strength governed by para "Standard of Acceptance" as above the work for which samples have failed shall be redone at the cost of contractors. However the Engineer-in-Charge may order for additional test (like cutting cores, ultrasonic pulse velocity test, load tests 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. However for payment the basis of rate payable to contractor shall be governed by the 28 days cube test results.
- 2.14 Only MS centering/shuttering and scaffolding material unless & otherwise specified shall be used for all RCC. Work to give an even finish of concrete surface. However marine ply shuttering in exceptional cases as per site requirement may be used on specific request from contractor on approval by the Engineer-in-Charge.
- 2.15 Necessary arrangements shall be made for field tests and all required equipment's shall be arrange by establishing field lab by the Agency for mandatory tests of the materials as specified in CPWD specifications or as per direction of Engineer-in-Charge. No extra payment shall be paid on this account.

3. READY MIX CONCRETE (RMC)/BATCH MIX CONCRETE FROM RMC PRODUCER

The contractor shall arrange Ready Mix Concrete (RMC) from the approved RMC producing plants as given in the list of preferred make.

The contractor shall, within a period of 15 days of award of the work, submit text of MOU proposed to be entered between purchaser (the contractor) and supplier (RMC producer) to the Engineer-in-Charge for his approval. The contractor shall draw the MOU with approved RMC producer and submit to the Engineer-in-Charge within a week of such approval. The contractor will not be allowed to use ready mix concrete without completion of above stated formalities.

Notwithstanding the approval granted by the Engineer-in-Charge in aforesaid manner

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or provisions in CPWD Specifications 2019, the contractor shall be fully responsible for quality of concrete including input control, transportation and placement etc.

The Engineer-in-Charge will reserve right to inspect at any stage and reject the concrete if he is not satisfied about quality of product at the user's end.

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 of tests for checking quality of materials, recording of test result and declaring the materials fit or unfit for use in production of mix.
- (ii) Calibration check of the RMC plant.
- (iii) Weight and quantity check on the ingredients, water and admixture added for batch mixing.
- (iv) Time of mixing of concrete.
- (v) Testing of fresh concrete, recording 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.
- (vi) For exercising such control, the Engineer-in-Charge shall periodically depute his authorized representative at the RMC plant. It shall be responsibility of the contractor to ensure that all necessary equipment, manpower & facilities are made available to the Engineer-in-Charge and/or his authorized representative at RMC plant.
- (vii) The contractor shall arrange for sending an SMS on the mobile No. of authorised representative of Engineer-in-Charge as soon as the RMC is despatched from the plant, giving details such as time of despatched, grade of concrete, tipper registration number etc.

The contractor should therefore draw MOU/agreement with RMC producer very carefully keeping in view all terms and conditions/specifications forming part of this document.

All required relevant records of RMC shall be made available to the Engineer-in-Charge or his authorized representative. The 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 & the RMC plant. Only concrete as approved in design mix by the Engineer-in-Charge shall be produced in RMC plant and transported to the site.

3.1 QUALITY CONTROL OF READY MIXED CONCRETE

It shall be the responsibility of the contractor to ensure that RMC producer provides all necessary testing equipments and takes all necessary measures to ensure quality control of ready mixed concrete. In general the required measures shall be:-

(i) Control of purchased material quality

RMC producer shall ensure that all the materials purchased and used in the production of concrete conform to the stipulation of the relevant standards and the requirements of the concrete mix design and quality control procedures. This shall be accomplished by visual checks, sampling and testing, certification from material supplier and

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information/date from materials supplier. Necessary equipment for the testing of all materials shall be provided and maintained in calibrated condition at the plant by the RMC producer.

(ii) Control of material storage

Adequate and effective storage arrangement shall be provided by RMC producer at RMC plant for reliable transfer and feed systems, drainage of aggregate, prevention of freezing or excessive solar heating of aggregate, prevention from contamination etc.

(iii) Record of mix design and mix design modification

RMC producer shall ensure that record of mix design and mix design modification is readily available in his computer at RMC plant for inspection of Engineer-in-Charge or his authorized representative at any time. Any modification in mix design shall be done only after the approval of the Engineer-in-Charge.

(iv) Transfer and weighing equipment

RMC producer shall ensure that a documented calibration procedure is in place. Proper calibration records shall be made available indicating date of next calibration due & corrective action taken. RMC producer shall ensure additional calibration checks whenever required by the Engineer-in-Charge in writing to contractor. RMC producer shall also maintain a daily production record including details of customers to whom RMC was supplied including details of mixes supplied. Record shall also be maintained of materials used for each day's production including water and admixtures.

The accuracy of measuring equipment shall be within + 2% of quantity of cement & + 3% of quantity of aggregate, admixture and water being measured.

(v) Maintenance of Plant, Truck Mixers and Pumps

Plant, Truck Mixers and Pumps should be well maintained so as to not hamper any operation of production, transportation and placement of concrete.

(vi) Production of concrete at RMC producing plant

- (a) Weighing (correct reading of batch date and accurate weighing):-For each load, printed or graphical records shall be made of the weights of the materials batched, the estimated slumps, the total amount of water added to the load, the delivery ticket numbers for that load and the time of loading the concrete into the truck.
- (b) Adequate testing equipments at the plant including equipment for measuring surface moisture content of aggregates shall be provided by the RMC producer.
- (c) Making corresponding adjustments at the plant automatically to batched quantities to allow for observed measured or reported changes in materials or concrete qualities.
- (d) Sampling of concrete, testing, monitoring of results.
- (e) Diagnosis and correction of faults identified from observation/complaints.
- (f) Control of designed and the prescribed mixes: a quality control system shall be operated to control the strength of designed mixes to the required levels. The system shall include continuous analysis of results from cube tests.

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- (vii) Ready mix concrete shall be arranged in quantity as required at site of work. The ready mix concrete shall be supplied as per the pre-agreed schedule approved by Engineer-in-Charge. Noting extra shall be payable on this account.
- (viii) The Engineer-in-Charge reserves the right to approve RMC producing plants not mentioned in the list of approved RMC plants if they fulfil all the necessary conditions.
- (ix) In case of rejection of concrete for which cubes have failed to achieve the requirement of acceptance criteria as per the CPWD specification, the work done using that RMC shall be rejected and the work shall be redone at the cost of the contractor, however, the Engineer-in-Charge may order for additional tests (like ultrasonic pulse velocity and rebound hammer test 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. However, for payment, the basis of rate payable to contractor shall be governed by the 28 days cube test result and reduced rates shall be regulated in accordance with para 5.4.10.5 D (D-3) of CPWD Specifications 2019.

Laying of RMC concrete-All ready mixed designed concrete shall be laid with the help of concrete pump of adequate capacity.

3.2 Transportation, placing and Compaction of Concrete

Mixed concrete from the RMC shall be transported to the point of placement by transit mixers and placed in position through concrete pumps and/or steel closed bottom buckets capable of carrying minimum 0.6 cum concrete is proposed to be transported by transit mixer, the mixing speed shall not be less than 4 rev/min. of the drum nor greater than a speed resulting in a peripheral velocity of the drum 70 m/minutes at its largest diameter. The agitating speed for the agitator shall neither be less than 2 rev/min nor more than 6rev/min of the drum. The numbers of revolution for a uniform mix, after all ingredients, have been charged into the drum unless tempering water is added, all rotation after 100 revolutions shall be at agitating speed of 2 to 6 rev/min and the number of such rotations shall not exceed 250. The general construction of transit mixer and other requirement shall conform to IS: 5892.

4 PRE-CAST RCC WORK

- 4.1 Pre-cast reinforced concrete units shall be of grade or mix as specified. Provision shall be made in the mould to accommodate fixing devices such as hooks, flats etc. and forming of notches and holes. Each unit shall be cast in one operation. A sample of the unit shall be got approved from Engineer-in-Charge before taking up the work.
- 4.2 Pre-cast units shall be clearly marked to indicate the top of member and its locations.
- 4.3 Pre-cast units shall be stored, transported and placed in position in such a manner that these are not damaged.

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5 SANITARY INSTALLATIONS, WATER SUPPLY AND DRAINAGE

The work of water supply and sanitary installations shall be got executed by the agency as approved by Engineer-in-Charge.

- (i) The entire plumbing drawing and sanitary installation drawing/ details shall be submitted by the contractor and got approved by the Engineer-in-Charge before the execution.
- (ii) The entire responsibility for the quality of work will however rest with the building contractor only.

The work of water supply, internal sanitary installations and drainage etc. shall be carried out as per the bylaws of the Municipal Corporation or any other local body and the contractor shall produce necessary completion certificates from such authority after completion of work.

All water tanks, taps, sanitary, water supply and drainage pipes fittings and accessories etc. shall conform to the bylaws and specifications of the Municipal Body/Corporation where CPWD specifications are not available.

The contractor shall engage licensed plumbers for the work and the materials (fixtures/fittings) tested by the local Municipal Body/Corporation wherever required at his own cost. Nothing extra shall be paid/reimbursed for the same.

The contractor shall give a performance test of the entire installation(s) as per standing specifications before the work is finally accepted by making his own arrangements for water supply, electricity etc. and nothing extra whatsoever shall be payable for the same.

The work in general shall be carried out as per CPWD specifications. Rate includes all materials, labour and all the operations mentioned in the respective items unless and otherwise specifically mentioned.

The contractor shall give a satisfactory performance test of the entire installation (s) before the work is finally accepted and nothing extra shall be payable to the contractor on this account.

The contractor shall be responsible for all the protection of sanitary, water supply fittings and fixtures against pilferage and breakage during the period of installation until the completion / handing over of the work.

The contractor shall submit completion plans for water supply internal sanitary installations and building drainage work within thirty days of the date of completion. These plans are to be submitted on drawings prepared preferably through computers (1 original copy + 3 photocopies) on suitable scales to show the general arrangement and desired details.

6. WATER PROOFING TREATMENT

The contractor shall associate himself with the specialized firm, to be approved by the Engineer-in-charge in writing, for water proofing treatment for basement/lower ground floor, underground tank and on roofs. A Noterized Guarantee Bond on stamp paper of Rs. 100/- should be submitted in the prescribed proforma attached with tender document shall be given by the specialized firm, for a period of 10 years from the date after the maintenance period prescribed in the contract, which shall be counter signed by the contractor as token of overall responsibility. In addition 10% (ten percent) of the cost of water proofing items shall be

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retained as guarantee to watch the performance of the work done. However half of this retained amount will be released after five years, if the performance of the work done is found satisfactory. If however any defect is noticed during the guarantee period, it shall be rectified by the contractor within seven days of intimation. In case it is not attended to, the same will be got done by another agency at the risk and cost of the contractor. This guarantee deposit can however be released in full if a bank guarantee of equivalent amount for 10 years is produced and deposited with the department by the contractor.

7. Water Supply & Sanitary Installation:

A Notarized Guarantee Bond on stamp paper of Rs. 100/- should be submitted by the contractor in the prescribed proforma attached with tender document for performance of water supply & sanitary installation work. In addition 5% (Five percent) of the cost of water supply & sanitary installation items shall be retained as guarantee to watch the performance of the work done. Which shall be released after 02 (Two) year to be reckoned from the date after the expiry of maintenance period prescribed in the contract, if the performance of the work done is found satisfactory.

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SPECIAL CONDITIONS

1. The contractor shall not store/dump construction material or debris on metalled road.
2. 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.
3. 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.
4. 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 precautions that the vehicle 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.
5. 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.
6. The contractor shall provide all medical help, investigation and treatment to the workers involved in the construction of building and carry of construction material and debris relatable to dust emission.
7. 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.
8. The contractor shall compulsory use water jet in grinding and stone cutting.
9. The contractor shall comply all the preventive and protective environmental steps as stated in the MoEF guidelines, 2010.
10. The contractor shall carry out on-Road-Inspection for black smoke generating machinery. The contractor shall use cleaner fuel.
11. The contractor shall ensure that the DG sets comply emission norms notified by MoEF.
12. 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.

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13. 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.
14. No extra payment shall be done for leveling course, if required any, to match finished level of floorings of different materials and thickness as per direction of Engineer-in-Charge.
15. During the execution of work, the finished items i/c tile works, granite work, marble work, kota stone and all other items shall be protected from damages/scratches/broken/dicolour etc. by using suitable materials as per direction of Engineer-in-Charge till the completion/handing over of building to user department.
- 16. Contractor shall have to establish huts for labours and storage of materials out side NBSC/BIRD Campus Lucknow (UP). The contractor shall have to arrange space for the same as is acceptable to the local body and nothing extra shall be paid on this account.**
17. The contractor shall submit the MEP (Mechanical, Electrical, and Plumbing) drawings and drawings for external services well in advance for approval of Engineer-in-Charge.

18. 5-Star GRIHA Compliance:-

- a) The scope of work includes achieving a 5-star GRIHA rating. The agency shall execute the work in accordance with the requirements.
- b) The agency shall provide necessary assistance to the GRIHA consultant and GRIHA officials to achieve 5-Star GRIHA.
- c) **The following conditions to be ensured with respect to achieving the GRIHA – 5 star rating in the work:**
 - (i) Soil should be stored within the site and covered with trauplin sheet in a suitable method as recommended by GRIHA. Ensure that topsoil from the excavated area is preserved, stabilized within the site, and its fertility is maintained throughout the construction period.
 - (ii) **Documentation and Verification**
 - a) The contractor shall submit mix designs, material test certificates, supplier declarations, and quantity records demonstrating compliance with requirements for GRIHA documentation. All materials shall conform to the relevant Indian Standards (IS) and be approved by the Engineer/Consultant before use.

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- (iii) Door Shutters must be Urea-formaldehyde free/ From GRIHA product catalogue (As recommended by GRIHA)

Any other condition (s) apart from the above which is required to achieve GRIHA-5 star rating in the work shall be ensured by the bidder during the execution of the work as per direction of Engineer-in-Charge.

19. No extra payment will be made for operation/activity mentioned at Sl. No. 1 to 18 above.

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

Sl. No.	Name of Equipment	Numbers
1	Excavators (various sizes)	As per requirement of work and direction of Engineer-in-Charge.
	Equipment for hoisting & lifting	
1	Tower Crane	
	Equipment for Concrete work	
1	Fully-Automatic batching plant capacity of 20 cum per hours or as per direction of Engineer-in-Charge	
2	Concrete pump (Desirable)	
3	Concrete Transit Mixer	
4	Concrete mixer (diesel)	
5	Concrete mixer (electrical)	
6	Needle vibrator (electrical)	
7	Needle vibrator (petrol)	
8	Surface vibrator	
	Equipment for Building work	
1	Bar bending Machine	
2	Bar cutting machine	
3	Drilling machine	
4	Wall grooving machine for chase cutting	
5	Welding machine i/c transformer	
6	Rig machine	
7	Cube testing machines	
8	M.S. pipes	
9	Steel shuttering	
10	Steel scaffolding	
11	Grinding/polishing machines	
	Equipment for transportation	
1	Tippers	
2	Trucks	
	Pneumatic equipment	
1	Air compressors (diesel)	
	Dewatering equipment	
1	Pump (diesel)	
2	Pump (electric) (Desirable)	
	Power equipment	
1	Diesel Generator (minimum 200 KVA)	

- Note: 1.** The above list is only indicative and not exhaustive. The Bidder may be required to deploy more T&P as per requirement of work.
- 2.** All the above plants & equipments are to be deployed as and when required or directed by Engineer-in-Charge.

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LIST OF PREFERRED MAKES FOR CIVIL WORKS

Approved makes of materials to be used in the work are as under. In case of non-availability of these makes, the Engineer-in-charge may allow use of alternative BIS makes of materials in the work. Non BIS marked materials may be permitted by the Engineer-in-charge.

Sl. No.	Material description	Proposed make list
1	Acoustic Wall Paneling	
	i) Wooden Slats Panels	Armstrong, Gyptech, Anutone, BSR Calsi Ceilings, Bollard, Tranquil
	ii) Puffed Fabric Finish Panel	Armstrong, Gyptech, Anutone, Bollard, Tranquil
2	Aluminium section	Hindalco, Jindal, Indian Aluminium Co.
3	Aluminium shuttering	Knest, S-form, Durand forms (India) Pvt. Ltd, Mivan, Pabors
4	Aluminium Composite Panel 4 mm thick 'B1' Fire rated (external grade)	Viva, Alstone, Eurobond, Wonder Alu Board, Alutuff, Alex, Aldeko
5	Anodized aluminium hardware	Alualpha, Global, Classic, Ebco
6	AAC Block	MAX Blocks, Biltech ACE, Don Construction Chemicals, UltraTech, Garvit, HIL
7	Adhesive -AAC block Adhesive	UltraTech, Ferrous Crete, Aneeb, JK Cement (JK Tylo), Saint Gobain Weber, Ardex Endura, VURA, Berger, Astral
8	Adhesive -Tile Adhesive Grouts	STP Ltd, Kajaria, BASF, Don Building Chemicals (India) Pvt. Ltd., Ardex Endura, - Garware, JK White (JK Tylo), Don Construction Chemicals India Pvt. Ltd., JK Cement, Vura, Berger, Astral, Trimurti
9	CPVC Pipe & fitting	Astral, Superme, Raksha, Ashirwad, Prayag Polymers, Birla HIL, AKG, Kothari, Sparsh Pearl, Vigor
10	Cement (PPC/OPC)	ACC, Ultratech, Shree Cement, JK Cement, Century Cement, Prism Cement, Ambuja
11	Cement (White)	Birla White, JK White or equivalent
12	Centrifugally Cast (Spun) Iron Pipes & Fittings /Hubless pipes & fittings	NECO, Kapilansh, RPMF, SKF, RIF
13	a) CP brass bath fittings (Standard)	Jaquar (Essco), CERA, Johnson, Parryware, Euronics, Polyplast, Asian Paints (EssEss), Kerovit (Kajaria), Essel, RAK, Hindware Limited (Italian), Somany, Prayag, Astral, Sparsh Pearl
	b) CP brass bath fittings (Premium)	Jaquar, Grohe, Kholer, Essel, Roka. Hindware Limited (Queo), Asian Paints (Bathsense), Sparsh Pearl
14	DGU Glass	Gold Plus, Olumpus Toughened, Shankar Fenestration Glasses
15	Distemper- 1st quality acrylic distemper (washable/ ready mix / Low VOC)	Asian Paints (Tractor Aqua Lock Paint), Garware, Berger: Bison lite ICI-Dulux, JK MaxX (Jumbo)], Birla Opus Prime (D-20)
16	Dash fasteners / Clamps/ Anchors	Hilti, Bosch, AFT, Fischer, Wuerth
17	DI Pipes & fittings	Jindal, Electro steel, Tata Ductura, Kapilansh
18	Elastomeric Liquid W.P. membrane with acrylic polymer	Tikidan (Tiki Aquoseal ARR), Don Construction Chemicals, Pidilite, MYK Arment, Berger, Astral, Technicol
19	Extruded polystyrene insulation board	Dowcorning, Supreme, Analco, Tikidan (DANOPREN Range), Technicol
20	False Ceiling System	
	i) GI Sections for frame work of	Saint Gobain, Hi-Steel, USG Boral, Western, Anutone, BSR Calsi

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	Gypsum/ Calcium Silicate board	Ceilings
	ii) T-grid of GI powder coated for Mineral / perforated Gypsum / Calcium Silicate / Metal/ Glass tiles /GRG ceiling	Saint Gobain, Hi-Steel, USG Boral, Armstrong, Anutone, Bollard, Royal Kraft, BSR Calsi Ceilings
21	False Ceiling Tiles	
	i) Perforated GRG tiles	Saint Gobain, USG Boral, Armstrong, Gyptech, Anutone, BSR Calsi Ceilings
	ii) Mineral Fiber tiles	Saint Gobain, Hi-Steel, USG Boral, Armstrong, Anutone
	iii) Glass Fiber Reinforced Gypsum tiles	Saint Gobain, Anutone, BSR Calsi Ceilings
	iv) Metal tiles	Saint Gobain, Hi-Steel, USG Boral, Armstrong, Gyptech, Bollard, Royal Kraft, Anutone, BSR Calsi Ceilings, Tranquil
	v) Calcium silicate tiles	Aerolite, Ramco Hilux or equivalent
22	Fire rated doors	Signum fire protection, Shakti Metdoor, Navair, Promat, Bhawani Fire, Asahi, Supreme Metwood
23	Fire rated stainless steel fittings	Geze, Dorma, Ozone, Dorset, KICH & KICH PR
24	Fire rated glass	AIS, Hero Fire S, Schott, Sanit Gobain, Asahi
25	Floor hardener	Ironite, Perma, STP Ltd., MYK Arment, Berger, Astral
26	Floor spring & door closer	Godrej, Dorset, Ozone, Hardwyn, Dormakaba, Geze, KICH & KICH PR
27	Flooring (Epoxy, PU Flooring, Anti-Static, Terrazzo, Car Park Deck, Self-levelling compound)	Beger, Don Construction Chemicals or equivalent.
28	Flush door shutters	Century, Durian, Green Ply, Jayna (Jain wood Industries), Airolam, Archidply, Black Cobra
29	FRP doors shutters & frame	Jayna, Fiberways, Jain doors Pvt. Ltd.
30	FRP Drain cover & frame	Dudhi, NECO, Fibreways or equivalent
31	FRP Chajja	Fibreways or equivalent
32	FRP Manhole Covers	Fibreways or equivalent
33	GI Sections for Dry Wall Cladding / Partition	Western or equivalent
34	Gypsum plaster	Ferrous Crete, Dudhi, Gyproc Saint Gobain, Ultra Tech, JK Cement 'Gypso MaxX', Western, Aneeb, Trimurti
35	Glass (Clear/ Float/ Frosted/ Refractive Glass/ Tinted/ Lacquered)	Saint Gobain, AIS, Modiguard, Gold Plus, Shankar Fenestration Glasses,
36	Glass -Mirror glass	Atul, Modi Guard, Golden Fish, Gold Plus
37	Glass Wool	Dow Corning, UP Twiga, Isover
38	Hand dryer	Euronics or equivalent
39	HDPE Pipes	Reliance, Jain Pipes, Raksha, Supreme, Kothari, Prayag, Astral
40	HDPE /PVC Membranes for water Proofing	Asian Paints, Berger, Pidilite, MYK Arment, Technonicol
41	HDHMR Board	Black Cobra or equivalent
42	Hessain Based Bituminous Felt	MAK Felt 46 Kg, STP Ltd. or equivalent
43	Laminates	Action TESA, Greenlam, Century Ply, Airolam, Archidply, Durian, Black Cobra
44	Laminated Glass	Gold Plus, Olumpus Toughened, Shankar Fenestration Glasses
45	Matting's (Trapper, carpet, Aluminium Dust – Buster)	Euronics or equivalent
46	MS Tubular windows	Navair, Sukriti, Jangid Engineering Works

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47	Melamine polish	Asian Paints melamine gold, Garware, Wudfin of Pidilite, Timbertone of ICI Dulux. Birla Opus Allwood
48	Manhole covers – (CI Manhole covers, frames and Gratings)	NECO, SKF, RPMF, Kapilansh, Astral, Fibreways
49	Manhole covers – (SFRC Manhole covers, frames and Gratings)	KK, JAIN, Pargati
50	Modular Kitchen	Godrej, Evok by Hindware, Glanz
51	Modular Expansion Joint	Herculus, MNR, Sanfield India Ltd, DECG (FRANO), Vexcolt, Pinnacle Solutions, V.R. Engineer
52	Pressed Steel door frames	Navair, Sukriti, Jangid Engineering Works
53	Plywood / Veneer	Greenply, Durian, Century, Airolam, Archidply, Black Cobra
54	Multicell Polycarbonate Sheet	GE Plastic, LEXAN, MG Polyplast, Danpal, Fibreways
55	Profile steel sheet	Ezydeck of TATA, Lloyd Superdeck, JSW, Jindal, Fibreways
56	Particle board	Action TESA, Merino, Archidply, Greenlam
57	Paver block & Kerb stone	Pavcon, Mayur, KK, Power, Navya
58	Paint -Acrylic emulsion	Asian Paints: (Premium Interior Emulsion Paint), Garware, Nerolac: Beauty Gold, Berger: Rangoli Total Care, ICI Dulux: Super Cover, JK MaxX (Trendz), Birla Opus Prime (I-50/Calista Everclear),
59	Paint-Premium acrylic	Asian Paints: (Royale Luxury Emulsion), Nerolac: Impression, Berger: Silk, ICI Dulux: Velvet Touch, JK MaxX (Majesta), Birla Opus Prime (One Pure Elegance),
60	Paint-Plastic emulsion	Asian Paints (Apolite), Garware, Nerolac: Impression, Berger (easy clean), ICI Dulux 3in 1, Birla Opus Prime (I-50/Calista Everclear),
61	Paint -Textured Exterior Paint	Luxture, Asian Paints, Nerolac, Garware, Berger Paints, JK MaxX Paints, Birla Opus Prime, UTPL,
62	Paint -Acrylic smooth exterior paint	Asian Paints: (Apex), Nerolac: Excel Super, Berger: Weather Coat, ICI Dulux: Weather Shield, JK Armour, Birla Opus Prime (E-30/E-50/ Calista Neo Star),
63	Paint -Premium acrylic smooth exterior paint with silicon additive	Asian Paints: Apex Ultima, Nerolac: Excel Total Super, Garware, Berger: Long life7, ICI Dulux : Weather Shield Max, JK MaxX (Maximo), Birla Opus Prime (E-70/One True Look),
64	Paint -Synthetic Enamel Paint	Asian Paints: Apcolite Premium Gloss Enamel, Nerolac: Synthetic Hi gloss, Berger: Luxol Hi gloss, ICI Dulux: Gloss Synthtic enamel, JK MaxX (JK Enamlo), Birla Opus Prime (N-52/N-53/ Sparkle Gloss/ Style Cover Max),
65	Primer-Cement Primer	Nerolac, Berger (BP white), Garware, Asian (Decoprime WT), ICI (White primer), JK MaxX (JK Primera), Birla Opus Prime (I-10/Calista Pro Hide),
66	Primer -Steel primer (Red Oxide Zinc Chromate Primer)	Asian Paints, Nerolac, Garware, Berger, ICI, JK MaxX, Birla Opus – (Red Oxide Primer / CMP RO Primer/ SGE RO Primer),
67	Primer -Wood primer	Asian Paints, Nerolac, Garware, Berger, ICI, JK MaxX, Birla Opus,
68	Paint- Epoxy paint	Asian Paints, Nerolac, Berger, ICI, JK MaxX, Birla Opus
69	Paint- Fire retardant paint	Asian Paints, Akzo Nobel, Wuerth Promat, JK MaxX, Birla Opus
70	PVC Water Tank	Syntex, JS Polyplast, Prayag, Astral, Vectus
71	PVC/WPC Jali	Black Cobra or equivalent
72	PVC Flushing Cistern	Sparsh Pearl or equivalent
73	PVC Seat Cover	Sparsh Pearl or equivalent
74	PTMT fittings	Shakti, Polyplast, Prima, Raksha, Prayag Polymer, Vectus, Sparsh

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		Pearl
75	Pipe-GI/MS Pipe	Tata, Jindal (Hisar), Prakash Surya
76	Pipe Fittings -GI	Unik, AVR, Zoloto
77	PVC door shutter and frame	Rajshri, Sintex, Jain Door Pvt. Ltd., Black Cobra
78	Polyurea coating for Water Proofing	Asian Paints, Berger, Pidilite, MYK Arment, Technicol
79	Polyurethane over deck insulation foam	Berger, Technicol or equivalent
80	Puf Sandwich Panel	Fibreways or equivalent
81	Ready Mix Concrete (RMC Plant)	RMC India, Ultratech Concrete, ACC Ready Mix, AVR India Pvt. Ltd., J.P. Group, Shree Cement Ltd. (Bangur Concrete), JK Cement (JK Super RMC)
82	Reinforcement- (Steel TMT bars)	SAIL, Tata Steel, Rashtriya Ispat Nigam Ltd. (RINL), JSW Steel Ltd, Jindal Steel & Power Ltd
83	Stainless steel railing, Accessories etc.	Jindal, Dormakaba, Ozone, Godrej, KICH & KICH PR
84	SS fittings for doors & window	Jindal, Dormakaba, Global, Dorset, Hardwyn, Godrej, Ozone, Geze, Prayag, KICH & KICH PR
85	Sealant – (Silicon based water repellant / weather sealant)	Dow Corning, Waker, BASF, Pidilite (Dr. Fixit / Roff). STP Ltd., Makphalt, Don Construction Chemicals, Tikidan (Tiki Siliseal / Tikiseal PU Range), MYK Arment, Berger
86	Sealant (Poly-Sulphide)	Fosroc, Pidilite (Dr. Fixit/Roff), CAC, BASF, Sika, Don Construction Chemicals, Makphalt, Tikidan (Tiki Polyseal Range), MYK Arment, Berger
87	SW Pipes (BIS approved)	Anand, Parry, Perfect
88	a) Sanitary ware, fittings & accessories (Standard)	Jaquar (Essco), CERA, Johnson. Parryware, Euronics, Asian Paints (EssEss), Kerovit (Kajaria), Essel, RAK, Hindware Limited (Italian), Somany
	b) Sanitary ware, fittings & accessories (Premium)	Jaquar, Grohe, Kholer, Essel, Roka. Hindware Limited (Queo), Asian Paints (Bathsense),
89	Soap & Paper dispenser	Euronics, Jaquar, Essel, Kholer, KICH & KICH PR, Sparsh Pearl
90	Stainless steel Grab Bars & Rails	Euronics, Jaquar, Essel, Dormakaba, KICH & KICH PR
91	Stainless Steel grating	Neer, Asian Paint, Essel, Euronics, Sparsh Pearl
92	Stainless steel sink	Neelkanth, Niralli, Essel, Jayna, Plato, Prima, Prayag
93	SCI S&S Pipes & fittings	RIF or equivalent
94	Tiles- Mosaic tiles/ Chequered Tiles	Ultra Tiles, Nitco, Pavcon
95	Tiles- Glazed Ceramic	Kajaria, Johnson, Somany, RAK, Nitco, Aparna Vitero, Italica, AGL, Orient Bell
96	Tiles- Vitrified Tiles (Antiskid / Matt / Glazed)	Kajaria, Johnson, Somany, RAK, Nitco, Aparna Vitero, Italica, AGL, Orient Bell
97	Tile Grouts	Aneeb, Don Construction Chemicals, MYK Arment
98	Toilet Cubicles	Merino (Titan Series), Greenlam (Sturdo Classic) or equivalent
99	Toughened Glass	Gold Plus, Olumpus Toughened, Shankar Fenestration Glasses
100	uPVC door/ window / ventilator	Fenesta, Veka, Duroplast, Aluplast, Prominace, Koemmerling, AdvikaFenster, Okotech [IS:17953:2023], Eumax [IS 17953: 2023], Yashpoly (IS 17953:2023), Pabros, Rajshri, Simta Astrix
101	uPVC doors and window hardware	Roto, Dorset, GEZE
102	uPVC pipe and fittings	Astral, Supreme, Raksha, Ashirwad, Prayag Polymers, Birla HIL, AKG, Kothari, Sparsh Pearl, Vigor
103	Water proofing compounds,	Fosroc, ROFF/Dr. Aneeb, Fixit (Pidilite Industries), CAC, Perma,

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	(admixtures, plasticizer, super plasticizer, curing compounds)	Sika, BASF, STP Ltd., Garware, Tikidan (Danomix Range), Birla Opus Prime, Penetron, Don Construction Chemicals, MYK Arment, Berger, Technicol
104	Water proofing compound (Integral) (with cement for plaster & mortar)	Fosroc: Conplast 421, CAC, Aneeb, Perma, Dr. Fixit : LW+, Sika: Sikacim, STP Ltd., Garware, Tikidan (Danomix LW Range), Birla Opus Prime, Penetron, Don Construction Chemicals, MYK Arment, Berger, Technicol
105	Water proofing compound (for bathroom/ toilet /balcony & other wet areas)	Fosroc: Bush Bond, Aneeb, Dr. Fixit : Pidifine 2K, Asian Paints: Damp Block 2K, Garware, Perma, CICO: Tapecrete, STP Ltd., Tikidan (Danocrite Range), Birla Opus Prime (C2K, C2K+), Don Construction Chemicals, MYK Arment, Berger, Technicol
106	Water proofing compound (Crystalline)	Fosroc: Bushbond TGP, CAC, Dr. Fixit : Dr. Fixit Krystalline, Sika: Sika 101h, Aneeb, Perma, Garware, STP Ltd., Tikidan (Tikicryst-BC Range), Penetron, Don Construction Chemicals, MYK Arment, Berger, Technicol
107	Water Proofing Coatings (Polyurethane, Polyurea, Acrylic Cementitious, SRI Coating, Food grade epoxy coating, Coal tar epoxy, Silicone water repellent coating)	Aneeb, Berger, Technicol or equivalent
108	WTP -MBBR Reactor, Multigrade Filter and Activated carbon Filter	Degremont, OSDPL, Thermax & Ion Exchange
109	WTP- MBBR Media	Cooldeck, MM Aqua, Eco Aqua & Ion Exchange
110	WPC door shutter and frame	Alstone, Jamex, Rajshri, Plasto Green, Black Cobra
111	Wall putty (cement based)	Asian Paints, Birla Wall Care, Trimurti, Garware, JK White, Dudhi, Wonder, JK Cement (JK wall MaxX),
112	WPC Board	Jamex, Alstone, Rajshri, Black Cobra

Note : Contractor shall provide applicable warranty of the products/materials being used in the work to the Engineer-in-Charge at time of approved of the product/material & contractor shall finally submit warranty taken from the manufacturer to Engineer-in-Charge for record.

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Annexure-IV**GUARANTEE TO BE EXECUTED BY CONTRACTORS FOR REMOVAL OF DEFECT AFTER COMPLETION IN RESPECT OF WATER PROOFING WORKS**

The Agreement made thisday oftwo thousand and betweenson ofof(hereinafter called the **Guarantor** of the one part) and the PRESIDENT OF INDIA (hereinafter called 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 render the buildings and structures in the said contract recited completely water and leak – proof.

AND WHEREAS **GUARANTOR** agreed to give a guarantee to the effect that the said structures will remain water and leak-proof for ten years from the date of giving of water proofing treatment.

NOW THE **GUARANTOR** hereby guarantees that water proofing treatment given by him will render the structures completely leak-proof and the minimum life of such water proofing treatment shall be ten years to be reckoned from the date after the maintenance period prescribed in the contract.

Provided that the guarantor will not be responsible for leakage caused by earthquake or structural defects or misuse of roof or alteration and for such purpose;

- (a) Misuse of roof shall mean any operation which will damage water proofing treatment, like chopping of firewood and things of the same nature which might cause damage to the roof;
- (b) Alteration shall mean construction of an additional storey or a part of the roof or construction adjoining to existing roof whereby proofing treatment is removed in parts;
- (c) The decision of the Engineer-in-charge with regard to cause of leakage shall be final.

During this period of guarantee the **guarantor** shall make good all defects and in case of any defect being found, render the building water –proof to the satisfaction of the Engineer-in-Charge at his cost, and shall commence the work for such rectification within seven days from the date of issue of the notice from the Engineer-in-Charge calling 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** cost and risk. The decision of the Engineer-in-Charge as to the cost, payable by the **Guarantor** shall be final and binding.

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That if **GUARANTOR** fails to execute the water proofing or commits breach thereunder then the **GUARANTOR** will indemnify the Principal and his successors against all loss, damage, cost, expense or otherwise which may be incurred by him by reason of any default on the part of the **GUARANTOR** in performance and observance of this supplementary agreement. As to the amount of loss and / or damage and / or cost incurred by the Government the decision of the Engineer – in – Charge will be final and binding on the parties.

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

Signed, sealed and delivered by OBLIGOR in the presence of –

1.
2.

Signed for and on behalf of THE PRESIDENT OF INDIA byin the presence of –

1.
2.

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Annexure-V**TO BE EXECUTED BY THE CONTRACTOR FOR REMOVAL OF DEFECTS AFTER
COMPLETION IN RESPECT OF EPOXY/PU FLOORING**

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

WHEREAS THIS agreement is supplementary to a contract (Hereinafter called the Contract) dated _____ and made between the GUARANTOR OF THE ONE PART AND the Government of the other part, whereby the contractor inter alia, undertook to render the work in the said contract recited structurally stable, sound material and workmanship.

AND WHEREAS THE GUARANTOR agreed to give a guarantee to the effect that the said work will remain structurally stable and guaranteed against faulty material and workmanship, finishing for 2 (Two) years to be reckoned from the date after the expiry of maintenance period prescribed in the contract.

NOW THE GUARANTOR hereby guarantee that work executed by him will remain structurally stable and guaranteed against faulty material and workmanship, finishing for two years to be reckoned from the date after the expiry of maintenance period prescribed in 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 to the satisfaction of the Engineer-in-charge at his cost and shall commence the work for such rectification within seven days from the date of issue of the notice from the Engineer-in-charge calling 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 the defects or commits breach thereunder, then the guarantor will indemnify the principal 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

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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 ON BEHALF OF THE PRESIDENT OF INDIA BY

_____ in the presence of :

1. _____
2. _____

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Annexure-VI**GUARANTEE BOND TO BE EXECUTED BY THE CONTRACTOR FOR REMOVAL OF DEFECTS AFTER COMPLETION IN RESPECT OF SANITARY INSTALLATIONS / WATER SUPPLY / DRAINAGE WORK.**

The agreement made this..... day of (Two Thousand only)..... betweenS/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 render the work in the said contract recited structurally stable, leak proof and sound material, workmanship, anodizing, colouring, sealing.

AND WHEREAS THE GUARANTOR agreed to give a guarantee to the affect that the said work will remain structurally stable, leak proof and guaranteed against faulty material and workmanship, and finishing for five years from the date of completion of work.

NOW THE GUARANTOR hereby guarantee that work executed by him will be free from any leakage, seepage, cracks in pipes, fittings, floor traps and guaranteed against faulty material and workmanship, defective galvanizing for five years to be reckoned from the date after the expiry of maintenance period prescribed in the contract.

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

During this period of guarantee, the guarantor shall make good all defects and in case of any defect to satisfaction of Engineer-in-charge at his cost and shall commence the work for such rectification within seven days from the date of issue of the notice from the Engineer-in-charge calling 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 cost and risk. 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 thereunder, then the guarantor will indemnify the principal 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

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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 Obligor and by and for and on behalf of the PRESIDENT OF INDIA on the day, month and year above written.

Signed, sealed and delivered by OBLIGOR in the presence of –

1.
2.

Signed for and on behalf of THE PRESIDENT OF INDIA byin the presence of –

1.
2.

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Milestones of the Contract

Sl. No.	Description of mile stone	Period for completion from date of start in months	Withheld amount for non-achievement of milestone
1	a) RCC work upto plinth level, b) Approval of GAD and Technical Data Sheet for electrical works.	03 months	1% of the accepted tendered value.
2	a) Completion of RCC work upto 2 nd floor and AAC/Brick work i/c electrical wall conduits upto ground floor. b) Procurement of floor & wall tiles, kota stone, sanitary and plumbing fittings & fixtures. c) Completion of ground floor toilet works.	07 months	1% of the accepted tendered value.
3	a) Completion of RCC work upto Terrace floor. b) AAC/Brick work, Internal sanitary & water supply work at all floors. c) Placing order for Lift, Fire fighting, Fire alarm system equipments, Pumps, Fan & fittings, Chiller Air Conditioning system, procurement of door/ window frames, shutters, etc.	12 months	1% of the accepted tendered value.
4	a) Completion of internal & external finishing, false ceiling etc. at all floors. b) Completion of Electric panel, Chiller unit etc. c) Procurement of Lift, Firefighting, Fire alarm system, Electrical panel, Chiller unit etc. equipments at site.	15 months	1% of the accepted tendered value.
5	Completion of facade work i/c development works and testing & commissioning of all services i/c electrical connection complete in all respect and handing over.	18 months	1% of the accepted tendered value.

Recovery for Non Achievement of completion of sample toilet

Sample item	Period for completion from day of start	Recovery amount (Rs.)
Completion of sample toilet in all respect including electrical work.	75 Days after casting of first floor slab.	Recovery of Rs. 15,000/- per fortnight (Non-refundable) till completion of sample toilet.

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SCHEDULE OF QUANTITY					
Name of Work : Construction of Multipurpose Hall of GRIHA-5 Star Including IEI & fans, Fire alarm & PA system, Wet Riser & Sprinkler system, VRF/VRV/ Split Air Conditioning system, online UPS system, audio visual system & Lifts etc. at NBSC/BIRD Campus Lucknow (UP) (Package-I).					
Sl. No.	Description of Item	Quantity	Unit	Rate	Amount
SECTION 1:-EARTH WORK					
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	4688.00	Cum	177.50	832120.00
1.2	Earth work in excavation by mechanical means (Hydraulic excavator) / manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, for all lift, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.				
1.2.1	All kinds of soil.	131.00	Cum	260.30	34099.00
1.3	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				
1.3.1	All kinds of soil				
1.3.1.1	Pipes, cables etc not exceeding 80 mm dia	160.00	Metre	215.60	34496.00
1.3.1.2	Pipes, cables etc exceeding 80 mm dia but not exceeding 300 mm dia.	160.00	Metre	352.15	56344.00
1.4	Filling available excavated earth (excluding rock) in trenches, plinth, sides of foundations etc. in layers not	3446.00	Cum	196.00	675416.00

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	exceeding 20cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 and for all lift.				
1.6	Supplying and filling in plinth with sand under floors, including watering, ramming, consolidating and dressing complete.	205.00	Cum	2123.75	435369.00
SECTION 2:-Concrete Work					
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	1:3:6 (1 Cement : 3 coarse sand (zone-III) derived from natural sources : 6 graded stone aggregate 20 mm nominal size derived from natural sources)	13.00	Cum	7294.70	94831.00
2.2	Providing and laying cement concrete in retaining walls, return walls, walls (any thickness) including attached pilasters, columns, piers, abutments, pillars, posts, struts, buttresses, string or lacing courses, parapets, coping, bed blocks, anchor blocks, plain window sills, fillets, sunken floor etc., up to floor five level, excluding the cost of centering, shuttering and finishing:				
2.2.1	1:2:4 (1 Cement : 2 coarse sand (zone-III) derived from natural sources : 4 graded stone aggregate 20 mm nominal size derived from natural sources)	5.00	Cum	9895.20	49476.00
2.3	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))	160.00	Cum	4911.85	785896.00
2.4	Providing and laying damp-proof course 50 mm thick with cement concrete 1:2:4 (1 cement : 2 coarse sand (zone-III) derived from natural sources : 4 graded stone aggregate 20 mm nominal size derived from natural sources).	114.00	Sqm	495.75	56516.00
2.5	Extra for providing and mixing water proofing material in cement concrete work in doses by weight of cement as per manufacturer's specification.	37.00	Cement Bag	18.15	672.00
2.6	Providing & applying a coat of residual petroleum bitumen of grade of VG-10 of	114.00	Sqm	146.15	16661.00

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	approved quality using 1.7 kg per square metre on damp proof course after cleaning the surface with brushes and finally with a piece of cloth lightly soaked in kerosene oil.				
2.7	Making plinth protection 50mm thick of cement concrete 1:3:6 (1 cement : 3 coarse sand (zone-III) derived from natural sources : 6 graded stone aggregate 20 mm nominal size derived from natural sources) over 75mm thick bed of dry brick ballast 40 mm nominal size, well rammed and consolidated and grouted with fine sand including necessary excavation, levelling & dressing & finishing the top smooth.	160.00	Sqm	749.30	119888.00
2.8	Providing and laying in position ready mixed or site batched design mix cement concrete for plain cement concrete work; using coarse aggregate and fine aggregate derived from natural sources, Portland Pozzolana/ 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 and finishing 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 minimum specified cement content, the contractor shall have discretion to either re-design the mix or bear the cost of extra cement.				
2.8.1	All works upto plinth level :				
2.8.2	Concrete of M10 grade with minimum cement content of 220 kg /cum	131.00	Cum	8835.15	1157405.00
SECTION 3:-RCC (Reinforcement Cement Concrete)					
3.1	Reinforced cement concrete work in beams, suspended floors, roofs having	89.00	Cum	11505.50	1023990.00

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	slope up to 15° landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral stair cases above plinth level up to floor five level, excluding the cost of centering, shuttering, finishing and reinforcement with 1:1.5:3 (1 cement : 1.5 coarse sand(zone-III) derived from natural sources : 3 graded stone aggregate 20 mm nominal size derived from natural sources).				
3.2	Centering and shuttering including strutting, propping etc. and removal of form for :				
3.2.1	Foundations, footings, bases of columns, etc. for mass concrete :	381.00	Sqm	392.15	149409.00
3.2.2	Walls (any thickness) including attached pilasters, buttresses, plinth and string courses etc.	165.00	Sqm	842.50	139013.00
3.2.3	Suspended floors, roofs, landings, balconies and access platform	6261.00	Sqm	927.25	5805512.00
3.2.4	Shelves (Cast in situ)	93.00	Sqm	927.25	86234.00
3.2.5	Lintels, beams, plinth beams, girders, bressumers and cantilevers	6203.00	Sqm	736.40	4567889.00
3.2.6	Columns, Pillars, Piers, Abutments, Posts and Struts	2379.00	Sqm	961.30	2286933.00
3.2.7	Stairs, (excluding landings) except spiral-staircases	255.00	Sqm	764.95	195062.00
3.2.8	Edges of slabs and breaks in floors and walls				
3.2.8.1	Under 20 cm wide	968.00	Metre	208.55	201876.00
3.2.9	Weather shed, Chajjas, corbels etc., including edges	50.00	Sqm	951.10	47555.00
3.3	Extra for additional height in centering, shuttering where ever required with adequate bracing, propping etc., including cost of de-shuttering and decentering at all levels, over a height of 3.5 m, for every additional height of 1 metre or part thereof (Plan area to be measured).				
3.3.1	Suspended floors, roofs, landings, beams and balconies (Plan area to be measured)	9249.00	Sqm	384.30	3554391.00
3.4	Steel reinforcement for R.C.C. work including straightening, cutting,				

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	bending, placing in position and binding all complete upto plinth level				
3.4.1	Thermo-Mechanically Treated bars of grade Fe-500D or more. Confirming to BAR Set-I as per additional condition for Steel reinforcement in Tender document.	173259.00	Kg	107.85	18685983.00
3.4.2	Steel reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete above plinth level				
3.4.2.1	Thermo-Mechanically Treated bars of grade Fe-500D or more. Confirming to BAR Set-I as per additional condition for Steel reinforcement in Tender document.	625917.00	Kg	107.85	67505148.00
3.5	Add for plaster drip course/ groove in plastered surface or moulding to R.C.C. projections.	2752.00	Metre	78.40	215757.00
3.6	Providing and laying in position ready mixed or site batched design mix cement concrete for reinforced cement concrete work; using coarse aggregate and fine aggregate derived from natural sources, Portland Pozzolana / 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.				
3.6.1	All works upto plinth level				
3.6.1.1	Concrete of M40 grade with minimum cement content of 390 kg/cum	1391.00	Cum	9957.65	13851091.00

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3.6.2	All works above plinth level upto floor V level				
3.6.2.1	Concrete of M40 grade with minimum cement content of 390 kg /cum	3245.00	Cum	10313.30	33466659.00
3.7	Add for using extra cement in the items of design mix over and above the specified cement content therein.	1808.00	Quintal	733.50	1326168.00
SECTION 4:-MASONARY WORK					
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)	136.00	Cum	7132.25	969986.00
4.2	Brick work with common burnt clay F.P.S. (non modular) bricks of class designation 7.5 in superstructure above plinth level up to floor V level in all shapes and sizes in :				
4.2.1	Cement mortar 1:6 (1 cement : 6 coarse sand)	181.00	Cum	9105.95	1648177.00
4.3	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.	120.00	Cum	169.45	20334.00
4.4	Half brick masonry with common burnt clay F.P.S. (non modular) bricks of class designation 7.5 in superstructure above plinth level up to floor V level.				
4.4.1	Cement mortar 1:4 (1 cement :4 coarse sand)	239.00	Sqm	1123.80	268588.00
4.5	Extra for half brick masonry in superstructure, above floor V level for every four floors or part thereof by mechanical means.	120.00	Sqm	15.00	1800.00
4.6	Extra for providing and placing in position 2 Nos 6 mm dia. M.S. bars at every third course of half brick masonry.	239.00	Sqm	104.80	25047.00
4.7	Brick edging 7cm wide 11.4 cm deep to plinth protection with common burnt clay F.P.S. (non modular) bricks of class designation 7.5 including grouting with cement mortar 1:4 (1 cement : 4 fine sand).	160.00	Metre	59.45	9512.00

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4.8	Providing and laying Autoclaved Aerated concrete (AAC) blocks masonry with 150 mm to 300 mm thick with Grade-1 AAC blocks of density 551 to 650 kg/cum conforming to IS:2185 (Part 3) in super structure above plinth level up to floor V level with RCC band at sill level and lintel level with approved block laying polymer modified adhesive mortar all complete as per direction of Engineer-in-Charge. (The payment of RCC band and reinforcement shall be made for separately).	1080.00	Cum	8333.65	9000342.00
SECTION 5:-CLADDING WORK					
5.1	Providing and fixing 18mm thick gang saw cut mirror polished premoulded and polished machine cut for kitchen platforms, vanity counters, window sills, facias and similar locations of required size of approved shade, colour and texture laid over 20mm thick base cement mortar 1:4 (1 Cement : 4 coarse sand) with joints treated with white cement, mixed with matching pigment. epoxy touch ups, including rubbing, curing, moulding and polishing to edge to give high gloss finish etc. complete at all level				
5.1.1	Granite stone slab of colour black, Cherry/Ruby red				
5.1.1.1	Area of slab upto 0.50 sqm	7.00	Sqm	5413.50	37895.00
5.1.1.2	Area of slab over 0.50sqm	142.00	Sqm	5136.30	729355.00
5.2	Providing edge moulding to 18 mm thick marble stone counters, Vanities etc., including machine polishing to edge to give high gloss finish etc. complete as per design approved by Engineer-in-Charge.				
5.2.1	Granite work	143.00	Metre	510.95	73066.00
5.3	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.	93.00	Metre	568.55	52875.00

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5.4	Extra for providing opening of required size & shape for wash basin/kitchen sink in kitchen platform, vanity counter and similar location in marble/ Granite/ stone work, including necessary holes for pillar taps etc. including moulding, rubbing and polishing of cut edges etc. complete.	77.00	Each	978.70	75360.00
5.5	Providing and fixing machine cut, mirror/ eggshell polished, Marble stone work for wall lining (veneer work) including dado, skirting, risers of steps etc., in required design and pattern wherever required, stones of different finished surface texture, on 12 mm (average) thick cement mortar 1:3 (1 cement : 3 coarse sand) laid and jointed with white cement slurry @ 3.3 kg/sqm including pointing with white cement slurry admixed with pigment of matching shade, including rubbing, curing, polishing etc. all complete as per Architectural drawings, and as directed by the Engineer-in-Charge.				
5.5.1	18 mm thick Italian Marble stone slab, Perlato, Rosso verona, Fire Red or Dark Emperadore etc.	59.00	Sqm	10414.80	614473.00
5.6	Designing, fabricating, testing, installing and fixing in position Curtain Wall with Aluminium Composite Panel Cladding, with open grooves for linear as well as curvilinear portions of the building, for all heights and all levels etc. including: (a) Structural analysis & design and preparation of shop drawings for pressure equalisation or rain screen principle as required, proper drainage of water to make it watertight including checking of all the structural and functional design.				
	(b) Providing, fabricating and supplying and fixing panels of aluminium composite panel cladding in pan shape in metallic colour of approved shades made out of 4 mm thick aluminium composite panel material consisting of 3 mm thick FR grade mineral core sandwiched between two Aluminium				

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	sheets (each 0.5 mm thick). The aluminium composite panel cladding sheet shall be coil coated, with Kynar 500 based PVDF/Lumiflon based fluoropolymer resin coating of approved colour and shade on face # 1 and polymer (Service) coating on face # 2 as specified using stainless steel screws, nuts, bolts, washers, cleats, weather silicone sealant, backer rods etc.				
	(c) The fastening brackets of Aluminium alloy 6005 T5 / MS with Hot Dip Galvanised with serrations and serrated washers to arrest the wind load movement, fasteners, SS 316 Pins and anchor bolts of approved make in SS 316, Nylon separators to prevent bi-metallic contacts all complete required to perform as per specification and drawing The item includes cost of all material & labour component, the cost of all mock ups at site, cost of all samples of the individual components for testing in an approved laboratory, field tests on the assembled working curtain wall with aluminium composite panel cladding, cleaning and protection of the curtain wall with aluminium composite panel cladding till the handing over of the building for occupation. Base frame work for ACP cladding is payable under the relevant aluminium items. The Contractor shall provide curtain wall with aluminium composite panel cladding, having all the performance characteristics all complete , as per the Architectural drawings, as per item description, as specified, as per the approved shop drawings and as directed by the Engineer-in-Charge. However, for the purpose of payment, only the actual area on the external face of the curtain wall with Aluminum Composite Panel Cladding (including width of groove) shall be measured in sqm. up to two decimal places.	212.00	Sqm	5015.05	1063191.00
SECTION 6:-WOOD AND PVC WORK					
6.1	Providing wood work in frames of				

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	doors, windows, clerestory windows and other frames, wrought framed and fixed in position with hold fast lugs or with dash fasteners of required dia & length (hold fast lugs or dash fastener shall be paid for separately).				
6.1.1	Second class teak wood	4.00	Cum	142949.70	571799.00
6.2	Providing and fixing ISI marked flush door shutters conforming to IS : 2202 (Part 1) non-decorative type, core of block board construction with frame of 1st class hard wood and well matched commercial 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters:				
6.2.1	35 mm thick including ISI marked Stainless Steel butt hinges with necessary screws	173.00	Sqm	2392.65	413928.00
6.3	Extra for providing vision panel not exceeding 0.1 sqm in all type of flush doors (cost of glass excluded) (overall area of door shutter to be measured):				
6.3.1	Rectangular or square	173.00	Sqm	199.15	34453.00
6.4	Providing and fixing wooden moulded beading to door and window frames with iron screws, plugs and priming coat on unexposed surface etc. complete :				
6.4.1	2nd class teak wood				
6.4.1.1	50x12 mm	351.00	Metre	221.10	77606.00
6.5	Providing and fixing bright finished brass tower bolts (barrel type) with necessary screws etc. complete :				
6.5.1	200x10 mm	148.00	Each	358.40	53043.00
6.5.2	150x10 mm	584.00	Each	287.25	167754.00
6.6	Providing and fixing bright finished brass 100 mm mortice latch and lock with 6 levers and a pair of lever handles of approved quality with necessary screws etc. complete.	77.00	Each	854.65	65808.00
6.7	Providing and fixing bright finished brass handles with screws etc. complete:				
6.7.1	125 mm	514.00	Each	256.65	131918.00
6.8	Providing and fixing bright finished brass hanging type floor door stopper with necessary screws, etc. complete.	148.00	Each	121.65	18004.00

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6.9	Providing and fixing aluminium die cast body tubular type universal hydraulic door closer (having brand logo with ISI, IS : 3564, embossed on the body, door weight upto 35 kg and door width upto 700 mm), with necessary accessories and screws etc. complete.	148.00	Each	1124.85	166478.00
6.10	Providing & Fixing decorative high pressure laminated sheet of plain / wood grain in gloss / matt / suede finish with high density protective surface layer and reverse side of adhesive bonding quality conforming to IS : 2046 Type S including cost of adhesive of approved quality				
6.10.1	1.0 mm thick	346.00	Sqm	897.30	310466.00
6.11	Providing and fixing panic bar / latch (Double point) fitted with a single body, Trim Latch & Lock on back side of the Panic Latch of reputed brand and manufacture to be approved by the Engineer- in- charge, all complete.	12.00	Each	8366.15	100394.00
6.12	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 & 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 & mullion (if required) shall be mitred cut and fusion welded/				

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	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 & 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. Wire mesh / Glazing of plain/ toughened/ laminated/ double glass unit with / without high performance coatings as per design requirements and conforming to IS: 3548 & 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 basic wind speed > 45 m/sec as per IS 875 — Part 3 (ii) Sites with structure height more than 20m for all wind speeds				
	Three track three panels sliding window with two glazed & one wire mesh panels with Aluminium channel for roller track, wool pile, nylon rollers with SS 304 body.				
6.12.1	Using R3 series with frame (98 mm & above) x (40 mm & above) & both glazed and fly screen sash (30 mm & above) x (55 mm & above) with zinc alloy (zamak) powder coated handle on every glazed panel along with multi-point locking system. (Height upto 1.8m).	536.00	Sqm	10874.20	5828571.00
6.13	Fixed window/ ventilator with mullion /transom.				
6.13.1	Using R3 series with frame (55 mm & above) x (45 mm & above) & mullion (55 mm & above) x (65 mm & above). (Height upto 2.5 metre)	24.00	Sqm	7827.75	187866.00

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6.14	Providing and fixing fire resistant door frame of section 50 x 60 mm on horizontal side & 35 x 60 mm on vertical sides having built in rebate made out of 1.6 mm thick GI sheet (Zinc coating not less than 120 gm/sqm) suitable for mounting 120 minutes Fire Rated Glazed Door Shutters. The frame shall be filled with mineral wool Insulation having density minimum 96Kg/sgm. The frame will have a provision of G.I. anchor fastners 14 nos (5 each on vertical style & 4 on horizontal style of size M10 x 80) suitable for fixing in the opening along with factory made template for SS ball bearing hinges of size 100x89x3 mm for fixing of fire rated glazed shutter. The frame shall be finished with an approved fire resistant primer or powder coating of not less than 30 micron in desired shade as per the directions of Engineer - in- Charge. (Cost of SS ball bearing hinges is excluded).	41.00	Metre	2202.90	90319.00
6.15	Providing and fixing 60 mm thick glazed fire resistant door shutters of 120 minutes Fire rating conforming to IS:3614 (Part II) or EN1634-1:1999, tested and certified as per laboratory approved by Engineer-in-Charge, with suitable mounting on door frame, consisting of vertical styles, top rail & side rail 60 mm x 60 mm wide and bottom rail of 110 mm x 60 mm made out of 1.6 mm thick G.I. sheet (zinc coating not less than 120 gm/ sqm) duly filled mineral wool insulation having density minimum 96 kg/ cum and fixing with necessary stainless steel ball bearing hinges of size 100x89x3 mm of approved make, including applying a coat of approved fire resistant primer or powder coating not less than 30 micron etc all complete as per direction of Engineer-in-Charge (paneling to be paid for separately).	29.00	Sqm	12017.90	348519.00

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6.16	Providing and fixing factory made ISI marked uninsulated metal fire rated doorset assembly for all non egress application areas like shafts etc consisting of galvanized iron steel frame and double leaf shutter, including necessary hardware accessories conforming to FD 120 UD classification of IS 3614 :2021 with fire rating of 120 minutes integrity_ The door frame and shutter shall be made out of minimum 1.20 mm thick GI Sheet with minimum 120 GSM Zinc coating as per IS. 277. The entire fire rated doorset assembly shall be tested in unlatched condition as per IS 17518 (Part -1): 2022 Frame The frame shall be of minimum size 90 x 60 mm with grooved profile to take appropriate fire rated smoke seal, having mitred cut joints (self tab/screwed assembled at site) and provided with appropriate reinforcement suitable for taking hardware and flush fixing as per IS: 4351. The smoke seal material shall be of EPDM in accordance with / ASTM E-84 of minimum size 10 mm x 4 mm, fixed within the inbuilt groove or stuck with adhesive on the entire perimeter of the frame. The door frame shall be fixed in all four sides to masonry wall opening with CSK/Flex headed fastener of minimum 8 mm dia size and minimum 80 mm long with 8mm dta polyamide sleeves @ 4 numbers at each on vertical sides (up to 2100 mm height) and 2 numbers each on top and bottom sides. Door shutter: The double skin double leaf door shutter shall be consisting of minimum 46 mm thick and having box like structure. slots cut and holes punched, for fixing hardware with stiffeners as per IS: 16074 including resin bonded honey comb paper core infill material of density 5 kg/cum Integral astragals to be provided on meeting styles of double leaf door, each on active and inactive leaf_ The door shutters shall be mounted				
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	on the frame with SS 304 grade ball bearing butt hinges as per EN 1935:2002 or butt hinges as per IS 12817 both, of minimum size 100x75x3 mm @ minimum 4 numbers hinges per door leaf upto 2100 mm / 2400 mm height or as per test evidence, which ever is more, fixed with M6 25 screws.				
6.16.1	Double leaf un-insulated fire rated door of FD 120 UD classification with 120 minutes integrity only as per IS 3614:2021 for non egress application area like shafts etc.	12.00	Sqm	12657.00	151884.00
6.17	Providing and fixing factory made ISI marked partially insulated metal fire rated doorset assembly, for staircase / exit pathway and refuge areas applications, consisting of galvanized iron steel frame and double leaf shutter including necessary hardware accessories conforming to FD 120 PI classification of IS 3614 :2021 with fire rating of 120 minutes integrity and 30 minutes insulation. The door frame and shutter shall be made out of minimum 1 20 mm thick GI Sheet with minimum 120 GSM Zinc coating as per IS: 277. The entire fire rated doorset assembly shall be tested in latched condition as per IS 17518 (Part -1): 2022 Frame The frame shall be of minimum size 90 x 60 mm with grooved profile to take appropriate fire rated smoke seal, having mitred cut joint (self tab/screwed assembled at site) and provided with appropriate reinforcement suitable for taking hardware and flush fixing as per IS 4351. The smoke seal material shall be of EPDM tested in accordance with ASTM E-84 of minimum size 10 x 4mm, fixed within the inbuilt groove or stuck with adhesive on the entire perimeter of the frame. The door frame shall be fixed to the three sides to masonry wall opening with CSK/Hex headed fastner of minimum 8 mm dia size and minimum 80mm long hot dip galvanized with 8mm dia Polyamide				

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	sleeves @ 5 number at each on vertical sides and 3 number on top side. Door shutter The double skinned double leaf partially insulated door shutters shall be consisting of minimum 50 mm thickness and having box like structure, slots cut and holes punched. for fixing of hardwares with stiffners as per IS: 16074 including resin bonded mineral wool / ceramic wool nfill material of minimum density 96 kg/cum. Each door leaf shall be provided with vision panel, having maximum area of 0.06 sqm, of 120 minute fire rated minimum 6 mm thick clear borosilicate glass pane fixed with clip-on arrangement and fire rated ceramic tape having minimum size 13x2 mm to be fixed all around the glass on both the sides. The intumescent seal of minimum size 15x1,5 mm or of size as per test evidence shall be fixed on all the three edges of the door leaves. Integral astragals to be provided for double leaf door on the meeting style each on active and inactive leaf. The door shutters shall be mounted on the frame with SS 304 grade ball bearing butt hinges as per EN 1935 : 2002 or butt hinges as per IS 12817, of minimum size 100x75x3 mm @ 5 numbers hinges upto 2400mm height or as per test evidence, whichever is more, fixed with M6 25 screws. All doors shall be factory prepared for receiving appropriate hardware and provided with necessary reinforcement for hardware accessories. Accessories Hardware Fire doorset assembly shall be provided with one number of single point panic push bar (cross bar) for active leaf and one number double point panic push bar (cross bar) with bottom strike of desired finish with vertical shoot bolts on top and bottom for inactive leaf of double leaf door as per EN 1125, one number external trim with half cylinder 42 mm long with one side key as per EN 1125,				
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6.17.1	two number heavy duty door closers of size EN 3-5 with standard arm with of desired finish (suitable for 1250 mm wide door leaf) conforming to IS 3564 / EN 1154, and one number surface mounted door coordinator for sequencing of closing. Finishing: Both frame and door shutters shall be factory finished with polyester powder coating of minimum 50 microns thick and shall have passed salt spray test as per IS:13871 of approved colour and shade all complete as per manufacturer's specifications and as per direction of the Engineer-in-charge. Installation: The hollow space in the door frame shall be filled / injected with fire rated self extinguishing type polyurethane foam (PUF) after installation at site of work. The rate shall be inclusive of complete fire rated door assembly, supply and installation by the approved manufacturer.				
	Double leaf partially Insulated metal fire rated doorset of PD 120 PI classification with 120 minutes integrity and 30 minutes insulation as per IS 3614:2021 for Staircase/ Exit pathway / Refuge area etc	24.00	Sqm	20285.60	486854.00
6.18	Providing and fixing glazing in fire resistant door shutters, fixed panels & partitions etc., with G.I. beading made out of 1.6 mm thick G.I. sheet (zinc coating not less than 120 gm/sqm) of size 20 x 33 mm screwed with M4 x 38 mm SS screws at distance 75 mm from the edges and 150 mm c/c , including applying a coat of approved fire resistant primer/ powder coating of not less than 30 micron on G.I. beading, & special ceramic tape of 5 x 20 mm size etc complete in all respect as per NBC 2016, IS 16231 (Part 3):2016 and as per direction of Engineer-in-Charge with glass of required thickness having 120 minutes of fire resistance both integrity & radiation control (EW120) and minimum 20 minutes of insulation	15.00	Sqm	43677.65	655165.00

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	(EI20). The manufacturer have to give test report/certification of fire glass and the glass should have the stamp showing the value of E, EW & EI. The glass shall be tested in approved NABL accredited lab or by any other accreditation body which operates in accordance with ISO/IEC 17011 and accredited labs as per ISO/IEC 17025 for testing and calibration scopes shall be eligible. The maximum glazing size shall not be more than 1100x2200 mm (w x h) or 2.42 sqm.				
SECTION 7:- STEEL WORK					
7.1	Structural steel work in single section, fixed with or without connecting plate, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete.	5082.00	Kg.	117.35	596373.00
7.2	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.	11207.00	Kg.	194.40	2178641.00
7.3	Steel work welded in built up sections/ framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required.				
7.3.1	In stringers, treads, landings etc. of stair cases, including use of chequered plate wherever required, all complete	1050.00	Kg.	123.60	129780.00
7.3.2	In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works	2008.00	Kg.	172.60	346581.00
7.4	Providing and fixing carbon steel galvanised (minimum coating 5 micron) dash fastener of 10 mm dia double threaded 6.8 grade (yield strength 480 N/mm ²), counter sunk head, comprising of 10 mm dia polyamide PA 6 grade sleeve, including drilling of hole in frame , concrete/ masonry, etc. as per direction of Engineer-in-charge.				

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7.4.1	10 x 120 mm	152.00	Each	170.95	25984.00
7.4.2	10 x 140 mm	202.00	Each	182.20	36804.00
7.5	Providing and fixing stainless steel (Grade 304) 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.).	2820.00	Kg	772.40	2178168.00
SECTION 8:-FLOORING WORK					
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	464.00	Sqm	1948.25	903988.00
8.2	Kota stone slabs 20 mm thick in risers of steps, skirting, dado and pillars laid on 12 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, including rubbing and polishing complete.	47.00	Sqm	2354.70	110671.00
8.3	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 providing 3mm spacers and grouting the joints with				

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	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.				
8.3.1	Glazed Vitrified tiles Matt/Antiskid finish of size				
8.3.1.1	Size of Tile 600 x 1200 mm	550.00	Sqm	1797.30	988515.00
8.4	Deduct for not grouting the joints with white cement and matching pigment in the items of fixing of vitrified tiles.	3439.00	Sqm	-13.30	-45739.00
8.5	Providing and laying machine cut, mirror polished Marble stone flooring, in required design (Simple geometrical, abstract etc.) and in patterns in combination with Italian marble stones of different colours, shades and finished surface texture etc., in linear portions of the building, all complete as per the architectural drawings, with 18 mm thick stone slab laid over 20 mm (average) thick base of cement mortar 1:4 (1 cement : 4 coarse sand) laid and jointed with white cement slurry @ 4.4 kg/sgm, including pointing with white cement slurry admixed with pigment to match the marble shade, including rubbing, curing and polishing etc. all complete as specified and as directed by the Engineer-in-Charge.				
8.5.1	18 mm thick Italian Marble stone slab, Perlato, Rosso verona, Fire Red or Dark Emperadore etc.	601.00	Sqm	6927.35	4163337.00
8.6	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				

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	complete as specified and as directed by the Engineer-in-Charge.				
8.6.1	Polished Granite stone slab of colour Black, Cherry/Ruby Red or equivalent	1533.00	Sqm	4481.30	6869833.00
SECTION 9:-ROOFING					
9.1	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				
9.1.1	110 mm diameter	261.00	Metre	377.40	98501.00
9.2	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.				
9.2.1	Bend 87.5°				
9.2.3	110 mm bend	32.00	Each	150.35	4811.00
9.3	Shoe (Plain)				
9.3.2	110 mm Shoe	32.00	Each	131.85	4219.00
9.4	Providing and fixing unplasticised -PVC pipe clips of approved design to unplasticised - PVC rain water pipes by means of 50x50x50 mm hard wood plugs, screwed with M.S. screws of required length, including cutting brick work and fixing in cement mortar 1:4 (1 cement : 4 coarse sand) and making good the wall etc. complete.				
9.4.1	110 mm	264.00	Each	371.30	98023.00
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.	16.00	Each	54.70	875.00
9.6	Providing and fixing false ceiling at all height including providing and fixing of frame work made of special sections, power pressed from M.S. sheets and galvanized with zinc coating of 120 gms/ sqm (both side inclusive) as per IS : 277 and consisting of angle cleats of size 25 mm wide x 1.6 mm thick with				

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	flanges of 27 mm and 37mm, at 1200 mm centre to centre, one flange fixed to the ceiling with dash fastener 12.5 mm dia x 50mm long with 6mm dia bolts, other flange of cleat fixed to the angle hangers of 25x10x0.50 mm of required length with nuts & bolts of required size and other end of angle hanger fixed with intermediate G.I. channels 45x15x0.9 mm running at the spacing of 1200 mm centre to centre, to which the ceiling section 0.5 mm thick bottom wedge of 80 mm with tapered flanges of 26 mm each having lips of 10.5 mm, at 450 mm centre to centre, shall be fixed in a direction perpendicular to G.I. intermediate channel with connecting clips made out of 2.64 mm dia x 230 mm long G.I. wire at every junction, including fixing perimeter channels 0.5 mm thick 27 mm high having flanges of 20 mm and 30 mm long, the perimeter of ceiling fixed to wall/partition with the help of rawl plugs at 450 mm centre, with 25mm long dry wall screws @ 230 mm interval, including fixing of gypsum board to ceiling section and perimeter channel with the help of dry wall screws of size 3.5 x 25 mm at 230 mm c/c, including jointing and finishing to a flush finish of tapered and square edges of the board with recommended jointing compound , jointing tapes , finishing with jointing compound in 3 layers covering upto 150 mm on both sides of joint and two coats of primer suitable for board, all as per manufacturer's specification and also including the cost of making openings for light fittings, grills, diffusers, cutouts made with frame of perimeter channels suitably fixed, all complete as per drawings, specification and direction of the Engineer in Charge but excluding the cost of painting with :				
9.6.1	12.5 mm thick tapered edge gypsum moisture resistant board	923.00	Sqm	1529.10	1411359.00

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9.7	Providing and fixing tiled false ceiling of specified materials of size 595x595 mm in true horizontal level, suspended on inter locking metal grid of hot dipped galvanized steel sections (galvanized @ 120 grams/ sqm, both side inclusive) consisting of main "T" runner with suitably spaced joints to get required length and of size 24x38 mm made from 0.30 mm thick (minimum) sheet, spaced at 1200 mm center to center and cross "T" of size 24x25 mm made of 0.30 mm thick (minimum) sheet, 1200 mm long spaced between main "T" at 600 mm center to center to form a grid of 1200x600 mm and secondary cross "T" of length 600 mm and size 24x25 mm made of 0.30 mm thick (minimum) sheet to be interlocked at middle of the 1200x600 mm panel to form grids of 600x600 mm and wall angle of size 24x24x0.3 mm and laying false ceiling tiles of approved texture in the grid including, required cutting/making, opening for services like diffusers, grills, light fittings, fixtures, smoke detectors etc. Main "T" runners to be suspended from ceiling using GI slotted cleats of size 27 x 37 x 25 x1.6 mm fixed to ceiling with 12.5 mm dia and 50 mm long dash fasteners, 4 mm GI adjustable rods with galvanised butterfly level clips of size 85 x 30 x 0.8 mm spaced at 1200 mm center to center along main T, bottom exposed width of 24 mm of all T-sections shall be pre-painted with polyester paint, all complete for all heights as per specifications, drawings and as directed by Engineer-in-charge.				
9.7.1	GI Metal Ceiling Lay in plain Tegular edge Global white color tiles of size 595x595 mm, and 0.5 mm thick with 8 mm drop; made of G I sheet having galvanizing of 100 gms/sqm (both sides inclusive) and electro statically polyester powder coated of thickness 60 microns (minimum), including factory	479.00	Sqm	1902.95	911513.00

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	painted after bending.				
9.8	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 interlocking metal powder coated T-Grid of hot dipped galvanised iron section of 0.40 mm thick on Silhouette profile rotary stitched double webbed white with 6 mm reveal profile (white/black), comprising of main-T runners of size 15x42 mm 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 600 mm to form grid module of size 600 x 600 mm, suspended from ceiling using galvanised 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. Galvanised 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 40 mm long dry wall S.8 screws. The work shall be carried out as per specifications, drawing and as per directions of the Engineer-in-Charge.				
9.8.1	With 15 mm thick integral densified micro edge light weight calcium silicate false ceiling tiles	316.00	Sqm	2630.40	831206.00

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9.9	Providing and fixing Heat Resistant Terrace Tiles (300 mm x 300 mm x 20 mm) with SRI (solar refractive index) > 78, solar reflection > 0.70 and initial emittance > 0.75 on waterproof and sloped surface of terrace, laid on 20 mm thick cement sand mortar in the ratio of 1:4 (1 cement : 4 coarse sand) and grouting the joints with mix of white cement & marble powder in ratio of 1:1, including rubbing and polishing of the surface upto 3 cuts complete, including providing skirting upto 150 mm height along the parapet walls in the same manner.	1356.00	Sqm	1703.95	2310556.00
9.10	Designing, Providing and fixing multiwall three or more layered polycarbonate sheet panel co-extruded Ultra Violet (UV) protective coating on external surface with standing seam on both the running ends, sheet shall be connected using polycarbonate connectors grip lock double tooth locking mechanism and provided with endcap at the ends to ensure water and air tightness. The light transmission from transparent or translucent or opaque or in combination polycarbonate sheet, varies from 15 to 85% shall be decided by engineer in charge as per requirement. The polycarbonate sheet shall have dart drop impact value more than 60 Joules as per IS 14434:2023 and confirm either flame retardance of class UL-94HB/94V-0 category as per IS14434:2023 or category V0 & HB as per ASEM D635-18 or BSID0 classification as per EN13501 for fire safety. The yellowness index tested as per ASTM E313 (D1925) or ASTM E313 (D1925) shall be equal to or more than 10 unit or 6 units respectively on a sample after 5000 hours of exposure of UV / sun light. The cross section ends of polycarbonate sheet shall be provided with self-adhesive aluminium impermeable tape at top and aluminium ventilated tape at bottom of the sheet				

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	and covered with polycarbonate / aluminium u-shaped protective profile. The poly carbonate sheet shall be held in position by using stainless steel (SS304 grade) trapezoidal cleat of 1mm thick having aluminium bottom width 35 mm and top width 50mm or any other shape and size as per design requirement and manufacture specification, cleat fixed with 2 or more stainless steel screws of 5 mm diameter with 25 mm long with structural steel framework. The cleat shall be tested to withstand pull out force equal to wind speed of 50m/s as per IS:875 and design test report shall be submitted to Engineer-in-charge for approval before use. The cost of ridge and gutters of pre-coated galvanized iron sheet of approved specifications and structural steel framework of shall be paid on respective item for separately. Note:- The fixing arrangement using cleat shall be designed separately for coastal areas for cyclonic wind speed.				
9.10.1	16 mm thick, 1000(± 10%) wide panel with U value not more than 2.10 W/m ² K and weight not less than 2.75 kg/sqm	120.00	Sqm	3678.65	441438.00
SECTION 10:-FINISHING WORK					
10.1	12 mm cement plaster of mix :				
10.1.1	1:6 (1 cement: 6 coarse sand)	4341.00	Sqm	343.65	1491785.00
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)	4638.00	Sqm	395.35	1833633.00
10.3	12 mm cement plaster finished with a floating coat of neat cement of mix :				
10.3.1	1:3 (1 cement: 3 fine sand).	170.00	Sqm	439.25	74673.00
10.4	6 mm cement plaster of mix :				
10.4.1	1:3 (1 cement : 3 fine sand)	9139.00	Sqm	300.45	2745813.00
10.5	Extra for providing and mixing water proofing material in cement plaster work in proportion recommended by the manufacturers:	39.00	per bag of 50kg cement used in the mix	22.10	862.00

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10.6	Extra for plastering exterior walls of height more than 10 m from ground level for every additional height of 3 m or part thereof.	2240.00	Sqm	87.10	195104.00
10.7	White washing with lime to give an even shade:				
10.7.1	New work (three or more coats)	6032.63	Sqm	39.05	235574.00
10.8	Finishing walls with textured exterior paint of required shade :				
10.8.1	New work (Two or more coats applied @ 3.28 Itr/10 sqm) over and including priming coat of exterior primer applied @ 2.20kg/10 sqm	1288.00	Sqm	223.60	287997.00
10.9	Finishing walls with Premium Acrylic Smooth exterior paint with Silicone additives of required shade:				
10.9.1	New work (Two or more coats applied @ 1.43 Itr/10 sqm over and including priming coat of exterior primer applied @ 0.90 litre/10 sqm)	455.00	Sqm	171.10	77851.00
10.10	Painting with synthetic enamel paint of approved brand and manufacture to give an even shade :				
10.10.1	Two or more coats on new work over an under coat of suitable shade with ordinary paint of approved brand and manufacture	968.00	Sqm	226.25	219010.00
10.11	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.	18118.00	Sqm	156.05	2827314.00
10.12	Wall painting with acrylic emulsion paint, 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.				
10.12.1	Two coats	8682.00	Sqm	137.45	1193341.00
10.13	Applying priming coats with primer of approved brand and manufacture, having low VOC (Volatile Organic Compound) content.				
10.13.1	With water thinnable cement primer on wall surface having VOC content less	9276.00	Sqm	73.95	685960.00

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	than 50 grams/litre				
SECTION 11:-ROAD WORK					
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 earth with lead upto 50 metres.	960.00	Sqm	218.90	210144.00
11.2	Providing and applying 2.5 mm thick road marking strips (retro- reflective) of specified shade/ colour using hot thermoplastic material by fully/ semi automatic thermoplastic paint applicator machine fitted with profile shoe, glass beads dispenser, propane tank heater and profile shoe heater, driven by experienced operator on road surface including cost of material, labour, T&P, cleaning the road surface of all dirt, seals, oil, grease and foreign material etc. complete as per direction of Engineer-in-charge and accordance with applicable specifications.	48.00	Sqm	747.80	35894.00
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).	20.00	Cum	10117.60	202352.00
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	144.00	Cum	9823.80	1414627.00

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	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).				
11.5	Providing and laying tactile tile (for vision persons as per standards) of size 300x300x9.8 mm 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 20 mm 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 of Engineer-in-Charge.	50.00	Sqm	2017.60	100880.00
11.6	Providing and laying factory made chamfered edge Cement Concrete paver blocks in footpath, parks, lawns, drive ways or light traffic parking etc, of required strength, thickness & size/ shape, made by table vibratory method using PU mould, laid in required colour & pattern over 50mm thick compacted bed of sand, compacting and proper embedding/laying of inter locking paver blocks into the sand bedding layer through vibratory compaction by using plate vibrator, filling the joints with sand and cutting of paver blocks as per required size and pattern, finishing and sweeping extra sand. complete all as per direction of Engineer-in-Charge.				
11.6.1	60mm thick cement concrete paver block of M-35 grade with approved colour, design & pattern.	240.00	Sqm	1045.65	250956.00
SECTION 12:-SANITARY INSTALLATIONS					
12.1	Providing & fixing Stainless Steel A ISI 304 (18/8) kitchen sink as per IS:13983 with C.I. brackets & stainless steel plug 40 mm including painting of fittings &				

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	brackets, cutting & making good the walls wherever required :				
12.1.1	Kitchen sink without drain board				
12.1.1.1	610x510mm bowl depth 200 mm	5.00	Each	4940.80	24704.00
12.2	Providing and fixing CP Brass 32 mm size Bottle Trap of approved quality & make and as per the direction of Engineer-in-charge.	77.00	Each	1034.80	79680.00
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	Flexible pipe				
12.3.1.1	32 mm dia	5.00	Each	119.55	598.00
12.4	Providing and fixing soil, waste and vent pipes :				
12.4.1	100 mm dia				
12.4.1.1	Hubless centrifugally cast (spun) iron pipes epoxy coated inside & outside IS:15905	357.00	Metre	1169.30	417440.00
12.5	75 mm diameter :				
12.5.1	Hubless centrifugally cast (spun) iron pipes epoxy coated inside & outside IS:15905	42.00	Metre	964.25	40499.00
12.6	Providing and fixing bend of required degree with access door, insertion rubber washer 3 mm thick, bolts and nuts complete.				
12.6.1	100 mm dia				
12.6.1.1	Hubless centrifugally cast (spun) iron epoxy coated inside & outside as per IS:15905	21.00	Each	567.20	11911.00
12.7	75 mm dia				
12.7.1	Hubless centrifugally cast (spun) iron epoxy coated inside & outside as per IS:15905	21.00	Each	418.95	8798.00
12.8	Providing and fixing plain bend of required degree.				
12.8.1	100 mm dia				
12.8.1.1	Hubless centrifugally cast (spun) iron pipes epoxy coated inside & outside IS:15905	84.00	Each	368.00	30912.00
12.9	75 mm dia				
12.9.1	Hubless centrifugally cast (spun) iron pipes epoxy coated inside & outside IS:15905	21.00	Each	252.50	5303.00

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12.10	Providing and fixing single equal plain junction of required degree :				
12.10.1	100x100x100 mm				
12.10.1.1	Hubless centrifugally cast (spun) iron epoxy coated inside & outside as per IS:15905	21.00	Each	581.45	12210.00
12.11	Providing and fixing single unequal plain junction of required degree :				
12.11.1	100x100x75 mm				
12.11.1.1	Hubless centrifugally cast (spun) iron epoxy coated inside & outside as per IS:15905	21.00	Each	551.55	11583.00
12.12	Providing and fixing terminal guard :				
12.12.1	100 mm				
12.12.1.1	Hubless centrifugally cast (spun) iron epoxy coated inside & outside as per IS:15905	10.00	Each	427.80	4278.00
12.13	Providing and fixing shielded coupling for Hubless centrifugally cast iron pipe				
12.13.1	100 mm dia				
12.13.1.1	SS 304 grade coupling with EPDM rubber gasket	432.00	Each	389.05	168070.00
12.14	75 mm dia				
12.14.1	SS 304 grade coupling with EPDM rubber gasket	21.00	Each	389.05	8170.00
12.15	Providing and fixing M.S. stays and clamps for sand cast iron/ centrifugally cast (spun) iron pipes of diameter :				
12.15.1	100 mm	150.00	Each	139.70	20955.00
12.16	Providing and fixing trap of self cleansing design with screwed down or hinged grating with or without vent arm complete, including cost of cutting and making good the walls and floors :				
12.16.1	100 mm inlet and 100 mm outlet				
12.16.1.1	Hubless centrifugally cast (spun) iron epoxy coated inside & outside as per IS:15905	42.00	Each	854.55	35891.00
12.17	Providing and fixing M.S. holder bat clamp of approved design to sand cast iron/ cast iron (spun) pipes comprising of M.S. flat brackets made of 50x5 mm flat of specified shape, projecting 75 mm outside the wall surface and fixed on wall with 4nos, 6mm dia expansion				

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	hold fasteners, including drilling necessary holes in brick wall/ CC/RCC surface and the cost of bolts etc. The pipes shall be fixed to the already fixed brackets with the help of 30 mm x 1.6 mm galvanized M.S. flats of specified shape and of total length 420 mm and shall be fixed with M.S. nuts, bolts, & washers of size 25x6 mm, one bolt on each side of the pipe.				
12.17.1	Total bracket length 580 mm of approved shape and design (for single 100 mm dia pipe)	150.00	Each	304.05	45608.00
12.17.2	Total bracket length 810 mm of approved shape and design (for two 100 mm dia pipes)	120.00	Each	378.10	45372.00
12.17.3	Total bracket length 1040 mm of approved shape and design (for three 100 mm dia pipes)	70.00	Each	451.90	31633.00
SECTION 13:- WATER SUPPLY					
13.1	Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold water supply and all CPVC plain & brass threaded fittings, including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step CPVC solvent cement and testing of joints complete as per direction of Engineer in Charge. Internal work - Exposed on wall.				
13.1.1	40 mm nominal dia Pipes	168.00	Metre	702.95	118096.00
13.1.2	50 mm nominal dia Pipes	58.00	Metre	934.15	54181.00
13.2	Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold water supply, including all CPVC plain & brass threaded fittings and fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step CPVC solvent cement and the cost of cutting chases and making good the same including testing of joints complete as per direction of Engineer in Charge. Concealed work, including cutting chases and making good the walls etc.				
13.2.1	20 mm nominal dia Pipes	1140.00	Metre	537.60	612864.00

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13.2.2	25 mm nominal dia Pipes	191.00	Metre	627.25	119805.00
13.2.3	32 mm nominal dia Pipes	192.00	Metre	739.30	141946.00
13.3	Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold water supply including all CPVC plain & brass threaded fittings This includes jointing of pipes & fittings with one step CPVC solvent cement, trenching, refilling & testing of joints complete as per direction of Engineer in Charge. External work				
13.3.1	65 mm nominal dia Pipes	50.00	Metre	1674.40	83720.00
13.4	Providing and fixing G.I. pipes complete with G.I. fittings including trenching and refilling etc. External work				
13.4.1	50 mm dia nominal bore	200.00	Metre	762.15	152430.00
13.5	Making connection of G.I. distribution branch with G.I. main of following sizes by providing and fixing tee, including cutting and threading the pipe etc. complete :				
13.5.1	50 to 80 mm nominal bore	1.00	Each	1785.35	1785.00
13.6	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :				
13.6.1	50 mm nominal bore	1.00	Each	1026.65	1027.00
13.7	Providing and fixing uplasticised PVC connection pipe with brass unions :				
13.7.1	45 cm length				
13.7.2	15 mm nominal bore	102.00	Each	97.75	9971.00
13.8	Constructing masonry Chamber 90x90x100 cm inside, in brick work in cement mortar 1:4 (1 cement : 4 coarse sand) for sluice valve, with C.I. surface box 100 mm top diameter, 160 mm bottom diameter and 180 mm deep (inside) with chained lid and RCC top slab 1:1.5:3 mix (1 cement : 1.5 coarse sand : 3 graded stone aggregate 20mm nominal size), i/c necessary excavation, foundation concrete 1:5:10 (1 cement : 5 fine sand : 10 graded stone aggregate 40 mm nominal size) and inside plastering with cement mortar 1:3 (1 cement : 3 coarse sand) 12 mm thick, finished with				

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	a floating coat of neat cement complete as per standard design :				
13.8.1	With common burnt clay F.P.S.(non modular) bricks of class designation 7.5	1.00	Each	18896.70	18897.00
13.9	Painting G.I. pipes and fittings with two coats of anti-corrosive bitumastic paint of approved quality :				
13.9.1	50 mm diameter pipe	200.00	Metre	30.50	6100.00
13.10	Providing and filling sand of grading zone V or coarser grade, all round the G.I. pipes in external work :				
13.10.1	50 mm diameter pipe	200.00	Metre	173.25	34650.00
13.11	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.	35.00	Each	452.00	15820.00
13.12	Providing & fixing C.P. bass angle valve for basin mixer & geyser points of approved quality conforming to IS:8931				
13.12.1	a) 15 mm nominal bore. With 15 mm nominal bore	77.00	Each	574.30	44221.00
SECTION 14:- SEWAGE DISPOSAL					
14.1	Providing, laying and jointing glazed stoneware pipes class SP-1 with stiff mixture of cement mortar in the proportion of 1:1 (1 cement : 1 fine sand) including testing of joints etc. complete :				
14.1.1	100 mm diameter	30.00	Metre	443.60	13308.00
14.1.2	150 mm diameter	30.00	Metre	695.80	20874.00
14.2	Providing and laying cement concrete 1:5:10 (1 cement : 5 coarse sand : 10 graded stone aggregate 40 mm nominal size) all-round S.W. pipes including bed concrete as per standard design:				
14.2.1	100 mm diameter S.W. pipe	30.00	Metre	964.75	28943.00
14.3	Providing and laying cement concrete 1:5:10 (1 cement : 5 coarse sand : 10 graded stone aggregate 40 mm nominal size) all-round S.W. pipes including bed concrete as per standard design:				

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14.3.1	150 mm diameter S.W. pipe	30.00	Metre	1179.85	35396.00
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	80.00	Metre	899.80	71984.00
14.4.2	300 mm dia. R.C.C. pipe	40.00	Metre	994.30	39772.00
14.5.	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:				
14.5.1	150 x 100 mm size P type				
14.5.1.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	10.00	Each	2734.20	27342.00
14.6.	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 :				
14.6.1	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) :				
14.6.1.1	With common burnt clay F.P.S.(non modular) bricks of class designation 7.5	8.00	Each	12770.55	102164.00
14.7.	Extra for depth for manholes:				
14.7.1	Size 90x80 cm				

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14.7.1.1	With common burnt clay F.P.S.(non modular) bricks of class designation 7.5	8.00	Meter	8825.40	70603.00
14.8	Providing orange colour safety foot rest of minimum 6 mm thick plastic encapsulated as per IS : 10910, on 12 mm dia steel bar conforming to IS: 1786, having minimum cross section as 23 mmx25 mm and over all minimum length 263 mm and width as 165 mm with minimum 112 mm space between protruded legs having 2 mm tread on top surface by ribbing or chequering besides necessary and adequate anchoring projections on tail length on 138 mm as per standard drawing and suitable to with stand the bend test and chemical resistance test as per specifications and having manufacture's permanent identification mark to be visible even after fixing, including fixing in manholes with 30x20x15 cm cement concrete block 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size) complete as per design.	120.00	Each	553.70	66444.00
14.8.1	Providing and fixing in position pre-cast R.C.C. manhole cover and frame of required shape and approved quality				
18.1.1	EHD - 35				
14.8.1.1	Circular shape 560 mm internal dia	8.00	Each	2123.80	16990.00
14.9.	Making connection of drain or sewer line with existing manhole including breaking into and making good the walls, floors with cement concrete 1:2:4 mix (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) cement plastered on both sides with cement mortar 1:3 (1 cement : 3 coarse sand), finished with a floating coat of neat cement and making necessary channels for the drain etc. complete :				
14.9.1	For pipes 250 to 300 mm diameter	4.00	Each	922.40	3690.00
14.10	Constructing brick masonry road gully chamber 50x45x60 cm with bricks in cement mortar 1:4 (1 cement : 4 coarse sand) including 500x450 mm pre-cast R.C.C. horizontal grating with frame				

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	complete as per standard design :				
14.10.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	4.00	Each	5957.90	23832.00
14.11.	Constructing brick masonry road gully chamber 110x50x77.5 cm with bricks in cement mortar 1:4 (1 cement : 4 coarse sand) including 500x450 mm precast R.C.C. horizontal grating with frame and vertical grating complete as per standard design :				
14.11.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	4.00	Each	11520.55	46082.00
SECTION 15:-ALUMINUM WORK					
15.1	Providing and fixing aluminium work for doors, windows, ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS: 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminium snap beading for glazing I paneling, C.P. brass / stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge. (Glazing, paneling and dash fasteners to be paid for separately) :				
15.1.1	For fixed portion				
15.1.1.1	Powder coated aluminium (minimum thickness of powder coating 50 micron)	168.00	Kg	530.90	89191.00
15.2.	For shutters of doors, windows & ventilators including providing and fixing hinges/ pivots and making provision for fixing of fittings wherever required including the cost of EPDM rubber / neoprene gasket required (Fittings shall be paid for separately)				
15.2.1	Powder coated aluminium (minimum thickness of powder coating 50 micron)	168.00	Kg	634.45	106588.00

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15.3	Providing and fixing glazing in aluminium door, window, ventilator shutters and partitions etc. with EPDM rubber / neoprene gasket etc. complete as per the architectural drawings and the directions of engineer-in-charge . (Cost of aluminium snap beading shall be paid in basic item):				
15.3.1	With float glass panes of 5 mm thickness (weight not less than 12.50 kg/sqm)	169.00	Sqm	1505.25	254387.00
15.4.	Providing and fixing double action hydraulic floor spring of approved brand and manufacture conforming to IS : 6315, having brand logo embossed on the body / plate with double spring mechanism and door weight upto 125 kg, for doors, including cost of cutting floors, embedding in floors as required and making good the same matching to the existing floor finishing and cover plates with brass pivot and single piece M.S. sheet outer box with slide plate etc. complete as per the direction of Engineer-in-charge.				
15.4.1	With brass cover plate minimum 1.25 mm thickness	144.00	Each	2966.10	427118.00
SECTION 16 :-WATER PROOFING WORK					
16.1.	Providing and laying water proofing treatment to vertical and horizontal surfaces of depressed portions of W.C., kitchen and the like consisting of: (i) Ist course of applying cement slurry @ 4.4 kg/sqm mixed with water proofing compound conforming to IS 2645 in recommended proportions including rounding off junction of vertical and horizontal surface. (ii) IInd course of 20 mm cement plaster 1:3 (1 cement : 3 coarse sand) mixed with water proofing compound in recommended proportion including rounding off junction of vertical and horizontal surface. (iii) IIIrd course of applying blown or residual bitumen applied hot at 1.7 kg. per sqm of area. (iv) IVth course of 400 micron thick PVC sheet. (Overlaps at joints of PVC sheet should be 100 mm wide and	601.00	Sqm	769.60	462530.00

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	pasted to each other with bitumen @ 1.7 kg/sqm).				
16.2.	Providing and laying integral cement based water proofing treatment including preparation of surface as required for treatment of roofs, balconies, terraces etc consisting of following operations: (a) Applying a slurry coat of neat cement using 2.75 kg/sqm of cement admixed with water proofing compound conforming to IS. 2645 and approved by Engineer-in-charge over the RCC slab including adjoining walls upto 300 mm height including cleaning the surface before treatment. (b) Laying brick bats with mortar using broken bricks/brick bats 25 mm to 115 mm size with 50% of cement mortar 1:5 (1 cement : 5 coarse sand) admixed with water proofing compound conforming to IS : 2645 and approved by Engineer- in-charge over 20 mm thick layer of cement mortar of mix 1:5 (1 cement :5 coarse sand) admixed with water proofing compound conforming to IS : 2645 and approved by Engineer- in-charge to required slope and treating similarly the adjoining walls upto 300 mm height including rounding of junctions of walls and slabs.				
	(c) After two days of proper curing applying a second coat of cement slurry using 2.75 kg/ sqm of cement admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge. (d) Finishing the surface with 20 mm thick joint less cement mortar of mix 1:4 (1 cement :4 coarse sand) admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge including laying glass fibre cloth of approved quality in top layer of plaster and finally finishing the surface with trowel with neat cement slurry and making pattern of 300x300 mm square 3 mm deep. (e) The whole terrace so finished shall be flooded with water for				

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	a minimum period of two weeks for curing and for final test. "All above operations to be done in order and as directed and specified by the Engineer-in-Charge :				
16.2.1	With average thickness of 120 mm and minimum thickness at khurra as 65 mm.	1356.00	Sqm	1684.60	2284318.00
SECTION 17 :- Structural Glazing Aluminium Composite Panel					
17.1.	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.	6059.00	Kg	414.30	2510244.00
17.2.	Designing, fabricating, testing, protection, installing and fixing in position semi (grid) unitized system of structural glazing (with open joints) for linear as well as curvilinear portions of the building for all heights and all levels, including: (a) Structural analysis & design and preparation of shop drawings for the specified design loads conforming to IS 875 part III (the system must passed the proof test at 1.5 times design wind pressure without any failure), including functional design of the aluminum sections for fixing glazing panels of various thicknesses, aluminium cleats, sleeves and splice plates etc. gaskets, screws, toggles, nuts, bolts, clamps etc., structural and weather silicone sealants, flashings, fire stop (barrier)-cum-smoke seals, microwave cured EPDM gaskets for water tightness, pressure equalisation & drainage and protection against fire				

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	hazard including:				
	(b) Fabricating and supplying serrated M.S. hot dip galvanised /Aluminium alloy of 6005 T5 brackets of required sizes, sections and profiles etc. to accommodate 3 Dimensional movement for achieving perfect verticality and fixing structural glazing system rigidly to the RCC/ masonry/structural steel frame work 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.				
	(c) Providing and filling, two part pump filled, structural silicon 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. (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 water tight. (e) Making provision for drainage of moisture/ water that enters the curtain glazing system to make it watertight, by incorporating principles of pressure equalization, providing suitable gutter profiles at bottom (if required), making necessary holes of required sizes and of required numbers etc. complete.				
	This item includes cost of all inputs of designing, labour for fabricating and installation of aluminium grid, installation of glazed units, T&P, scaffolding and other incidental charges				

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	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 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. 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. 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),				

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	Department of Science & Technologies, India. Cost of testing is payable separately. The NIT approving authority will decide the necessity of testing on the basis of cost of the work, cost of the test and importance of the work. 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 ISO/IEC 17011 and accredits labs as per ISO/IEC 17025				
	1. Performance Laboratory Test for Air Leakage Test (-50pato - 300pa) & (+50pa to +300pa) as per ASTM E-283-04testing method for a range of testing limit 1 to 200 mVhr 2. Static Water Penetration Test. (50pa to 1500pa) as per ASTM E- 331-09 testing method for a range up to2000 ml .3. Dynamic Water Penetration (50pa to 1500pa) as per AAMA 501.01- 05 testing method for a range upto2000 ml 4. Structural Performance Deflection and deformation bys tatic 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 5. Seismic Movement Test (upto 30 mm) as per AAMA501.4-09 testing method for Qualitative test, Tests to be conducted on site.6. Onsite Test for Water Leakage for a pressure range 50kpa to 240 kpa (35psi) upto 2000 ml	642.00	Sqm	3510.50	2253741.00
17.3.	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 # 2of approved colour and shade, an inner Heat strengthnhned clear float glass 6mm thick, spacer tube 12mm wide, dessicants, including primary seal and secondary seal (structural silicone	642.00	Sqm	3718.70	2387405.00

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	sealant) etc. all complete for the required performances, as per the Architectural drawings, as per the approved shop drawings, as specified and as directed by the Engineer-in-Charge. The IGUs shall be assembled in the factory/ workshop of the glass processor.(Payment for fixing of IGU Panels in the curtain glazing is included in cost of item No.25.2)For payment, only the actual area of glass on face # 1 of the glass panels (excluding the areas of the grooves and weather silicone sealant) provided and fixed in position, shall be measured in sqm.				
	(i) Coloured tinted float glass 6mm thick substrate with reflective soft coating on face # 2, + 12mm Airgap + 6mm Heat Strengthened clear Glass of approved make having properties as visible Light transmittance (VLT) of 25 to 35 %, Light reflection internal 10 to 15%, light reflection external 10 to 20%, shading coefficient (0.25- 0.28) and U value of 3.0 to 3.3 W/m2 degree K etc. The properties of performance glass shall be decided by technical sanctioning authority as per the site requirement.				
17.4.	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.	65.00	Sqm	3671.50	238648.00
SECTION 18 :- NEW TECHNOLOGIES					
18.1	Providing an fixing factory made single extruded WPC (Wood Polymer Composite) solid wood/ window/ clerestory window frames/ chowkhat				

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	comprising of virgin PVC polymer of K value 58- 60 (Suspension Grade), calcium carbonate and natural fibers (wood powder/ rice husk/ wheat husk) and nontoxic additives (maximum toxicity index of 12 for 100gms) fabricated with miter joints after applying PVC solvent cement and screwed with full body threaded star headed SS screws having minimum frame density of 750kg/cum, screw withdrawal strength of 2200N (face) & 1100N (edge), minimum compressive strength of 58N/mm² and modulus of elasticity 900N/mm² and resistance of spread of flame of class A category with property of being termite/ borer proof, water /moisture proof and fire retardant and fixed in position with M.S. hold fast/ lugs/ SS dash fasteners of required dia and length complete as per direction of Engineer in Charge, (M.S. hold fast/lugs or SS dash fasteners shall be paid for separately). Note: For WPC (Wood Polymer Composite) solid wood/ window frames minus 5mm tolerance to dimensions i.e. depth and width of profile shall be acceptable. Variation in profile dimensions on plus side shall be acceptable but no extra payment on this account shall be made.				
18.1.1	Frame size 65 x 150 mm	140.00	Metre	1637.65	229271.00
18.2	Providing and fixing factory made single extruded WPC (Wood Polymer Composite) solid decorative type flush door shutter of required size comprising of virgin polymer of K value 58-60 (Suspension Grade), calcium carbonate and natural fibers (wood powder/ rice husk/wheat husk) and non toxic additives (maximum toxicity index of 12 for 100 gms) having minimum density of 650 kg/cum and screw withdrawal strength of 1800 N (Face) & 900 N (Edge), minimum compressive strength 50 N/ mm², modulus of elasticity 850 N/mm² and resistance to				

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	spread of flame of Class A category with property of being termite/ borer proof, water/moisture proof and fire retardant. WPC to be laminated with PVC foil of minimum 14 microns thick of approved design pasted with hot melt adhesive on both faces of shutter and fixing with stainless steel butt hinges of required size with necessary full body threaded star headed counter sunk S.S screws, all as per direction of Engineer-In- Charge. (Note: stainless steel butt hinges and necessary S.S screws shall be paid separately)				
18.2.1	30 mm thick	53.00	Sqm	4764.20	252503.00
18.3	Providing and fixing of facade at all heights with extruded hollow Clay / Terracotta ventilated rain screen tiles of height 250/ 300/ 400 mm and length of 595 mm of approved texture, design and pattern having Flexural Strength/ Modulus of Rupture of 2 14 N/mm and maximum water absorption of 10% tested as per ISO 10545-4:2004(E) and ISO 10545-3:1995 respectively in true level fixed to a supporting aluminium framework (Alloy 6063 T5/T6) consisting of vertical 'T' (for intermediates) 'L' (for ends/ termination)/ Tubular sections (at corners) of size 80x60x2 mm/ 40x60x2 mm / 40x40x2 mm respectively, spaced at maximum spacing of 600 mm c/c matching to the tile vertical grid, and horizontal aluminium 'C'-clamps of size 56x25x2 mm thickness of length 150 mm at junction of tiles and of length 75 mm at wall ends/ corners fixed on top of the vertical sections at spacing of 250/ 300/ 400 mm c/c matching to the tile horizontal grid with two numbers of self-drilling / self-tapping SS screws of size 5.5x25 mm with EPDM washers. The vertical 'T'/L/ Tubular' sections shall be fixed to the wall using HDG (hot-dip-galvanized) steel L-brackets (galvanizing thickness of minimum 80 microns) of size 110x80x6 mm at				

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	intermediate vertical aluminium profiles and of size 220x110x12 mm at outer corners and stainless steel grade 304, M10 full threaded anchor fasteners with nylon sleeve 100 mm long (for brick work) and M8 expansion anchor fasteners 75 mm long for concrete surface, spacing of brackets to be based on a structural/ static calculation. The brackets shall be of length 175 mm at junction of two vertical aluminium profiles and of length 100 mm at intermediate points of vertical profiles and shall be fixed to the vertical aluminium T / L / Tubular profiles using two numbers self-drilling/ self-tapping SS screws of size 5.5x25 mm with EPDM washers. EPDM gaskets to be fixed in between brackets and vertical profiles. The tiles shall be mounted on the 'C' clamps such that the tiles are supported at top and bottom at both ends. The tiles shall be additionally secured to the horizontal 'C' clamps using special SS clips of required size which shall be inserted and pressed into position on the 'C' clamps holding the tiles and the cut-tiles shall be glued at points to the horizontal 'C' clamps by using MS Polymer sealant adhesive. The vertical joint open groove between two adjacent tiles shall be 5 mm. The tiles and system shall be designed to resist wind load as per IS 875 (Part 3) according to different zones. The tiles shall be installed using the ventilated rain screen principle with provision for natural ventilation of the space between the facade tiles and the structural wall. The work shall be carried out as per specification, drawing and as per direction of the Engineer-in-Charge. Note: Scaffolding wherever required to be paid separately 26.921 With 16 mm thickness (+/- 10%) terracotta				
18.3.1	With 16 mm thickness (+/- 10%) terracotta tiles of other than grey colors	418.00	Sqm	5991.40	2504405.00

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		Total	(A)	237574797.00	
	Modified Estimated Cost after using correction factor on DSR 2023 on account of GST @ 0.973 on (A)		(B)	231160277.00	
	Cost Index @ 5% on (B)			11558014.00	
			Total	242718291.00	
SECTION 19 :- NON SCHEDULE ITEMS					
19.1	Providing and fixing [wall hung WC, hinges and accessories set of size 370x490x365mm of Jaquar (Cat. No.ITS-WHT-6953NBIPP) with UF Soft close slim seat cover, hinges, accessories set concealed cistern for wall hung WC of Jaquar (Cat no. JCS-WHT-2400S) with control plate of Jaquar (Cat no.JCP-CHR-2415)] or equivalent premium model of Grohe, Kholer, Hindware limited (queo) etc. as per preferred make list. Including all fittings and fixtures, nuts, bolts and gasket etc including making connection with the existing P/S trap, complete in all respect as per directions of Engineer-in-Charge.	52.00	Each	37699.20	1960358.00
19.2	Providing and fixing Health faucet with 8mm dia , 1m long flexible tube and wall hook make Jaquar Cat-No.(ALDCHR-573) or equivalent premium model of Grohe, Kholer, Hindware limited (queo) etc. as per preferred make list. complete as per direction of Engineer-in-Charge.	52.00	Each	1247.20	64854.00
19.3	Providing & fixing [white vitreous china flat back Urinal(Jaguar Model No URS-WHT-13253N) with Urinal Flush Valve (PRS-073)] or equivalent premium model of Grohe, Kholer, Hindware limited (queo) etc. as per preferred make list. and all necessary fittings, all complete as required by direction of Engineer-in-Charge.	23.00	Each	10640.35	244728.00
19.4	Providing and fixing laminated/frosted toughened glass urinal partitions of H: 900 W: 450 .(JSE-CHR-810US450X) or equivalent premium model of Grohe, Kholer, Hindware limited (queo) etc. as per preferred make list. all complete as per direction of Engineer-in-charge.	17.00	Sqm	4839.10	82265.00

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19.5	Providing and fixing [Vitreous china table top wash basin (Jaquar make Cat No.JDS-WHT-25907N) or equivalent of size 530x420x140 mm with C.P. brass Waste coupling (Jaquar make Cat No.ALD-705) 32mm Size] or equivalent premium model of Grohe, Kholer, Hindware limited (queo) etc. as per preferred make list. including, making hole top of platform or wherever required all complete as per direction of Engineer-in-charge.	77.00	Each	8483.60	653237.00
19.6	Providing and fixing Single Lever Wash basin mixer without Popup waste with 450mm long Braided hoses, cartridge sleeve, wall flange nipple & spout (Make-Jaquar Cat No- OPP-15011BPM) or equivalent premium model of Grohe, Kholer, Hindware limited (queo) etc. as per preferred make list. all complete as per direction of Engineer-in-charge. .	77.00	Each	4200.30	323423.00
19.7	Providing & fixing Soap dispenser with glass bottle (Make-Jaquar Cat No. AKPCHR 35735P) or equivalent premium model of Grohe, Kholer, Hindware limited (queo) etc. as per preferred make list. with all necessary fittings as per direction Engineer-in-charge.	77.00	Each	1649.00	126973.00
19.8	Providing & fixing Soap dispenser with glass bottle (Make-Jaquar Cat No. AKPCHR 35735P) or equivalent premium model of Grohe, Kholer, Hindware limited (queo) etc. as per preferred make list. with all necessary fittings as per direction Engineer-in-charge.	17.00	Each	4428.60	75286.00
19.9	Providing and fixing Stainless Steel toilet paper holder of Jaquar make (Cat. No.ACN-1153S) or equivalent premium model of Grohe, Kholer, Hindware limited (queo) etc. as per preferred make list. in complete as per direction by Engineer-in-charge	52.00	Each	1416.60	73663.00

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19.10	Providing and fixing superior quality oval modern Glass capsule led mirror with touch sensor of ARC homes or equivalent of required shape and size with all necessary fittings as per direction of Engineer-in-Charge.	77.00	Sqm	5802.60	446800.00
19.11	Providing and fixing Angle valve with Flange for basin mixer and geyser points make Jaquar make (Cat. No. ALI-85053) or equivalent premium model of Grohe, Kholer, Hindware limited (queo) etc. as per preferred make list. all complete as per direction of Engineer-in-charge.	77.00	Each	1399.30	107746.00
19.12	Providing and fixing C.P. brass angle valve with Flange (Jaquar make Cat No. VGP-81053) or equivalent premium model of Grohe, Kholer, Hindware limited (queo) etc. as per preferred make list. standard & design all complete approved by Engineer-in-Charge. 15mm nominal bore	25.00	Each	1091.35	27284.00
19.13	Providing & fixing CP Corner glass shelf with CP brass bracket, screw and guard rail of make Jaquar Cat-No. ACN 1173 or equivalent premium model of Grohe, Kholer, Hindware limited (queo) etc. as per preferred make list. as per direction Engineer-in-charge.	17.00	Each	1857.50	31578.00
19.14	Providing and fixing Stainless Steel grating of approved quality and Make. Square type with collar & cockroach trap all complete as per direction of Engineer-in-charge. 125 mm diameter	75.00	Each	773.30	57998.00
19.15	Providing and fixing C.P. brass Wall Mounted Sink Mixer with Swivel Spout & Flanges (Make-Jaquar Cat No-ARI-39309) or equivalent premium model of Grohe, Kholer, Hindware limited (queo) etc. as per preferred make list. all complete as per direction of Engineer-in-charge.	5.00	Each	4596.20	22981.00
19.16	Providing and fixing CPVC Ball Valve in CPVC pipe and testing of joints complete as per direction of Engineer-in-charge.				
(a)	20 mm dia	10.00	Each	239.40	2394.00
(b)	25 mm dia	15.00	Each	389.90	5849.00

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(c)	32 mm dia	15.00	Each	601.05	9016.00
(d)	40 mm dia	10.00	Each	847.40	8474.00
19.17	Providing & fixing CP brass Hand Grip 600mm of Jaquar make WAC-SAP-BR0600CSN or equivalent or equivalent premium model of Grohe, Kholer, Hindware limited (queo) etc. as per preferred make list. all complete and as per direction of Engineer-in-charge.	4.00	Each	2721.20	10885.00
19.18	Providing & fixing CP brass Hinged Grab Rail of Jaquar make WAC-SAP-BG0800CSN or equivalent or equivalent premium model of Grohe, Kholer, Hindware limited (queo) etc. as per preferred make list. all complete and as per direction of Engineer-in-charge.	4.00	Each	8295.60	33182.00
19.19.	Providing and fixing 12mm thick clear toughened glass in doors, windows, ventilators, railing, partitions, frameless shower encloser etc. with beading/ EPDM rubber / neoprene gasket, stainless screws etc. complete as per direction of Engineer-in-charge.	11.00	Sqm	3656.55	40222.00
19.20.	Providing and fixing Stainless Steel Glass Door H-Type Handle of size 32mm outer dia , 3mm thick &450mm long of approved brand and manufacture, including providing and fixing and making necessary holes etc. for fixing required fittings, all complete as per direction of Engineer-in-charge.	6.00	Pair	1898.05	11388.00
19.21	Providing & fixing Stainless Steel glass door lock with strike box (OZONE) code OPL-4A/4B-N-S STD SSS, complete as per direction of Engineer in Charge.	3.00	Each	2731.95	8196.00
19.22	Providing and fixing frosted film as glazed portion and glazed doors complete as per directions of Engineer-in-Charge.	137.00	Sqm	746.80	102312.00

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19.23	Supply of 6mm Sintered Stone reinforced on the rear side with a 160 GSM Glass Fibre Mesh. The Sintered Stone panels have to be manufactured with a machine capacity of 44,000 tons, giving them high flexural strength of at least 62 N/mm ² and low porosity less than 0.08%. Glaze used in the Sintered Stone panels must comprise titanium dioxide which has super hydrophilic properties under exposure to UV, breaks down dirt, pollutants, and harmful microbes, and purifies the air by converting NOx and SOx into harmless polyatomic compounds. The Sintered Stone must comply with testing standards and was tested in accordance with European standards EN 13501-1:2018 for fire performance and has to meet A2-S1, d0 classification. The Sintered Stone has to be tested as per EN 438-2:2016 and subjected to a 1500-hour UV exposure test which needs to be conducted to evaluate the material's resistance to ultraviolet (UV) radiation, ensuring durability against potential degradation, fading, and discoloration over time. The tested Sintered Stone is to be evaluated for colour stability and it should attain a rating of at least 3 for the contrast, grey scale and 4 for appearance, rating in accordance with EN 438-6 to sustain extreme climatic conditions and frequent seasonal changes. The Sintered Stone must obtain a Class 5 rating in the Stain Test, as per IS 10545 (Part-14). Sintered Stone has to be subjected to the Salt Spray Test and must be conducted as per the guidelines of IS 9227:2022. The test shall be carried out for a duration of 960 hours using a solution made with 99.5% pure sodium chloride to match normal wear and tear conditions. Sintered Stone is manufactured using a standard production process in accordance with BIS Standard IS 15622:2017	985.00	Sqm	3026.30	2980906.00
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19.24	Providing and Fixing of Primary Structure includes Wind Load and Dead Load Brackets with T6063 grade & dimensions of 50×60×60×2.8mm and 50×60×120×2.8mm (or equivalent), needs to be fixed to the wall using 8×100 mm or 10×100 mm Anchor Fasteners. T6063 grade Aluminum L - 50×60×2.8 mm and T-74.5×60×2.8 mm profiles (or equivalent as approved by consultant) are to be mounted on these brackets using self-tapping screws. Secondary structure includes Male Clips (Sintered Stone Concealed Clip Male SSCM 2.3) (Sintered Stone Visible Clip Male SSVCM 2.3) and Female Clips (Sintered Stone Concealed Clip Female SSCCF83) (Sintered Stone Visible Clip Female SSVCF 2.3) along with the sintered stone panels, which are fixed on these clips with structural sealant Sika Sil 20 / Dow 995 with double-sided tape which is Superbond Spyder 996 (black)/Ultra M6 GY. These clips along with the panels are fixed onto the primary structure using self-tapping screws of approved make. Stiffeners & connectors may have to be used between the sintered stone and the profiles in all complete as per direction of Engineer-in-charge.	985.00	Sqm	3500.30	3447796.00
19.25	Providing and Fixing Fibre glass cloth to be fixed & firmly anchored to the Wall Surface for construction joints and chasing in brick work for electrical conduits or water supply pipes including cement slurry and pegs/nails as required before plastering etc. i/c Material, Labour, Tools, etc complete as per direction of Engineer-in-charge.	453.00	Sqm	73.10	33114.00
	FLOORING WORK				
19.26	Providing and laying full body vitrified tile in floor of minimum thickness 10 mm with water absorption less than 0.06% and conforming to IS:15622, of approved make, brand and manufacturer, laid on 20 mm thick base cement mortar 1:4 (1 cement: 4 coarse				

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	sand) jointing with grey cement slurry @3.30 kg / sqm including providing 3mm spacers and grouting the joints with white cement and matching pigments etc. The slab must be cut with the zero chipping diamond cutter only. Laying of slab will be done with the help of notch trowel, wedge, clips of required thickness, vacuum cups for lifting, leveling system and rubber mallet for placing the slab gently and easily. Note:-Tiles must have minimum 15% recycled content and must be from GRIHA product catalogue				
19.26.1	Size of Tile 600 x 1200 mm of all colours and shades.	1710.00	Sqm	1816.55	3106301.00
19.27	Providing and laying full body Vitrified tiles in minimum thickness 10 mm, with water absorption less than 0.08 % and conforming to I.S. 15622, of approved make, in all colours & shade, in skirting, 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.				
19.27.1	Size of Tile 600 x 1200 mm of all colours and shades.	82.00	Sqm	1893.65	155279.00
19.28	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, 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.				
19.28.1	Glazed Vitrified tiles Matt/Antiskid finish of size				
19.28.1.1	Size of Tile 600 x 1200 mm	1097.00	Sqm	1862.30	2042943.00

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19.29	Providing and laying Granite stone slabs 18 mm thick in risers of steps, skirting, dado and pillars laid on 12 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, including rubbing and polishing complete.				
19.29.1	Polish granite stone slab Jet Black, Cherry Red, Elite Brown, Cat Eye or equivalent.	306.00	Sqm	5399.20	1652155.00
19.30	Supplying and fixing Nylon Cut Pile Carpet Flooring of approved colour and shade, 8 mm thick and 800 GSM pile weight, conforming to manufacturer's specifications, laid over 4 mm thick expanded polyethylene (EPE/EPC) foam underlay, fixed with approved quality adhesive, including necessary trimming, cutting, jointing, finishing at edges, and all incidental charges complete, as directed by the Engineer-in-Charge. Make: Carpeteria / Acoustika / Devine / equivalent approved	624.00	Sqm	3337.75	2082756.00
19.31	Providing and laying Carpet Tile flooring of approved sample of desired size as per manufacturer specification and recommendation including an underlayer of 8mm thick polyfoam, adhesives, grippers and all necessary fixing arrangements etc. complete as per design and drawing. Technical Specifications: Material Composition: The carpet tiles shall be manufactured using 100% Solution Dyed Polyamide 6.6 (Nylon 6.6) fibers to ensure outstanding wear resistance, resiliency, and a good-as-new appearance over long-term commercial use. Tile Dimensions: 500mm x 500mm with high dimensional stability to prevent shrinkage or gapping. Pile Construction: Tufted Level Loop or Structured Loop pile to ensure high crystallinity, preventing dirt adherence and allowing effective vacuum cleaning. Pile Height:	129.00	Sqm	3660.05	472146.00

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	2.8mm to 3.2mm. Total Thickness: 6.5mm to 7.5mm (excluding 8mm polyfoam underlay). Pile Weight: minimum 550 g/m ² to 610 g/m ² . Wear Classification: Class 33 (Heavy Commercial Use) as per EN 1307. Backing System: Modified Bitumen (ProBase) or equivalent high-performance PVC-free backing (EcoWorx). Fire Performance: EN 13501-1 Class Bfl-s1 or DIN 4102 B1. Anti-Static Properties: permanently anti-static with electrostatic propensity of 2.0 kV as per EN 1815 all complete, as directed by the Engineer-in-Charge				
19.32	Providing and fixing laminated wooden flooring of PERGO/ACTION TESA or equivalent of approved shade and design of abrasion capacity AC-3 made up of 12 mm thick high density fiber board having even core density, laminated with European made impregnated décor paper dully faced with anti abrasion layer of Aluminum oxide impregnated tissue and balanced with impregnated base paper. The product shall have an isometric locking profile made form a 5 mm spindled profiling head. The locking profile shall be wax coated to prevent moisture/seepage and tropical zed with an anti-bacterial surface treatment. The flooring strips/tiles shall be 4 feet long and 8 inches wide fixed on an under day base of 2 mm thick layer of expended Polyethylene (EPE) foam having a density of 24 kg./cum. The foam shall be fixed after governing the exiting floor with 0.2 mm thick PE sheet of 130 GSM. The rate shall include the cost of fixing specified approved beading at wall & floor joints and 63x18 mm skirting with headless nails & adhesive etc. as required complete as per direction of Engineer-in-Charge.	348.00	Sqm	2223.70	773848.00

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19.33	Providing and fixing 10 mm thick laminated wooden skirting of approved colour, shade and texture, 60 mm high, manufactured from high-density fibre board (HDF)/medium-density fibre board (MDF) with decorative laminate finish on the exposed face and balancing laminate on the reverse, fixed to the wall with approved quality adhesive/ fasteners, including cutting, matching, mitring at corners, finishing, and all necessary fixtures and fittings complete, as per the manufacturer's specifications and as directed by the Engineer-in-Charge.	147.00	Meter	352.15	51766.00
19.34	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.				
19.34.1	Size of Tile 600x1200 mm	3439.00	Sqm	254.90	876601.00
19.35	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.				
19.35.1	Korean marble Stone				
19.35.1.1	Area of slab Under/over 0.50 sqm	93.00	Sqm	8010.40	744967.00
19.36	Providing and Fixing horizontal level suspended metal ceilings comprising of Metal works V-P 500 Hook-on baffle system manufactured by Knauf Ceiling Solutions or equivalent with Rectangular vertical baffle blades made of Aluminium (Grade AA 3xxx, H14 temper) in coated thickness of 0.7mm ±	758.00	Sqm	2439.50	1849141.00

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	0.08mm as per IS:2676 (1981), post coated to Global White colour, suitable for architectural finishes and Interior applications, with single grid system and suitable spacing between baffles. The baffle width shall be 50mm, height shall be 100mm, length shall be 3000mm. The on-center spacing of baffles shall be 150mm (clear space between baffles 100mm). The baffles shall have plain unperforated finish with square edge, hook-on edges with suitable upturns. The baffles shall be electro statically powder coated using RoHS compliant pure polyester powder to achieve coating thickness ranging from 60-80 microns. The powder coating shall pass Salt Spray Test for 750 Hours as per ASTM B117, QUV –A Test for 1000hours as per ASTM G-154 – (Cycle – 1) and Humidity test for 1000hours as per DIN 50017. The powder coating shall have an adhesion of GT0 as per EN ISO 2409. The shade variation across batches shall be delta E<1 using Excite/BYK Gardner instrument and gloss level of 25±5% at 60° as per ASTM D523. The grids shall comprise primary U-shaped slotted carrier bars of 120gsm galvanised steel (GI) of 3000mm L x 43mm H x 30mm W x 1.5mm T. Accessories shall include baffle connector (GI), baffle face cover (GI) – RAL shade, carrier bar splice (GI), carrier spring (SS), wall anchor (GI). all complete as per direction of Engineer-in-charge.				
19.37	Providing and fixing WPC (Wood Plastic Composite) decorative louvers false ceiling of size 2900x170x28 mm with Matching colour end profile of approved shade, size and profile over Aluminium Channel at a 300mm interval to wall with expansion screws with the spacing between two adjacent screws should be 500mm, accessories, cutting, finishing, scaffolding and all incidental works, complete as per	248.00	Sqm	3156.85	782899.00

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	drawings, manufacturer's specifications and the direction of the Engineer-in-Charge. Make:-Ventura or Equivalent (Frame to be paid separately)				
19.38	Providing and fixing solid teak wood open-cell ceiling comprising factory-fabricated open-cell panels of size 1200 × 1200 mm and/or 600 × 1200 mm, formed with 75 mm wide × 150 mm deep second-class teak wood sections, including principal rafters, secondary framing members, hangers, cleats, brackets, anchor fasteners, screws, and all necessary hardware complete. The work shall include providing and fixing 8 mm thick BWR grade commercial plywood backing wherever shown in the drawings, finished with approved decorative laminate of approved shade and texture, fixed with approved screws and adhesive complete.	81.00	Sqm	49258.05	3989902.00
19.39	Providing and fixing 10 mm thick plaster of Paris (gypsum anhydrous) and reinforced with rabbit wire mesh fixed to GI frame at all height including providing and fixing of frame work made of special sections, power pressed from M.S. sheets and galvanized with zinc coating of 120 gms/sqm (both side inclusive) as per IS : 277 and consisting of angle cleats of size 25 mm wide x 1.6 mm thick with flanges of 27 mm and 37mm, at 1200 mm centre to centre, one flange fixed to the ceiling with dash fastener 12.5 mm dia x 50mm long with 6mm dia bolts, other flange of cleat fixed to the angle hangers of 25x10x0.50 mm of required length with nuts & bolts of required size and other end of angle hanger fixed with intermediate G.I. channels 45x15x0.9 mm running at the spacing of 1200 mm centre to centre, to which the ceiling section 0.5 mm thick bottom wedge of 80 mm with tapered flanges of 26 mm each having lips of 10.5 mm, at 450 mm centre to centre, shall be fixed in a	2174.00	Sqm	1868.00	4061032.00

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	direction perpendicular to G.I. intermediate channel with connecting clips made out of 2.64 mm dia x 230 mm long G.I. wire at every junction, including fixing perimeter channels 0.5 mm thick 27 mm high having flanges of 20 mm and 30 mm long, the perimeter of ceiling fixed to wall/partition with the help of rawl plugs at 450 mm centre, with 25mm long dry wall screws @ 230 mm interval, including fixing of gypsum board to ceiling section and perimeter channel with the help of dry wall screws of size 3.5 x 25 mm at 230 mm c/c, including jointing and finishing to a flush finish of tapered and square edges of the board with recommended jointing compound, jointing tapes, finishing with jointing compound in 3 layers covering upto 150 mm on both sides of joint and two coats of primer suitable for board, all as per manufacturer's specification and also including the cost of making openings for light fittings, grills, diffusers, cutouts made with frame of perimeter channels suitably fixed, all complete as per drawings, specification and direction of the Engineer in Charge. (But excluding the cost of painting)				
19.40	Providing and fixing stainless steel sliding door bolts of approved make (SS 304 grade), with satin/matt finish, including necessary stainless steel screws, nuts, etc., complete, and as per the direction of Engineer-in-charge.				
(a)	250x16 mm	119.00	Each	680.20	80944.00
(b)	200x12 mm	119.00	Each	464.34	55256.00
19.41	Providing & fixing Toilet Cubicle (of following standard dimension which includes 600 mm door size width) made of heat, bacteria, water, chemical, scratch, impact and anti bacterial resistant 12mm thick solid compact laminate panels tested by NABL LAB. Finish of the compact laminate should be Shade, which includes doors, pilasters & intermediate panels finished				

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	with approved texture/shade as per the detail drawings & as per IS 2046 (Indian Standard) and as per fire retardant BS-476/97 standard. The product should have Green Guard Certificate. This also includes providing and fixing in position necessary hardware made out of Stainless steel (Grade 304) as per manufacturer's specifications & Architects instructions like (1) Door Knob, (2) Gravity Hinges, (3) Thumb turn lockset with Occupancy indicators, (4) Coat hooks with Door stopper (5) U-Channels, (6) Adjustable Legs/ pedestal (Grade 304). (7) Top rail with Corner Connector (8) Rubber noise deafening tape, (9) Screws & wall Plugs.				
19.41.1	The top fitting should consist of SS round top rail which will get fixed with pilasters, with SS panel tube holder, SS corner bend (connected with top rail) will be used on the corner of cubicle in absence of brick wall, SS wall fixing is used only on the wall which will hold the ss top rail. All screws will be of 304 Grade in stainless steel with satin finish. All pilasters are supported by stainless steel Bottom Cladding. The base of the stainless steel bottom cladding will be anchored to the floor with a clearance height upto 150 mm. Toilet Cubicle with standard dimension of 2065mm Height x 1000 mm Width x 1550mm Depth, which includes 600mm door size width). Toilet Cubicle I-Shape (Front Partition) with standard dimension of 2065mm Height x 1000mm Width which includes 600mm door size width) all complete as per the direction of Engineer-in-charge.	48.00	Each	38218.13	1834470.00

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19.42	Providing, hoisting and fixing in position ISI marked hot compression moulded S.M.C (sheet moulding compound) panel tank having required partition of Sintex, Sovisy India or substantially equivalent make of required size on steel staging (which shall be paid separately). The tank shall have manhole of minimum 600mm dia with lockable cover, 40 mm dia airvent pipe, inlet, outlet, over flow & scour pipe with 50NB 230mm long GI nipple. The tank shall be tied with HDG bolts and nuts, HDG flang support channel, rubber gasket SS washers cleats, HDG rectangular vertical steel support for each wall panel & jointing with stainless steel tie rod to support each panel i/c PVC support for roof panel and all other fittings to make it leak proof as per manufactures specifications and as per direction of Engineer-in-charge. (Size of tank varies from 5000 lit. to 10000 lit. as per site requirement) Two years warranty including repair and maintenance of S.M.C tank will be applicable after completion of work and the warranty certificate shall be provided by OEM and Countersigned by contractor and nothing extra shall be paid on this account all complete as per the direction of Engineer-in-charge.	30000.00	Liter	22.24	667200.00
19.43	Providing and Fixing of wall paneling with HDHMR Wooden Slats Prelaminated 16 mm Thick, acoustic panel size 192mm x 2420 mm, Groove Size 3.2mm at an interval of 28 mm c/c as per acoustic design / Architects approval, The wooden acoustic panels to be backed with black acoustic fleece. All wooden acoustic panels should be fixed with headless nail. The color shade of grooved acoustic panel will be as per Engineer In charge / Architect's approval. The 'U' channel grid of size GI frame work of 48mm GI Studs using 0.55mm thick and stud channels at 610mm x 610mm, 0.5mm thick, fixed	214.00	Sqm	6558.15	1403444.00

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	backed with 24 SWG x 12.5mm GI Chicken Wire Mesh with air gap a minimum of 50mm on back side, as per detailed drawing.-the frame work shall be filled with 50 mm thick micron having the density of 1000 gsm to achieve the best NRC value and finally wooden acoustic slats fixed on GI Channel grid as final finish. all complete as per the direction of Engineer-in-charge. Make = Armstong/ Hill point/ MutePro or Equivalent as per Engineer in charge				
19.44	Providing & fixing UPVC Gripper with fabric on the walls using GI frame work of 48mm GI Studs using 0.55mm thick and stud channels at 610mm x 610mm, 0.5mm thick, fixed, backed with 24 SWG x 12.5mm GI Chicken Wire Mesh with air gap a minimum of 50mm on back side, as per detailed drawing. The frame work to be filled with 50 mm thick micron having the density of 1000 gsm to achieve the 1.0 NRC value Finished in stretched fabric tucked in 10 mm corner & center grippers with tool grippers will fixed with screws on 75 x 12 mm thick Ply runners all complete as per the direction of Engineer-in-charge.Make = Armstong/ Hill point/ MutePro	107.00	Sqm	4264.65	456318.00
19.45	Providing and fixing of Acoustic panel on wall GI frame work of 48mm GI Studs using 0.5mm thick and stud channels at 610mm x 610mm, 0.5mm thick, fixed with MS angle cleats 1220x610mm centers to wall by using metal fasteners, backed with 24 SWG x 12.5mm GI Chicken Wire Mesh with air gap a minimum of 50mm on back side, as per detailed drawing. The frame work to be filled with 50 mm thick micron having the density of 1000 gsm to o achieve the 1.0 NRC Cover with 9 mm Pet panel on 8 mm perfoated ply with the help of adhesive all complete as per the direction of Engineer-in-charge. Make = Armstong/ Hill point/ MutePro	823.00	Sqm	5161.70	4248079.00

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	Ceiling				
19.46	Providing and fixing of acoustical hall suspended baffle false ceiling with baffle size of 300 mm x 1200 mm space at 150 mm c/c and baffle made with 12 mm thick acoustic PET (Polyester fiber) sheet cut with CNC in shape as per design fixed at top with 12 mm wide aluminium extruded profile and suspended from roof through baffle carrier made of factory painted GI, suspended threaded rod soffit cleat and dash fastener all complete as per the direction of Engineer-in-charge. Make = Armstong/ Acoustika/ MutePro	162.00	Sqm	11639.00	1885518.00
19.47	Providing & fixing of hall suspended ceiling with 9 mm thick PFB board ceiling, consisting of GI perimeter channels of size 0.55mm thick (having one flange of 20mm and another flange of 30mm and a web of 27mm) along with perimeter of ceiling, screw fixed to brick wall/ partition with the help of nylon sleeves and screws, at 610mm c/c. Then suspending GI intermediate channels of size 45mm (0.9mm thick with 2 flanges of 15mm each) from the soffit at 1220mm c/c with ceiling angles of width 25mm x 10mm x 0.55mm thick fixed to soffit with GI cleats and steel expansion fasteners. Ceiling section of 0.55mm thickness having knurled web of 51.5mm and two flanges of 26mm each with lips of 10.5mm are then fixed to the intermediate channel with the help of connecting clips and in a direction perpendicular to the intermediate channel at 457mm c/c. Then 8 mm ply is screw fixed to ceiling section with 25mm drywall screws at 230mm c/c. Screw fixing is done mechanically with drilling machine with suitable attachment all complete as per the direction of Engineer-in-charge. Make = Armstong/ Acoustika/ MutePro	108.00	Sqm	5161.70	557464.00
	Flooring				

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19.48	Providing & fixing of stage flooring with 5 mm thick SPC flooring wear layer 0.3n plank size 180 x 1220 mm, padding IXPE black, material 100% virgin, click and lock unilin fixed with 4 mm thick EPC sheet underlay on existing levelled floor all complete as per the direction of Engineer-in-charge. Make- WELSPUN/Milliken/Interface	61.00	Sqm	3328.90	203063.00
19.49	Providing & fixing of wooden L profile 25 mm x 25 mm thickness 10 mm @ stage edge all complete as per the direction of Engineer-in-charge. Make = Armstong/ Acoustika/ MutePro	53.00	Meter	686.60	36390.00
19.50	Providing and fixing 2nd Class Teak wood Door Frame of section 145mm × 70mm installed with 10mm Dia × 150mm fasteners (4 nos. vertical and 2 nos. horizontal) with heat activated intumescent fire seal strip of size 20mm × 4mm (Marshall/Raven) with 77mm thick door shutter having 38 dB acoustic noise reduction properties along with 120 minutes fire rating, having infill of 45mm thick resin bonded glass wool of 24kg/M* density coated with FR Acrylic Sealant (SHL, Jotun & Berger) sandwiched between two 9mm thick Starpan Calcium Silicate Boards, 100% free from asbestos, Brucite and Meerschaum, having a density not less than 1150 kg/M and thermal conductivity of 0.14 W/m •K, faced with 6mm thick commercial ply along with 1mm thick laminate facing as final finish / 3mm thick decorative veneer as final finish. The shutter shall be provided with heat activated intumescent fire seal strip of size 20mm x 4mm (Marshall/Raven) mounted in the grooves, having teak wood lipping of size 15 x 84mm all around the shutter. The internal framework of the acoustic door shall be not less than 68 x 80mm. The acoustic wooden door assembly shall have heavy-duty 2 nos. automatic concealed spring-loaded, self-leveling door bottom seals	15.00	Sqm	34351.00	515265.00

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	(Marshall/Pemko) and 3 nos. of Twinos type acoustic seals all around the door frame. The entire assembly shall be pre-tested from CBRI Rookee for double leaf configuration as per IS:3614 (Part 2 BS 476 (Part 20 & 22) for 120 minutes fire rating. Double leaf partially Insulated acoustic fire rated doorset of FD 120 PI classification with 120 minutes integrity and 30 minutes insulation as per IS 3614:2021 for Staircase/ Exit pathway / Refuge area etc all complete as per the direction of Engineer-in-charge.				
19.51	Supply and fixing of 304 Grade Stainless Steel Ball Bearing Hinges of size 125x75x3 mm with SS screws complete as per direction of Engineer-in-Charge for all storeys.	28.00	Each	767.40	21487.00
19.52	Providing and fixing S.S. grills of required pattern in frames of windows etc. with S.S. flats, square or round bars etc. including priming coat with approved steel primer all complete.				
19.52.1	Fixed to openings /wooden frames with rawl plugs screws etc.	3969.00	KG	504.25	2001368.00
19.53	Providing and fixing of Twilight Series Vertical / Horizontal Zebra Blinds of AEROLUX, D'DECOR, DECK, HUNTER DOUGLAS, Vista or substantially equivalent make in band width 7.5 cm - 12 cm, made up of 100% polyester. Twilight Blind tube made of aluminium with a min. diameter of 36mm, bottom rail made of powder coated aluminum having minimum weight 390 gm/meter fitted with end caps in colour matching to the fabric. Aluminium profile should have the control clutch drive unit engineered heavy duty chain drive pulley operating system consisting of gear clutch housing and locking plug containing minimum 6 ribs and inserted at minimum of 38mm into roller tube mounting hardware brackets, universal brackets including end plug bracket with lockdown retainer device. Ball chain shall be of 2mm	559.00	Sqm	2383.20	1332209.00

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	diameter cord with plastic balls made of U.V stable compound moulded to form an endless ball chain to be used for raising or lowering action of shade. Item also includes repair & maintenance for 2 years along with warranty from OEM. All complete as per satisfaction & direction of Engineer-in-Charge. Note : Area of window opening shall be measured for payment purpose				
19.54	Providing and Placing at position Plastic Dustbin 110 Litre Capacity of approved make with tubular M.S. frame all complete as per direction of Engineer-in-charge.(M.S. frame should be paid separately)	10.00	Each	973.70	9737.00
	TOTAL Rs.				291661147.00

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PART- C

(Electrical Work)

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PROFORMA OF SCHEDULES

(Separated Performa for Civil, Elect. & ~~Hort.~~ Works in case of composite tenders)

Name of Work:- **Construction of Multipurpose Hall of GRIHA-5 Star Including IEI & fans, Fire alarm & PA system, Wet Riser & Sprinkler system, VRF/VRV/ Split Air Conditioning system, online UPS system, audio visual system & Lifts etc. at NBSC/BIRD Campus Lucknow (UP) (Package-I).**

SCHEDULE 'A'

Schedule of Quantities (as per PWD-3)

Attached page No. 240 to 349

SCHEDULE 'D'

Extra schedule for specific requirements/document for the work, if any: **Nil**

SCHEDULE 'E'

Reference to General Conditions of contract – Applicable GCC is GCC for Construction works 2023, as modified and corrected up to previous day of last date of submission of bids.

Name of Work: **Construction of Multipurpose Hall of GRIHA-5 Star Including IEI & fans, Fire alarm & PA system, Wet Riser & Sprinkler system, VRF/VRV/ Split Air Conditioning system, online UPS system, audio visual system & Lifts etc. at NBSC/BIRD Campus Lucknow (UP) (Package-I).**

Estimated cost of work:

Electrical Work **Rs. 15,52,35,302/-**

i) Earnest money:

Included in schedules of Civil component

ii) Performance Guarantee:

Included in schedules of Civil component

iii) Security deposit:

2.5% of Tendered value of work.

SCHEDULE 'F'

General rules and direction

Officer inviting tender

Executive Engineer, Lucknow-I, CPWD, Lucknow.

Definitions:

2(vii) **Engineer-in-Charge**

Electrical items of work

Executive Engineer (E), Lucknow Electrical, CPWD, Lucknow.

Civil items of work

Executive Engineer, Lucknow-I, CPWD, Lucknow.

2(viii) **Accepting Authority**

Chief Engineer (Lucknow), CPWD, Lucknow

2(ix) **Percentage on cost of materials and labour to cover all overheads and profits**

15%

2(x) **Standard Schedule of Rates:**

Electrical items of Work:

DSR 2025 & M/R

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2(xi) Department: Central Public Works Department
 9(ii) Standard CPWD contract Form: GCC 2023 for Construction Works, CPWD Form-7/8 as amended/modified up to previous day of last date of submission of the bids.

- Clause 1**
- i) Time allowed for submission of Performance Guarantee from the date of issue of letter of acceptance As prescribed in Civil component.
 - ii) Maximum allowable extension with late fee @ 0.1% per day of Performance Guarantee amount beyond the period as provided in (i) above As prescribed in Civil component.
- Clause 2** Authority for fixing Compensation under Clause 2 **Chief Engineer (Lucknow), CPWD, Lucknow**
- Clause 5**
- i) Number of days from the date of issue of letter of acceptance for reckoning date of start As prescribed in Civil component.
 - ii) Time allowed for execution of work As prescribed in Civil component.

Authority to decide:-

- (i) Authority to convey the decision of shifting of mile stone and extension of time- **Executive Engineer (E), Lucknow-I, C.P.W.D., Lucknow.**
- (ii) Authority to decide rescheduling of mile stone and extension of time- **Chief Engineer (Lucknow), CPWD, Lucknow or successor thereof or Higher authority.**
- (iii) Shifting of date of start in case of delay in handing over of site- **Chief Engineer (Lucknow), CPWD, Lucknow or successor thereof or Higher authority.**

PROFORMA OF SCHEDULE Clause 5 schedule of handing over of site:

Part	Portion of site	Description	Time period for handing over reckoned from date of issue of letter of intent
Part-A	Portion without any hindrance	Full site	As per civil component
Part-B	Portion with encumbrances	NA	As per civil component
Part-C	Portion dependent on work of other agencies	NA	As per civil component

Clause 6 : Computerized Measurement Book/ Electronic Mode of Measurement : EMB through CPWD ERP Portal.

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. 86 Lacs**

Clause 7A Whether clause 7A shall be applicable. **As per Civil Component**

Clause 8 Competent Authorities to inspect and issue Part/Final Completion Certificate **As per Civil Component**

Clause 8A Authority to decide compensation on account if contractor fails to submit completion plans. **As prescribed in Civil Component**

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Clause 10A	List of testing equipment to be provided by the contractor at site lab.	Refer page No. 162
Clause 10 B (ii)	Whether clause 10-B shall be applicable.	As per Civil Component
Clause 10 C :	Not Applicable	
Component of labour expressed as percentage of value of work		25%

Clause 10 CC	As per Civil Component
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Clause11	Specification to be followed for execution of work: CPWD General Specifications for Electrical Works Part I Internal - 2023, General specification for external electrical work Part II -2023, Part III- Lift & Escalators-2003, Part IV- Sub-station- 2013, Part-V- Wet riser & Sprinkler systems-2020, Part-VI – Fire Detection & Alarm system-2018, Part VII- DG sets-2013, Part VIII- Gas Based Fire Extinguishing system-2013, Heating, Ventilation & Air- Conditioning (HVAC)- 2024 as amended last date previous to date of submission of tender.
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Clause 12

Type of work	Construction Work
12.2	Deviation limit beyond which Clause 12.2 shall apply for building work:
	100%

Clause 16	Competent Authority for Deciding reduced rates:	
	For Electrical items of work	Chief Engineer (Lucknow), CPWD, Lucknow
Clause 18	List of mandatory machinery, tools & plants to be deployed by the contractor at site.	As per list enclosed and as required.
Clause 19 C	Authority to decide penalty for each default	As prescribed in civil component
Clause 19 D	Authority to decide penalty for each default	As prescribed in civil component
Clause 19 G	Authority to decide penalty for each default	As prescribed in civil component
Clause 19 K	Employment of skilled / semi-skilled workers.	As prescribed in civil component

Clause 25 Conciliator /Arbitrator

(i) Conciliator	:	As per Civil Component
(ii) Arbitrator Appointing Authority	:	
(iii) Place of Arbitration	:	

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

Sl. No.	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	
						Figures	Words
1	Graduate Engineer Or Diploma Engineer	Electrical	Project/ Site Engineer	5 Or 10 respectively	1	Rs. 25,000/- per month per person	Rs. Twenty five Thousand per month per person
2	Graduate Engineer	Electrical	Project Planning /quality/ billing Engineer	2 Or 5 respectively	1	Rs. 15,000/- per month per person	Rs. Fifteen Thousand per month per person

Note.

- Nothing extra need to be added while preparing M/R justified amount of the work if stipulation is made as per above recommended scale of requirement of technical staff.
- Requirement of technical staff and their experience can be varied depending upon nature of work and contract period determined.
- In event requirement of technical staff is varied and estimated expenditure on technical staff worked out on the basis of 75% of the rate of recovery exceed 1% of the cost of work ,excess may be added while preparing M/R justified amount of the work .

Assistant Engineers retired from Government services that are holding Diploma will be treated at par with Graduate Engineers. Diploma holder with minimum 10year 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

- Schedule/ statement for determining theoretical quantity of cement & bitumen on the basis of Delhi Schedule of Rates 2025 printed by CPWD
- Variations permissible on theoretical quantities**
 - Cement for works with estimated cost put to tender not more than Rs. 25 lakhs.
For works with estimated cost put to Tender is more than Rs. 25 lakhs
 - Bitumen all works
 - Steel reinforcement and structural steel Sections for diameter, section and category.
 - All other materials

As per Civil Component

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ANNEXURE**Clause- 10 –A & 18**

List of mandatory machinery, tools and plants & testing Equipment to be deployed by the contractor at site, these equipment shall be available in the test room at site.

- | | | |
|-----|--|---------|
| 1. | Steel/Aluminium Ladder 1.5 m to 8 m. | 2 Nos. |
| 2. | Chase cutting machines. | 4 Nos. |
| 3. | Electrical wire drawing equipment. | 3 Set. |
| 4. | Torque wrench for nut/bolt/screws. | 5 Nos. |
| 5. | Conduit die set. | 3 Set. |
| 6. | Pipe vice. | 2 Nos. |
| 7. | Bench vice. | 2 Nos. |
| 8. | L.T.Megger 500/1000 volts. | 2 Nos. |
| 9. | Tong Tester. | 2 Nos. |
| 10. | Multimeter. | 2 Nos. |
| 11. | Hydraulically operated & hand operated crimping machine. | 1+1 No. |
| 12. | Earth tester. | 2 Nos. |
| 13. | Portable Ordinary drilling machine. | 4 Nos. |
| 14. | Portable Hammer drilling machine. | 2 Nos. |
| 15. | Overhead conduit puller. | 1 No. |
| 16. | Vernier caliper | 2 Nos. |
| 17. | Screw gauge | 2 Nos. |

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Annexure-II**ON NON-JUDICIAL STAMP PAPER OF MINIMUM RS. 100****(Guarantee offered by Bank to CPWD in connection with the execution of contracts)****Form of Bank Guarantee for Earnest Money Deposit /Performance Guarantee/Security****Deposit/Mobilization Advance**

1. Whereas the Executive Engineer (name of division), CPWD 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), CPWD 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/Mobilization Advance 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 here by 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. (Rupeesonly)
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

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agreement or to extend time of performance by the said Contractor from time to time or to postpone for any time or from time to time any of the powers exercisable by the Government against the said contractor and to forbear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such variation or extension being granted to the said Contractor or for any forbearance, act of omission on the part of the Government or any indulgence by the Government to the said Contractor or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

6. We, (indicate the name of the Bank), further agree that the Government at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor at the first instance without proceeding against the Contractor and notwithstanding any security or other guarantee the Government may have in relation to the Contractor's liabilities.
7. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor.
8. We, (indicate the name of the Bank), undertake not to revoke this guarantee except with the consent of the Government in writing.
9. This Bank Guarantee shall be valid up to unless extended on demand by the Government. Notwithstanding anything mentioned above, our liability against this guarantee is restricted to Rs. (Rupees only) and unless a claim in writing is lodged with us within the date of expiry or extended date of expiry of this guarantee, all our liabilities under this guarantee shall stand discharged.

Date

Witnesses:

1. Signature.....

Name and address

Authorized signatory

Name

Designation

Staff code no.

2. Signature

Name and address

Bank seal

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

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

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Name of Work: Construction of Multipurpose Hall of GRIHA-5 Star Including IEI & fans, Fire alarm & PA system, Wet Riser & Sprinkler system, VRF/VRV/ Split Air Conditioning system, online UPS system, audio visual system & Lifts etc. at NBSC/BIRD Campus Lucknow (UP) (Package-I).

Eligibility condition for Associate agency for execution of Pdg. E.I. & Fans, compound light & cable work

The associate agency shall be registered/enlisted in CPWD in composite category in appropriate class and should have a valid electrical license or shall associate a firm having valid license. The Registration/enlistment shall be valid on the date of MOU entered between main agency and associate agency.

The main contractor/agency has to submit detail of such agency to be associated to the Engineer-in-charge (of E.I. & Fans) with in fifteen days from date of start of work. The associate agency shall be approved by Engineer-in-charge (of E.I. & Fans work). In case the main contractor intends to change associated agency/agencies during the operation of the contract, he shall obtain prior approval of Engineer-in-charge (of E.I. & Fans Work). The new agency/agencies shall also have to satisfy the laid down eligibility criteria mentioned above. In case Engineer-in-charge is not satisfied with the performance of any agency, he can direct the main contractor to change the agency executing such items of work and this shall be binding on the contractor. Main agency/associate agency has to under go tripartite agreement between for each material supplied by him.

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Eligibility condition for Associate agency for execution of SITC of Fire Alarm System [SH: 2]

The main agency has to associate the specialized agency of Fire Alarm System.

The associate specialized agency should have successfully completed works, as mentioned under during last 7 years ending previous day of last date of submission of tender.

(i) Three similar works each of value not less than 40% of estimated cost of Fire Alarm work.

OR

(ii) Two similar works each of value not less than 60% of estimated cost of Fire Alarm work.

OR

(iii) One similar works each of value not less than 80% of estimated cost of Fire Alarm work.

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 tender.

Similar work shall mean works of “SITC Fire Alarm System”.

The main contractor/agency has to submit detail of such associate agency to Engineer-in-charge (SITC of Fire Alarm System) with in fifteen days from date of start of work. The associate agency shall be approved by Engineer-in-charge (SITC of Fire Alarm System). 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 (SITC of Fire Alarm System). 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 main contractor to change the agency executing such items of work and this shall be binding on the contractor.

However, the composite category contractor shall also carry out himself work without associating any specialized agency provided: -

- a) He fulfils the prescribed eligibility criteria respectively for these work(s).

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Eligibility condition for Associate agency for execution of SITC of UPS System [SH-3]

The associate specialized agency should have successfully completed works, as mentioned under during last 7 years ending previous day of last date of submission of tender.

- (i) Three similar works each of value not less than 40% of estimated cost of UPS System.
OR
- (ii) Two similar works each of value not less than 60% of estimated cost of UPS System.
OR
- (iii) One similar works each of value not less than 80% of estimated cost of UPS System.

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 tender.

Similar work shall mean works of “SITC of UPS System”.

The main contractor/agency has to submit detail of such associate agency to Engineer-in-charge (**SITC of UPS System**) with in fifteen days from date of start of work. The associate agency shall be approved by Engineer-in-charge (**SITC of UPS System**). 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 (**SITC of UPS System**). 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 main contractor to change the agency executing such items of work and this shall be binding on the contractor.

However, the composite category contractor shall also carry out himself work without associating any specialized agency provided: -

- a) He fulfils the prescribed eligibility criteria respectively for these work(s).

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Eligibility condition for Associate agency for execution of SITC of CCTV & LAN System [SH-4]

The main agency has to associate the OEM/specialized agency of CCTV & LAN system

The associate specialized agency should have successfully completed works, as mentioned under during last 7 years ending previous day of last date of submission of tender.

- (i) Three similar works each of value not less than 40% of estimated cost of CCTV work.
- OR
- (ii) Two similar works each of value not less than 60% of estimated cost of CCTV work.
- OR
- (iii) One similar works each of value not less than 80% of estimated cost of CCTV work.

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 tender.

Similar work shall mean works of “SITC of CCTV & LAN system”.

The main contractor/agency has to submit detail of such associate agency to Engineer-in-charge (SITC of CCTV system) with in fifteen days from date of start of work. The associate agency shall be approved by Engineer-in-charge (SITC of CCTV system). 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 (SITC of CCTV System). 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 main contractor to change the agency executing such items of work and this shall be binding on the contractor.

However, the composite category contractor shall also carry out himself work without associating any specialized agency provided: -

- a) He fulfils the prescribed eligibility criteria respectively for these work(s).

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Eligibility condition for Associate agency for execution of SOLAR PHOTO VOLTAIC POWER PLANT [SH-5]

The main agency has to associate the specialized agency of Solar Photo Voltaic Power Plant .

The associate specialized agency should have successfully completed works, as mentioned under during last 7 years ending previous day of last date of submission of tender.

- (i) Three similar works each of value not less than *40% of estimated cost of SPVP Plant work*
OR
- (ii) Two similar works each of value not less than *60% of estimated cost of SPVP Plant work*
OR
- (iii) One similar works each of value not less than *80% of estimated cost of SPVP Plant work*

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 tender.

Similar work shall mean works of “SITC OF SOLAR PHOTO VOLTAIC POWER PLANT”.

The main contractor/agency has to submit detail of such associate agency to Engineer-in-charge (SITC OF SOLAR PHOTO VOLTAIC POWER PLANT) with in fifteen days from date of start of work. The associate agency shall be approved by Engineer-in-charge (SITC OF SOLAR PHOTO VOLTAIC POWER PLANT). 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 (SITC OF SOLAR PHOTO VOLTAIC POWER PLANT). 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 main contractor to change the agency executing such items of work and this shall be binding on the contractor.

However, the composite category contractor shall also be carry out himself work without associating any specialized agency provided: -

- a) He fulfils the prescribed eligibility criteria respectively for these work(s).

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Eligibility condition for associate agency for Lift [SH: 6]

1. The Lift Manufacturer shall comply with BIS standards; duly certified by designated labs/ certifying agencies.
2. The manufacturer shall be PPP MII Order 2017 (as amended) compliant.
3. The manufacturer shall furnish an undertaking regarding availability of spares for the entire life of the lift i.e. 15 to 20 years
4. The complete lift installation including its components, safety devices, various types of controls etc., testing, inspection, operation and maintenance shall conform to relevant Codes/Standards, as amended upto date.
5. Quality Standards shall conform to IS/ISO-9001:2015 as amended.
6. The down time of installed lifts, which are being maintained by the manufacturer, shall not be more than 8 hours (average) in case of minor faults and 7 days (average) in case of major faults in last one year. The data to be considered shall be for last financial year.
7. The experience of successful completion of Similar works shall be as per CPWD Work Manual/SoP as follows:-

The main agency has to associate the specialized agency for execution of Lift work.

The associate specialized agency should have successfully completed works, as mentioned under during last 7 years ending previous day of last date of submission of tender.

- (i) Three similar works each of value not less than 40% of estimated cost of Lift work.

OR

- (ii) Two similar works each of value not less than 60% of estimated cost of Lift work.

OR

- (iii) One similar works each of value not less than 80% of estimated cost of Lift work.

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 tender.

Similar work shall mean works of "SITC of Lift".

The main contractor/agency has to submit detail of such associate agency to Engineer-in-charge (SITC of Lift) within fifteen days from date of start of work. The associate agency shall be approved by Engineer-in-charge (SITC of Lift). 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 (SITC of Lift). 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 main contractor to change the agency executing such items of work and this shall be binding on the contractor.

The firm has to ensure that lift equipment manufacturer comes under definition of local manufacturers as per Govt. of India, Policy of Public Procurement (Preference to make in India) Order, 2017 (PPP-MII Order 2017) issued by Department of Industrial Policy and Promotion.

However, the composite category contractor shall also be carry out himself work without associating any specialized agency provided: -

- a) He fulfils the prescribed eligibility criteria respectively for these work(s).

OR

- b) He directly procures the equipment of approved make from manufacturer and gets it installed from authorized agency/ service provider of the manufacturer or specialized agency as per criteria mentioned in the NIT.

A undertaking from make in India manufacturer lift and authorization certificate from manufacturer of lift for un-conditional technical support to agency associated.

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Eligibility condition for Associate agency for execution of SITC of Audio Video System [SH-7]

The main agency has to associate the OEM/specialized agency of Audio Video System

The associate specialized agency should have successfully completed works, as mentioned under during last 7 years ending previous day of last date of submission of tender.

- (i) Three similar works each of value not less than 40% of estimated cost of Audio Video System.
- OR
- (ii) Two similar works each of value not less than 60% of estimated cost of Audio Video System
- OR
- (iii) One similar works each of value not less than 80% of estimated cost of Audio Video System .

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 tender.

Similar work shall mean works of “SITC Audio Video System ”.

The main contractor/agency has to submit detail of such associate agency to Engineer-in-charge **(SITC of Audio Video System)** with in fifteen days from date of start of work. The associate agency shall be approved by Engineer-in-charge **(SITC of Audio Video System)**. 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 **(SITC of Audio Video System)**. 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 main contractor to change the agency executing such items of work and this shall be binding on the contractor.

However, the composite category contractor shall also be carry out himself work without associating any specialized agency provided: -

He fulfils the prescribed eligibility criteria respectively for these work(s).

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Eligibility condition for Associate agency for execution of SITC of VRV/VRF System [SH: 8]

The main agency has to associate the OEM/specialized agency of VRV/VRF System

The associate specialized agency should have successfully completed works, as mentioned under during last 7 years ending previous day of last date of submission of tender.

- (i) Three similar works each of value not less than 40% of estimated cost of VRV/VRF work.
OR
- (ii) Two similar works each of value not less than 60% of estimated cost of VRV/VRF work.
OR
- (iii) One similar works each of value not less than 80% of estimated cost of VRV/VRF work.

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 tender.

Similar work shall mean works of “SITC of VRV/VRF system”.

The main contractor/agency has to submit detail of such associate agency to Engineer-in-charge (**SITC of VRV/VRF system**) with in fifteen days from date of start of work. The associate agency shall be approved by Engineer-in-charge (**SITC of VRV/VRF system**). 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 (**SITC of VRV/VRF System**). 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 main contractor to change the agency executing such items of work and this shall be binding on the contractor.

However, the composite category contractor shall also carry out himself work without associating any specialized agency provided: -

- a) He fulfils the prescribed eligibility criteria respectively for these work(s).

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Eligibility condition for Associate agency for execution of SITC of Fire Fighting System [SH: 11]

The main agency has to associate the specialized agency of Fire Fighting System.

The associate specialized agency should have successfully completed works, as mentioned under during last 7 years ending previous day of last date of submission of tender.

(i) Three similar works each of value not less than 40% of estimated cost of Fire Fighting work.

OR

(ii) Two similar works each of value not less than 60% of estimated cost of Fire Fighting work.

OR

(iii) One similar works each of value not less than 80% of estimated cost of Fire Fighting work.

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 tender.

Similar work shall mean works of "SITC Fire Fighting System".

The main contractor/agency has to submit detail of such associate agency to Engineer-in-charge (SITC of Fire Fighting System) with in fifteen days from date of start of work. The associate agency shall be approved by Engineer-in-charge (SITC of Fire Fighting System). 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 (SITC of Fire Fighting System). 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 main contractor to change the agency executing such items of work and this shall be binding on the contractor.

However, the composite category contractor shall also carry out himself work without associating any specialized agency provided: -

- a) He fulfils the prescribed eligibility criteria respectively for these work(s).

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SH:-1 to 8 & 11
MEMORANDUM OF UNDERSTANDING [M.O.U] BETWEEN

1] M/S [Name of the firm with full address]
 Enlistment Status
 Valid Upto:
 [Henceforth called the main contractor]

And

2] M/S [Name of the firm with full address]
 Enlistment Status
 Valid Upto:

[Henceforth, called Associated Contractor]

Name of Work:- Construction of Multipurpose Hall of GRIHA-5 Star Including IEI & fans, Fire alarm & PA system, Wet Riser & Sprinkler system, VRF/VRV/ Split Air Conditioning system, online UPS system, audio visual system & Lifts etc. at NBSC/BIRD Campus Lucknow (UP) (Package-I).

[Electrical Component only] as per schedule, specifications, terms and conditions of the tender.

We state that M.O.U. between us will be treated as an agreement and has legality as per Indian Contract Act (amended up to date) and the department (CPWD) can enforce all the terms and conditions of the agreement for execution of the above work. Both of us shall be responsible for the execution of work as per the agreement to the extent of this MOU allows. Both the parties shall be paid consequent to the execution as per agreement to the extent this MOU permits.

We have agreed as under :

- 1- The associated contractor shall be liable for disciplinary action if he failed to discharge the action(s) and other legal action as per agreement besides forfeiture of the security deposit.
- 2- All the material, machinery and equipments, tools and tackles required for execution of the electrical works as per agreement shall be the responsibility of the associated contractor.
- 3- The site staff required for the electrical 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

COUNTERSIGNED
EXECUTIVE ENGINEER (E)

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SH:-1 to 8 & 11**WILLINGNESS CERTIFICATE**

Name of Work: Construction of Multipurpose Hall of GRIHA-5 Star Including IEI & fans, Fire alarm & PA system, Wet Riser & Sprinkler system, VRF/VRV/ Split Air Conditioning system, online UPS system, audio visual system & Lifts etc. at NBSC/BIRD Campus Lucknow (UP) (Package-I).

I hereby give my willingness to work as associated contractor for the above mentioned work.

I will execute the work as per specifications and conditions for the agreement and as per direction of the Engineer-in-charge. Also I will employ full time technically qualified supervisor for the works. I will attend inspection of officers of the department as and when required.

Date :

Signature of Contractor

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Additional Conditions for E.I. & Fans work.

- 1- The work shall be carried out strictly in accordance with CPWD General Specifications for Internal Electrical Works Part I Internal - 2023, General specification for External Electrical work Part II -2023, Part III- Lift & Escalators-2003, Part IV- Sub-station- 2013, Part-V- Wet riser & Sprinkler systems-2020, Part-VI – Fire Detection & Alarm system-2018, Part VII- DG sets-2013, Part VIII- Gas Based Fire Extinguishing system-2013, as amended last date previous to date of submission of tender. as amended upto date and as per instructions of the Engineer-in-Charge including as below and nothing will be paid extra.

- (a) All material shall be got approved from Engineer-in-Charge before use. One sample flat/Bay /Room shall be made for approval of final location of switch boards/ fittings etc. and then only work shall be executed in other flats/bays/Room.

All damages done to the building during 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. Any expenditure incurred by the department in this condition shall be recovered from the contractor and decision of the Engineer-in-Charge about recovery shall be final.

- (b) All hardware items such as screws, thimbles, G.I. wires etc. which are essentially required for completing an item as per specifications will be deemed to be included in the item even when the same have not been specifically mentioned. All hardware materials such as nuts/bolts/screws/ washers etc. to be used in the work shall be zinc/cadmium plated iron.

- (c) CONDUIT LAYOUT shall be prepared by contractor and got approved before execution of work. Minimum No. of Junctions to be kept, & if required junctions to be kept underneath the fitting locations in corridor/rooms so that junctions are not visible after fittings are fixed/in position. Drop of conduit shall be well planned w.r.t. location of fitting/D.B. and criss crossing to be avoided. All chases in walls shall be cut using wall grooving machine. For this purpose electricity shall be arranged by contractor.

- (d) Any conduit which is not to be wired by the contractor shall be provided with GI fish wire for wiring by some other agency subsequently. Nothing extra shall be paid for the same.

Termination of multi-stranded conductors shall be done using crimping type thimbles at both the ends. Nothing extra shall be paid for the same.

- (e) For Submain Wiring, Colour Code for different phases and Neutral (R.Y.B. black) to be maintained. While circuit wiring, wiring for fan point, wiring for light point shall be done with different colours for easy identification. Wiring for neutral shall be done with black colour and all connections to fans & fittings wherever visible shall be made with white PVC insulated copper wire or wherever cover sleeve may be provided. At Switch board, Switch shall be fixed in a logical manner w.r.t. fittings layout.

- (f) Unless specifically approved by Executive Engineer (E.), loose wire box, above DB shall not be provided however DB's shall have loose wire box of same make.

All connections to MCB's shall be made using thimble/lugs.

- (g) All DB's i/c incoming & outgoing MCB's shall be suitably numbered for location/circuits. DB shall be fixed in recess suitably (30 mm. approx. projected from unplastered wall) to ease opening of door. Top of DB to match with door frame height as per site conditions.

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- (h) Phenolic laminated sheet shall be of Egg white colour, and shall be filed/rounded at edges and of minimum 3mm thick wherever required.
- (i) All fittings and fans should be properly earthed through the protective conductor.
Provision of earth bars in main boards, earth terminal block in DB's & earth studs in all metal boxes shall be made, connection to this stud shall be crimped.
A clamp type termination should be made in the termination of earth strips (where provided) to pipe electrodes to provide surface type contact.
- (j) The earthing shall be carried out in the presence of the Engineer-in-charge or his authorized representative.
- (k) The size at switch box for providing Modular Plate type Switch/Sockets shall be properly settled to take care of all necessary switches/screws/fan regulators. Blanking plate if required shall also be provided at no extra cost.
- (l) For point wiring in steel conduit all piano type switch or all modular type switches/sockets/telephone outlets/T.V. outlets shall be of only one make.
- (m) The contractor shall make his own arrangement at his own cost for electrical/ general tools and plants required for the work.
- (n) All LED light fittings should have minimum 5 years warranty, warranty certificate to be submitted by agency on OEM letter head regarding this.
- 2- The work shall be carried out according to approved drawings/details which shall be subsequently issued to the successful tenderer for execution of work and as per instructions of the Engineer-in-Charge who will have the right to change the layout as per requirement at site and the contractor shall not have any claim due to change in layout.

The work shall be carried out in engineering like manner. 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 programme of electrical works are to be co-ordinated in accordance with the building work and no claim for idle labour will stipulated in the tender, electrical work shall have to be completed alongwith completion of civil work.

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. Similarly any rejected material should be immediately cleared off from the site by the contractor.

Watch and ward of the material/equipment shall be the responsibility of the contractor till handing over of installation to the department.

The contractor or his representative is bound to sign the site order book as and when required by the Engineer-in-Charge and to comply with the remarks therein.
- 3- The entire installation shall be at the risk and responsibility of the contractor until these are tested and handed over to the department. However, if there is any delay in construction from the department side, the installation may be taken over in parts, but the decision on the same shall rest with Engineer-in-Charge which shall be a binding on the contractor.
- 4- Issue of material to the contractor wherever stipulated, shall be according to the requirement at site from time to time depending upon the program of work.
- 5- The contractor shall have to return the surplus/unused material supplied by the department for use on work at the place of original supply failing which the recovery shall be made at the recovery rate as given the list stipulated materials, if applicable.

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- 6- Cement for this bonafied work is to be arranged and used by the contractor himself and nothing extra will be paid on this account.
- 7- The contractor shall make his own arrangement at his own cost for electrical / general tools and plants required for the work.
- 8- The rates of all items of work shall unless clearly specified otherwise, includes the cost of all labour, materials and other input involved in the execution of work.
- 9- Central / State Sales Tax / Contract Tax / GST etc. should be included in the rates tendered. Statutory deductions of contract tax at source shall be made while releasing payment through running/final bills. A certificate specifying the rate and amount of deduction shall however be issued. No Form 31/32 (road permit) shall be issued by the department. The road permit shall be arranged by the tenderer at his own.
- 10- All U.G. Cable work shall be got inspected and measurements lest checked by the Assistant Engineer in charge of work and his authorized representative before filling up the trenches, failing which work remain subject to 100% recheck at the risk and cost of the contractor.
- 11- All U.G. Cables before laying shall be got tested for continuity in presence of the authorized representative of the Engineer-in-Charge.
- 12- Route of the U.G. Cables shall be got approved from the Engineer-in-Charge or his authorized representative.
- 13- Earthing shall invariably be done in the presence of the Engineer-in-Charge pr his authorized representative.
- 14- Contractor shall preserve the copies of invoices, test certificates; gate passes etc. to prove the genuineness of material / purchases which are used at site as per agreement
- 15- Notwithstanding the schedule of quantities, all items of interrelated works consider necessary to make the installation complete and operative are deemed to be included shall be provided by the contractor at no extra cost.
- 16- The secured advance as applicable shall be allowed.
- 17- **Completion Plan & Test Certificate:** Contractor shall submit completion plan for Internal and External electrical services (**in triplicate**) failing which a recovery 0.1% of tendered amount shall be made from final bill. Contractor has to submit SLDs & layout plan in triplicate in Dwd. pdf & A0 size hard copies in triplicate duly signed and checked by the concerned JE/AE.

Test certificate for the work carried out shall also be submitted failing which recovery @3% of tender amount subject to maximum of Rs.500000/- shall be made from final bill.

- 18- **Panels:** Drawing of panel shall be submitted for approval within 30 days from award of work and fabrication to be taken up only after approval of such drawing.
- 19- Quantities indicated in Schedule of work are only tentative, contractor shall consult AE-in-Charge before procurement. Payment shall be made only for the quantities actually executed and measured.
- 20- **Time Period:** Contractor has to plan his activities, so that electrical work is to be carried out in close co-ordination with CIVIL work and in no case CIVIL work be delayed because of delay in electrical work and the work has to be completed accordingly.

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- 21- The makes for items shall be as per list attached.
- 22- **Storage :-** Responsibility for storage space for execution of work shall be of main contractor.
- 23- **Power & Water Supply:-** Responsibility for supply of power & water for execution of work shall be of main contractor.

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ADDITIONAL CONDITIONS FOR FIRE FIGHTING SYSTEM.

- 1- **Specification:-** The work shall be executed as per CPWD's general specification for Electrical Works part-I (Internal)-2023, Part-II (External)-2023, Part-V (Wet Riser System for Fire Fighting Installation)- 2020, amended upto date and as per direction of Engineer-in-Charge. The additional specifications are to be read with above and in case of any variations; specifications given along with the tender shall apply.
- 2- **Location:-** The work is to be executed at **Multipurpose Hall, NBSC/BIRD Campus Lucknow (UP)**. The Contractor is advised to visit the site before submission of their tender.
- 3- **Approval from CFO:-** The Contractor shall be required to obtain Pre NOC and final NOC from Chief Fire Officer and work shall be deemed to be completed only after receiving NOC from CFO & rectification if any. Statutory fee if any shall be paid by department. However, all liasoning work / arranging inspection of CFO shall be the responsibility of contractor.
- 4- **Storage:-** Responsibility for storage space for execution of work shall be of main contractor.
- 5- **Power & Water Supply:-** Responsibility for supply of power & water for execution of work shall be of main contractor.
6. The material in required quantity to be used in the work shall be got approved from the Engineer-in-charge 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 as per specifications.
7. Contractor shall preserve the copies of invoices, test certificates; gate passes etc. to prove the genuineness of material/purchases. The responsibility of procurement, genuine material of specialized works shall rest with the contractor.
8. **No inspection outside the country is permissible if required so the same will be deemed to be waived off and necessary test reports shall be submitted before the dispatch of equipment.**
9. **Payment Terms:-** The Following percentage of contract rates shall be payable against the stages of work shown herein:

S.no.	Stage of work	Panels, Fire fighting pumps	All other items
i	After initial inspection (wherever specified) and delivery at site in good condition on pro-rata basis.	75 %	70 %
ii	On completion of pro-rata installation	15 %	20 %
iii	On testing, Commissioning and handing over.	10 %	10 %

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ADDITIONAL CONDITIONS FOR FIRE ALARM SYSTEM

- 1- **Specification:-** The work shall be executed as per CPWD's general specification for Electrical Works Part – I (Internal), Part-VI Fire Detection and Alarm System – 2018. The additional specifications are to be read with above and in case of any discrepancy; technical specifications given along with the tender shall apply.
- 2- **Location:-** The work is to be executed at **Multipurpose Hall, NBSC/BIRD Campus Lucknow (UP)**. The contractor is advised to visit the site before submission of their tender and ensure that equipment being offered by them shall be accommodated in the spaces available.
- 3- **Acceptance of Tender:-** The department reserve the right to reject any or all the tenders without assigning any reason.
- 4- **Rates:-** The rates shall be inclusive of all taxes, levies, packing, transportation, handling etc. Nothing extra shall be paid.
- 5- **Storage:-** Responsibility for storage space for execution of work shall be of main contractor.
- 6- **Power & Water Supply:-** Responsibility for supply of power & water for execution of work shall be of main contractor.
- 7- **T&P:-** The department will not issue any T&P for execution of the work.
- 8- **Pre-commissioning test:-** Before commissioning of the installation, all tests as per CPWD's specifications and or respective manufacturer's recommendations shall be carried out and result submitted.
- 9- **Acceptable make:-** The acceptable make of various equipment are indicated in the list attached. Alternative or equivalent make will not be accepted.
- 10- **Care of Building:-** The contractor will have to ensure that no damage is caused to the building during execution of the work. The contractor will have to repair any damage caused during execution of the work, failure of which the department will repair the same at the risk & cost of the contractor.
- 11- **Approval of Drawings:** After award of the work, the contractor will have to submit following drawings: - (i) Single Line Diagram of Fire Alarm System. (ii) Drawings of Fire Alarm System. (iii) Any other drawing considered necessary by Engineer-in-Charge. Work will be started after getting the above drawings approved by the Engineer-in-charge.
- 12- **Payment Terms:-** The Following percentage of contract rates shall be payable against the stages of work shown herein:

S.no.	Stage of work	Panels, Detectors & Devices	All other items
i	After initial inspection (wherever specified) and delivery at site in good condition on pro-rata basis.	75 %	70 %
ii	On completion of pro-rata installation	15 %	20 %

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iii	On testing, Commissioning and handing over.	10 %	10 %

- 13- **Final inspection:-** After completion of the work, the contractor will demonstrate trouble free operation of the system to the Engineer-in-Charge. In case any deficiencies are noticed during the demonstration, the same will be attended by the contractor promptly.
- 14- **Completeness of Tender:** All sundry materials such as Foundation Bolts, Hardware Items, Junction Boxes, Sleeves, Flexible conduit etc. which are not specifically mentioned in the tender but are required for completion of the work, will be deemed to be included and the contractor will be bound to provide the same without any extra cost.
- 15- **Minor Building Work:** Minor building work such as Foundation, making opening in Walls/Slab for passage of pipe, making chases, fixing suspenders in Slab/Walls and furnishing the damages to the building to the satisfaction of Engineer-in-Charge etc. are to be executed by the contractor as a part of the work and nothing extra shall be paid for the same.
- 16- **Indemnity:** The contractor will be fully responsible for any accident taking place during execution of the work. The department will not take any responsibility for the same.
- 17- **Completion Plan/Drawings:** After completion of the work the contractor will submit completion plans, wiring drawings of equipment, catalogue etc. which are required for maintenance of the system.
- 18- Payment shall be released only after submission of PAN No. and valid GST TIN No. of the state where work is to be executed. If payment is delayed due to non- submission of PAN No. and valid GST TIN No. then, responsibility for the same will lie on the part of the contractor and no claim/interest etc. will be paid by the department on this account.
- 19- The contractor shall make payment to the worker through Cheque/RTGS/D.D. and a proof of making payment through Cheque/RTGS/D.D. may be submitted along with running account bill of contractor.
- 20- **Approval from CFO:-** The Contractor shall be required to obtain Pre NOC and final NOC from Chief Fire Officer, and work shall be deemed to be completed only after receiving NOC from CFO & rectification if any. Statutory fee if any shall be paid by department. However all liasoning work / arranging inspection of CFO shall be the responsibility of contractor.
- 21- The material in required quantity to be used in the work shall be got approved from the Engineer-in-charge 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 as per specifications.
22. Contractor shall preserve the copies of invoices, test certificates, gate passes etc. to prove the genuineness of material/purchases. The responsibility of procurement, genuine material of specialized works shall rest with the contractor.
23. **No inspection out side the country is permissible if required so the same will be deemed to be waived off and necessary test reports shall be submitted before the dispatch of equipment.**

TECHNICAL SPECIFICATION FOR FIRE ALARM SYSTEM

1.0 ANALOGUE ADDRESSABLE FIRE ALARM SYSTEM

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1.1 SCOPE OF WORK

- 1.1.1 The scope of work under this heading shall include designing supplying and installing, Testing and commissioning of Analogue Addressable Fire Detection and Alarm System. The work under this system shall consist of furnishing all materials, equipment, appliances and labour necessary to install the complete Fire Detection and Alarm System, complete with Main Fire Alarm Control Panel, Sensors, Sounders, Strobes, Manual Call Stations, Relays etc. for interfacing with other systems.
- 1.1.2 It shall include laying of cabling/wiring/conduiting and power supply etc., necessary for installation of the system with supply of sensors and devices as appropriate and as indicated in the Specification and Bill of Quantities. Any openings/chasing in the wall/ceiling required for the installation shall be made good in appropriate manner.
- 1.1.3 The Bidder shall also undertake to control and monitor the ventilation and other systems from the Fire Alarm Panel through the use of Addressable Output / Input Modules.
- 1.1.4 The Building should be designated as multiple fire zones with each area forming one or more software programmed zones. All wiring shall be done using 2 x 1.5 mm² twisted pair shielded PVC insulated copper cable while exposed and in PVC/MS Conduits in concealed in concrete.

1.2.1 GLOSSARY OF TERMS

- 1.2.1.1 **FIRE ALARM CONTROL PANEL (FACP)** This refers to the microprocessor-based panel that shall be connected to the various sensors/devices by means of 2 wire loops. The FACP shall be able to supervise individual detectors for proper performance as well as to give pinpoint location of Fire or Fault Alarm and initiate Alarms as well as facility for cutting off of AHU's and Electrical Power is also to be included. The panel shall also have the provision of through volt-free contact to activate an Auto-Dialer to dial selected phone numbers in case of fire.
- 1.2.1.2 **LOOP** A loop shall mean a 2-wire circuit which is capable of monitoring and controlling detector/devices. The loop card shall have built-in short circuit isolators to accommodate Class A wiring.
- 1.2.1.3 **ADDRESSABLE DEVICES** This term indicates the complete group of addressable devices such as Sensors or Detectors, Manual Call Stations, Addressable Output / Input Modules etc.
- 1.2.1.4 **SENSORS OR DETECTORS** The Sensors or Detectors shall be Analogue Addressable type. The chamber should be easily removable for the purpose of easy maintenance. The address programming shall be done through the decade switch in the Detector. The Detectors shall have a common base to allow easy interchange of various types of Detectors.
- 1.2.1.5 **MANUAL CALL STATION** The Manual Call Station shall be addressable type with Input Modules to define the address for each station. The function shall be similar to that of conventional Manual Call Point and should be reset table without replacing the glass.
- 1.2.1.6 **OUTPUT MODULE** Output module shall mean Addressable points from the FACP with potential free contacts for tripping of AHUs, power supply etc. as required. Any module shall operate two relay outputs powered from the loop and preferably consuming single address on the loop. The system shall also be able to handle separate modules to interface the speakers of the Public Address System.

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- 1.2.1.7 **INPUT MODULE** The input modules shall be of dual/single channel type. The dual channel module shall be selectable for Normally Open or Normally Close by a 2 bit DIL switch.
- 1.2.1.8 **FAULT ISOLATOR** This unit shall be placed on the loop preferably after every 20 devices and shall be able to isolate electrical short circuit in the wiring. All the other detectors shall remain functional because of the Class A wiring of the loop. The isolator shall not utilize an address and shall be built into the detector base wherever required.
- 1.2.1.9 **SOUNDERS/HOOTERS** Each sounder shall be of addressable type. It shall be capable of being directly mounted on the wall/ceiling or along with the detector. The sounder shall be programmed to activate in event of an alarm from a single detector/device or a group of detectors/ devices.

1.3 SPECIFICATION

- 1.3.1 A general line diagram showing the circuit and spacing of detectors is to be enclosed. The quantity mentioned in the Price Schedule shall be quoted for. Unit rates shall apply in the event of any variance.

1.4 FIRE ALARM SYSTEM

- 1.4.1 The Fire Alarm System shall confirm to EN54, BS: 5839-1:2013 in respect of design and installation, and it shall give Audio/Visual Alarm Signals when there is rise in temperature in case of Heat Detector or while measuring Smoke Density in case of Smoke Detector, while it exceeds the pre-set limit. The system shall give pinpoint location of fire with warning system and voice communication for commands and instruction if required.
- 1.4.2 Annunciation facility shall also be inbuilt into the FACP, the panel being able to initiate alarm signal for any particular zone.
- 1.4.3 The system shall be fully supervised for all fault conditions with distinctive alarm operated for fault and fire conditions. Test buttons and software features shall be provided to test the electronic circuits and Detector health.
- 1.4.4 The FACP shall have facility to connect addressable Input / Output Devices in the peripheral RS 485 bus.
- 1.4.5 The system shall be based on an "Open Protocol" to ensure flexibility of using Sensors / Detectors of an alternate manufacturer, in case the user requires such an option at a later date.

1.5 FIRE ALARM CONTROL PANEL (FACP)

- 1.5.1 The Fire Alarm Control Panel shall be micro processor based fully Analogue Addressable, Analogue Control Unit which shall control all Analogue Addressable Detectors, Manual Call Stations and Switching Systems (for disconnecting AHU and power supply) connected to it.
- 1.5.2 All addressable units shall be connected to the FACP through the Loop Cards and shall be addressed through individual numbers. The FACP shall be able to obtain analogue value for all detectors in the circuit through a pulsed digitalized current data. The FACP shall be able to analyze all analogue inputs from all addressable units, and through its own software

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and ambient level screening the FACP shall be able to identify fire, possible fire or fault conditions. The unit supervision shall be dynamic and continuous.

- 1.5.3 The FACP shall itself have one loop card built in. The loop shall be able to address Detector/Devices as per BOQ. All the networked panels shall display all the events occurring anywhere in the system. Each FACP on the network shall effectively function as a repeater panel as well.
- 1.5.4 The FACP shall also give adequate warning signal whenever there is dust accumulation in detectors, and up to the point of its replacement it should be possible to change the level of ambient alarm calibration condition either by the use of software program operable by the owner or by resetting the detector.
- 1.5.5 Short / Open circuit units shall also be reported at the FACP. In such cases, the system through the use of fault isolators shall be able to isolate that segment between the two fault isolators. The missing Detectors/Devices shall also be reported at the FACP with identification of the location.
- 1.5.6 The FACP shall have the facility to set sensitivity of each smoke sensor remotely.
- 1.5.7 When an alarm condition is sensed at the FACP from a smoke or heat detector, a delay time/alarm verification period shall be stated. If the sensor is still in alarm after the delay time expires, an alarm condition is reported. The delay time shall be adjustable from 0 to 990 sec's.
- 1.5.8 The FACP shall have the facility to perform walk test such that an operation can be periodically checked out for all initiating devices. As each device is placed into alarm the FACP shall print the condition and automatically reset the device. Audible devices shall be initiated, if required at a preprogrammed time. If a zone is inadvertently left in walk test mode, it shall automatically reset to normal after the idle time is exceeded. During the walk test the zones other than the programmed zones shall be under continuous supervision (normal mode). In case of any alarm initiated by detector/devices the walk test shall get terminated automatically.
- 1.5.9 Programming functions shall include alarm/trouble type assignment, point descriptor assignment, alarm message assignment, etc.
- 1.5.10 Programming may be carried out from the FACP keyboard or utilizing the approved PC setup software via laptop/desktop computer.
- 1.5.11 The FACP shall have a Liquid Crystal Display of Alphanumeric type to indicate immediately all conditions. The display should be high resolution, backlit 80 character. In case of testing of the system from the FACP the Display shall be able to give readouts of analogue value of all detectors being tested. The FACP shall also be able to carry out continuous self-monitoring when in normal condition.
- 1.5.12 The FACP shall have facility for in-built or external printer coupled to the FACP, which shall log all events with time. The printout shall clearly indicate the event - Fire/Pre Alarm/Fault etc. With the unit address and time.
- 1.5.13 The FACP shall also be able to discriminate between false alarms and fire conditions, as well as priority selection of alarm in case alarm activate in two or more remotely located units simultaneously. In such cases, the Manual Call stations shall have the highest priority.

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- 1.5.14 The FACP also is able to actuate switches automatically in case of Fire condition that of AHU's and power supply or other systems such as Gas Extinguishing Systems.
- 1.5.15 In this respect the bidder is required to take note of clause relating to cutting off of AHU's given above. The bidder shall note that the Client shall provide no additional facilities for completion of this mechanism other than that specified in clause 1.4.6.
- 1.5.16 The System shall be fail safe and adequate safe guards should be under taken that in the event of a failure of a part of the System it shall not handicap the complete System. The Loop Cards shall be of Modular Construction.
- 1.5.17 The Bidder shall undertake the responsibility of the complete installation, commissioning, user trials, training and maintenance of the System as required. The Bidder shall take all responsibility for preparation and installation of System Software into the FACP. The Software shall be such so as to be easily operated by the Client's Personnel and secured against Software errors, ability to be upgraded so as to incorporate more features at a later date.
- 1.5.18 The FACP shall have its own Battery Backup of a minimum of 48 hours in normal condition and then half an hour in alarm condition. The back up time calculation shall be done as per IS 2189 standards.
- 1.5.19 It shall be able to withstand temperature variations from 00 centigrade to 550 centigrade. Further, Relative Humidity (non-condensing type) up to 95% shall not hamper its performance. The voltage rating shall be from 15V DC to 32V DC, though the voltage may be change depending upon the working voltages of a proprietary FACP.
- 1.5.20 The logic circuitry shall be based on high noise immunity solid state hardware employing modular construction. Logic cards shall be of epoxy fiber glass construction.
- 1.5.21 The FACP shall be capable of being networked (future expansion) with other similar FACP's located at different part of the premises through a single RS485 bus.
- 1.5.22 The FACP shall have provision for interfacing with the Public Address System.
- 1.5.23 The panel should have the facility to interface with an automatic two-channel programmable speech dialer for verbal reporting of fire. It shall be able to call four telephone numbers per channel. The programmable speech dialer shall have two alarm inputs and shall provide listen-in capabilities through the built-in microphone. The dialer shall have a built-in keypad for easy operation, programming and voice recording.

1.6 ADDRESSABLE DETECTORS

A. SMOKE DETECTOR

- 1.6.1. All detectors are fitted with plug-in system type connections, from the maintenance and compatibility point of views. An alarm release will not effect a detector's good functioning. After resetting the alarm, the detector will resume operations without readjustment of any kind.
- 1.6.2. The detector shall be high performance optical type. Detectors using radioactive elements shall have BARC approval.
- 1.6.3 The detector shall be able to sense incipient fire by detecting the presence of visible and invisible products of combustion. The detector shall be suitable for low voltage (15 to 32 V DC) two wires supply. The detector shall be provided with Twin LED indication and the

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sensitivity of the detector shall not vary with change in ambient temperature, humidity, pressure or voltage variation.

- 1.6.4 Neither its performance shall be affected by air current up to 1.52mtr per second. The detector shall be suitably protected against dust accumulation/ ingress and it shall be free from maintenance and functionally tested at intervals. All detectors shall be identical in construction design and characteristic to facilitate easy replacement.
- 1.6.5 The coverage per smoke detector shall strictly follow IS 2189 standards. It shall be possible to connect Smoke Detector with Heat Detector or Manual Push Button in the same circuit. The sensitivity of detector shall be set from the FACP to suit the site requirement.
- 1.6.6 It shall have in-built locking mechanism to check the removal and pilferage of the detector.
- 1.6.7 The Photoelectric type Smoke Detector shall be Analogue Addressable type and be able to send analogue output to the FACP regarding its condition. It shall be able to communicate with the FACP by the pulses emitted from the FACP. The detector should be programmed using a decade or rotary switch.
- 1.6.8 The base of the Detector shall be electronics free and interchangeable with other smoke or heat detectors.
- 1.6.9 It shall be able to withstand temperature variations from - 10 degree centigrade to 50 degree centigrade. Further, Relative Humidity (non-condensing type) up to 80% shall not hamper its performance. The voltage rating shall be from 15V -32V DC though the voltage may be changed depending upon the working voltages of a proprietary FACP.
- 1.6.10 It shall be possible to test the Detectors working both from the FACP as well as locally by means of a magnet to simulate a Functional Test Condition.
- 1.6.11 It shall be possible to mount the detectors in Duct Casting Unit for sampling of Supplying Air from the AHUs. Secondary response indicators shall be provided for all the Above False Ceiling Detectors.
- 1.6.12 The detector shall have twin LED's for 360 degree viewing angle. LED on the detector shall blink each time the sensor is scanned by the FACP. If the FACP determines that the sensor is in alarm, the FACP will command the sensor LED to remain on to indicate the same. Each sensor will be capable of being tested for alarm via command from the FACP. Each sensor shall respond to FACP scan with the information about its type for identification.
- 1.6.13 It shall be possible to connect loop powered base sounders on the detector loop. The sounder shall not require a separate cable for power supply.

B. HEAT DETECTOR

- 1.6.14 Heat detector shall provide temperature measurement when it reaches pre-alarm in normal course. However the operator shall have the option of calling up the temperature measured by the specific detector as and when required.
- 1.6.15 It shall have in-built locking mechanism to check the removal and pilferage of the detector.
- 1.6.16 The heat detector shall be Analogue Addressable type and be able to send analogue output to the FACP regarding its condition. It shall be able to communicate with the FACP by the

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pulses emitted from the FACP. The detector should be programmed using a decade or rotary switch.

- 1.6.17 The base of the Detector shall be electronics free and interchangeable with other smoke or heat detectors
- 1.6.18 It shall be able to withstand temperature variations from - 10 degree centigrade to 50 degree centigrade. Further, Relative Humidity (non-condensing type) up to 80% shall not hamper its performance. The voltage rating shall be from 15V -32V DC though the voltage may be changed depending upon the working voltages of a proprietary FACP.
- 1.6.19 It shall be possible to test the Detectors working both from the FACP as well as locally by means of magnet to do a Functional Test.
- 1.6.20 The detector shall have twin LED's for 360 degree viewing angle. LED on the detector shall blink each time the sensor is scanned by the FACP. If the FACP determines that the sensor is in alarm, the FACP will command the sensor LED to remain on to indicate the same. Each sensor will be capable of being tested for alarm via command from the FACP. Each sensor shall respond to FACP scan with the information about its type for identification.
- 1.6.21 It shall be possible to connect loop powered base sounders on the detector loop.

1.7 MANUAL CALL STATIONS

- 1.7.1 The manual station shall be a press to break type. The device shall be red in color and suitable for surface or flush mounting. Manual stations shall be inter faceable to an addressable input module that can be accommodated within the device. The manual station shall have normally open fire alarm and annaunciator contacts and these contacts shall close on activate. Contacts shall remain closed until station is manually reset.
- 1.7.2 The Manual Call Station shall be fully addressable with its own addressable module and operated by digitized signals from the FACP. The voltage range shall be from 15V to 32V. It shall have protection as per IP33. The operating temperature range shall be from -10 degree C to 50 degree C. Relative Humidity (non condensing) range of performance parameters shall be between 10 to 93%.

1.8 FIRE ALARM REPEATER / ANNUNCIATOR PANEL

- 1.8.1. The Alarm Repeater/Annunciator Panel shall display fire/fault messages simultaneously with the FACP. It shall be capable of interfacing with the FACP on a single RS 485 Bus.
- 1.8.2. The panel shall have a 80 character backlit alphanumeric LCD display, which shall display date, time & description of alarm/trouble events that are displayed in the FACP with an inbuilt buzzer to indicate fault/fire alarm.
- 1.8.3. The panel shall be powered from the FACP.
- 1.8.4. It shall have control keys for Sound, Silence, Mute and to reset the FACP from the repeater station.
- 1.8.5. The repeater panel shall have the following LED,,s indications a. Supply b. Fault c. Mute d. Silent e. Disabled f. Fire

1.9 SOUNDER/HOOTERS CUM STROBES

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- 1.9.1 The sounder shall be electronic type and shall give discontinuous/ intermittent audible alarm whenever any detector or MCP operates.
- 1.9.2 The sound output from the Hooter should be as per IS 2189.
- 1.9.3 The sounder/Hooter shall be powered from either 2 wire detector loop.
- 1.9.4 The horn/strobe shall be listed to UL 1971/ UL 464/LPCB and shall be Approved for fire protective service. The horn/strobe shall be wired as a primary-signaling notification appliance and comply with the Americans with Disabilities Act requirements for visible signaling appliances, flashing at 1 Hz over the strobes entire operating voltage range. The strobe light shall consist of a xenon flash tube and associated lens/reflector system. The horn shall have three audibility options and an option to switch between a Temporal 3 pattern and a Non-Temporal (continuous) pattern. These options are set by a multiple position switch. On four-wire products, the strobe shall be powered independently of the sounder. The horn on horn/strobe models shall operate on a coded or non-coded power supply.

1.10 DUCT CASTING UNIT The Duct Casting Units are to be directly installed in the return Air conditioning ducts for detecting any hazardous quantity of products of combustion be carried through the ducts. The complete unit shall consist of Polycarbonate housing to accommodate Photo Electric Detector with plug - in facility and sampling tubes, one for Air inlet and other as the air outlet. The Inlet tube shall extend into and across the duct width (from 0.5 meter to 3.0 meter); the outlet tube shall be of fixed length of 7.5-cm length. When the AHU blower fans shall operate a continuous cross sectional Sampling of air from the duct shall flow through the housing containing the Detector. The outlet tube shall return the sampled air into the duct. The functional requirements of the Duct Casting Unit shall be: i) Uniform Sensitivity - irrespective of air velocity - up to 1200 meters per minute. ii) It shall function on the Venturi principle, with Aluminum Venturi tubes. iii) The Duct Casting Unit shall be compact, easy to install and with the facility to dismantle the cover or Detector for maintenance purposes. iv) The housing shall be mounted outside the duct; the probe tubes shall be inserted through the duct by cutting precision sized holes into the duct and sealed with rubber gaskets. v) The Duct Casting Unit shall be LPCB/UL Approved.

1.11 ADDRESSABLE MONITOR MODULE

- 1.11.1 The monitor module shall provide an addressable input for N.O. or N.C. Contact devices such as manual stations, Water flow switches, sprinkler Supervisory devices, etc.
- 1.11.2 It shall provide a supervised initiating circuit. An open-circuit fault shall be Annunciated at the Fire Alarm panel (Subsequent alarm shall be reported.)
- 1.11.3 The device shall contain an LED, which blinks upon being scanned by the Fire alarm panel. Upon determination of an alarm condition of an alarm condition, the LED shall be latched on.
- 1.11.4 The device shall have a selectable inbuilt fault isolator.

1.12 ADDRESSABLE CONTROL MODULE

- 1.12.1 Addressable Control Module shall be provided to operate dry contacts for switching ON OFF pressurization fans, AHU's etc. in case of fire etc.

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1.12.3 It shall have a built in type identification to automatically identify this Device to the control panel.

1.12.4 It shall have internal circuitry & relay powered directly by two-wire loop.

1.12.5 It shall have a selectable inbuilt fault isolator.

1.13 FAULT ISOLATOR MODULE

1.13.1 The Fault Isolator Device shall detect and isolate a short-circuited segment of a Fault-tolerant loop.

1.13.2 The device shall automatically determine a return to normal condition of the Loop and restore the isolated segment.

1.13.3 The fault isolator device shall be placed 20-30 devices as per IS 2189 to limit the Number lost in the event of a short-circuit/wiring fault.

1.14 GRAPHIC MONITORING SOFTWARE

1.14.1 The Graphic Software shall provide both Alarm Management and system maintenance tool.

1.14.2 All the information is available on a single screen allowing quick Assessment, whilst any actions can be taken by accessing the Built-in menus. Building Evacuation, Alarm Silencing and Reset are available to any users with suitable security clearance.

1.14.3 System maintenance can be performed on any device or zone whether the workstation is connected to a single panel or a series of networked panels. From a single location simple checks can be performed to assess the status of individual devices, whilst devices and zones can easily be temporarily isolated for on-site works to be performed. Advanced functionality is available to users with level 3 access permitting the maintenance of PC software security passwords, Time & Date setting and control of the workstation functionality.

1.14.4 The schematic view offers users the site plan. It can be configured to provide a number of levels representing the overall site, individual floor plans, small sections of the floor plans or even individual rooms. Each plan is independently named and can be configured to show all devices as installed on the site.

1.14.5 The event log details a complete history of the activity of the fire system. All major control actions are recorded with date, time, user and an Optional comment field. Entries are colour coded to help easy Identification of specific types of events.

1.15 FIRE ALARM SYSTEM TESTING

1.15.1. FACP

a. The FACP shall be checked for basic tests such as visually checking input voltage and amperage. All zones one by one shall be de wired to check for fault signal indication in the FACP.

b. The Power Source shall be cut off and checked for stand by Supply from the Batteries. After six hours the FACP Source shall be switched on to check for auto switch over to the Mains mode.

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- c. Tests shall be conducted for AC fail, charger fail, DC fail, Battery Disconnect or Battery fail. In all such cases the relevant L E D should glow and the piezo sound shall also give sound output.

1.15.2 SMOKE DETECTOR

- a. The testing shall be carried out for each loop / zone, initially one detector in a zone and subsequently 2 or more disassociated detectors in each zone with time lapse between the detectors to test for Alarm Priority, Alarm Queuing and Call Logging.
- b. An identified detector will be subjected to smoke aspiration from burning paper/cigarette puffs, rubber and other materials which give dense smoke held at 0.3 M distance from the detector. The FACP should indicate increased analogue output for that address and after the programmed delay time, a fire alarm signal shall be indicated. This delay shall be utilised for alarm verification.
- c. The same test shall be carried out for two detectors in the same Loop but in different rooms. The FACP shall indicate Pre Alarm higher analogue levels for both detectors in its display with separate identification for both fires. One of the detectors in question is subjected too higher and longer levels of smoke aspiration. The FACP should give priority alarm for this address. The printout shall indicate individual addresses of the detectors with achieved analogue values and the time of event.
- d. This test shall be carried out for different Loops as well as for 2 Loops simultaneously.

1.15.3 HEAT DETECTOR

- a. The same tests in the same sequence shall be carried out for this Detector but with the application of hot air from a hair dryer held at approximately 60 cm distance.

1.15.4 COMBINED TEST

- a. The next test will be in combination of Photoelectric / Heat Detectors simultaneously with time lapse between application of smoke or heat or as required by the Client.

1.15.5 ADDITIONAL TEST

- a. One detector of each type will be disconnected and subjected to slow dust build - up by means as desired by the Bidder and again connected in the circuit.
- b. The FACP shall indicate the changed ambient levels and automatically adjust the analogue values for the same. These Detectors are to be replaced by new Detectors of identical type and the FACP shall then be programmed accordingly and checked. The Bidder will take custody of the removed detectors without additional cost to the Owner.
- c. Any part of the Loop shall be short-circuited. The FACP shall indicate the communication failure of all the devices connected in the short-circuited segment. After the short circuit is corrected, the Fault Isolator shall return to its normal status automatically, this being reflected in the FACP. The Loop shall then be in normal operation again. Any part of the Loop shall be de wired and tested as given above.

1.15.6 All other tests as required by the client at the time of handing over.

FIRE ALARM CONTROL PANEL

Type	:	Analog Addressable
Type of display	:	LCD
Display of	:	ALL EVENTS
Addressable capability	:	As per BOQ
Intelligent capability	:	Yes
Fault-isolation capability	:	Yes
Alarm delay capability	:	Yes
Sensor-self-test capability	:	Yes
LCD display type	:	Minimum 80 character on each line
BAS integration capability	:	Yes through Modbus
Stand-by battery with charger:	:	Yes

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Voltage requirement : 230 V 50 HZ – Ac

MULTICRITERIA/MULTISENSOR DETECTOR

Type : Analog Addressable
 Twin LED indication : Yes
 Blinking LED facility : Yes
 Addressable capability : Yes
 Intelligent capability : Yes
 Remote / Local test capability: Yes
 Sensor Coverage : Spot Detection
 Programming of detector : By Decade or Rotary Switch
 Operating Temperature Deg C : -10° C to 50° C
 Operating RH at 40° C : 10% - 93% RH
 Operating Voltage : 15 - 32 V DC
 Sensors : Optical and thermal type
 Sensitivity settings : minimum 2 Nos.
 Photo thermal sensitivity settings : minimum 3 Nos.
 Detection Mode : Combines or Thermal Only.

LAZER SMOKE DETECTOR

Type : Analog Addressable
 Twin LED indication : Yes
 Blinking LED facility : Yes
 Addressable capability : Yes
 Intelligent capability : Yes
 Remote / Local test capability : Yes
 Sensor Coverage : Spot Detection
 Programming of detector : By Decade or Rotary Switch
 Operating Temperature Deg C: -10° C to 50° C
 Operating RH at 40° C : 10% - 93% RH
 Operating Voltage : 15 - 32 V DC

OPTICAL SMOKE DETECTOR

Type : Analog Addressable
 Twin LED indication : Yes
 Blinking LED facility : Yes
 Addressable capability : Yes
 Intelligent capability : Yes
 Remote / Local test capability: Yes
 Sensor Coverage : Spot Detection
 Programming of detector : By Decade or Rotary Switch
 Operating Temperature Deg C : -10° C to 50° C
 Operating RH at 40° C : 10% - 93% RH
 Operating Voltage : 15 - 32 V DC

FIXED/ ROR TYPE HEAT DETECTOR

Type : Analog Addressable
 Dual Thermistor : Yes
 Twin LED indication : Yes
 Blinking LED facility : Yes
 Addressable capability : Yes
 Intelligent capability : Yes
 Remote / Local test capability : Yes
 Sensor Coverage : Spot Detection
 Programming of detector : By Decade or Rotary Switch

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Operating Temperature Deg C: -10° C to 50° C
 Operating RH at 40° C : 10% - 93% RH
 Operating Voltage : 15 - 32 V DC

MANUAL CALL POINT

Type : Analog Addressable, Resettable type
 LED indication : Yes
 Operating Voltage : 15V - 32 V
 Dimensions : Semi-flush mounting: 89 x 93 x 27.5 (WxHxD)/
 Surface mounting : 89 x 93 x 59.5 (WxHxD)
 Weight : Semi Flush : 110g/Surface: 160g
 IP Rating : IP24D
 Operating Temperature: -10°C to +50°C
 Relative Humidity : 0% - 95% non-condensing
 Operating Voltage : 15V to 30Vdc max

REPEATER ALARM PENAL

Type : Active Type
 Controls : System Reset, Accept, Mute, Silence & Self Test
 LCD Display : 80 Characters
 Power Supply : External Type 24 VDC
 Operating Current : 90MA

ADDRESSABLE MONITOR MODULE

Mounting Option : DIN Rail or Surface Mount
 Status Indication : Tri Colour LED
 Address Setting : Through Selector Switch
 Operating Temperature : -10 deg c- +50 deg c
 Humidity : 0 – 95 % Maximum Non Condensing
 Operating Voltage : 15-30 VDC
 Type : Single Channel

ADDRESSABLE CONTROL/OUTPUT MODULE

Mounting Option : DIN Rail or Surface Mount
 Status Indication : Tri Colour LED
 Address Setting : Through Selector Switch
 Operating Temperature : -10 deg c- +50 deg c
 Humidity : 0 – 95 % Maximum Non Condensing
 Operating Voltage : 15-30 VDC
 Type : Single Channel
 Relay Type : Form C

FAULT ISOLATOR MODULE

Mounting Option : DIN Rail or Surface Mount
 Status Indication : Tri Colour LED
 Address Setting : Through Selector Switch
 Operating Temperature : -10 deg c- +50 deg c
 Humidity : 0 – 95 % Maximum Non Condensing
 Operating Voltage : 15-30 VDC
 Fault detection Delay : 100 to 400 ms

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ADDITIONAL CONDITION FOR UPS SYSTEM

1.0 SCOPE

This specification covers manufacture, assembly at factory, testing as may be necessary before dispatch, delivery at site, installation, testing and commissioning of 30 KVA UPS at **Multipurpose Hall, NBSC/BIRD Campus Lucknow (UP)**. This also covers the commercial conditions of contract, applicable for the work. These shall be read, in conjunction with conditions indicated in the standard form PWD-8. In the event of any discrepancy between these forms and the conditions hereunder, the later shall prevail.

1.1. The tenderers are advised not to deviate from the technical specification/items commercial terms and conditions of NIT like terms of payment, guarantee, arbitration clause, escalation etc.

2.0 Terms of payment

The following terms of payment shall be applicable for U.P.S covered in this work.

- (i) No advance payment shall be made.
- (ii) **70% after** initial inspection and delivery at site in good condition on pro-rata basis.
- (iii) **20% after** completion of installation in all respect.
- (iv) **Balance 10% will** be paid after Testing, Commissioning & Handing Over to the department for beneficial use.

3. Storage :- Responsibility for storage space for execution of work shall be of main contractor.

4. Power & Water Supply:-Responsibility for supply of power & water for execution of work shall be of main contractor.

5 Works to be done by the contractor

In addition to supply, installation, testing and commissioning of all the equipments, as per schedule of work, and CPWD specifications, the following works shall be deemed to be included within the scope of work to be executed by the contractor.

- i) Any minor building work for the installation such as cutting and making good the damages.

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- ii) Provision of all accessories required for the installation.
- iii) Tools and tackles required for handling and installation of equipments.
- iv) Protection required for the equipments from rain, dust storm etc. during transportation.
- v) Necessary equipments for commissioning the system at site and testing etc.
- vi) No Form 31/Road permit will be issued to the contractor by the department.

6 After award of work

The successful tenderer shall submit the detailed working in respect of UPS. Work will be started after getting the drawing approved by the Engineer-in-Charge.

7 Inspection

7.1 Copies of all manufacturer's routine and type test certificates of the equipments shall be furnished to the Engineer-in-Charge.

7.2 UPS and battery bank shall be offered for initial inspection & testing in the work of the manufacturer before delivery. Contractor will give sufficient notice for the same. The department reserves the right to inspect or not to inspect the equipment in the work of the manufacturer. In the later case confirmation in writing will be issued by the department. The department will bear the to& fro expenses of the officer deputed for carrying out inspection. However nothing extra shall be paid for conducting routine test in the presence of department's representative.

7.3 After installation, the equipment shall be tested by the contractor, for which all consumables shall be provided by him.

The inspection at site includes operation checks and any other test as necessary to check the performance of the equipments, so as to check conformity to tender specifications.

8 Warranty

All equipments supplied and installed shall be covered by warranty for one year against defective workmanship and material. If any equipment is found to be defective due to faulty materials, faulty design, or inferior quality of materials it shall be repaired or replaced at site free of charge by the successful tenderer at his own cost during the warranty period. The warranty shall cover consequential damages to the equipment supplied and installed by the tenderer due to poor workmanship or defective materials. All repairs shall be done promptly

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within a reasonable period. The warranty period will commence from the date of handing over of the installations to the department duly commissioned.

9 Painting

The tendered cost shall include cost of painting of entire installation complete in all respect.

10 Rates

10.1 The department will not issue Octroi exemption certificate.

11 Extent of work

11.1 The work shall comprise of entire labour including supervision and all materials necessary to make a complete installation and such tests and adjustments and commissioning as may be required by the department.

11.2 The scope of works include on job technical training of two persons at site nothing extra shall be payable on this account.

12. The material in required quantity to be used in the work shall be got approved from the Engineer-in-charge 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 as per specifications.
13. Contractor shall preserve the copies of invoices, test certificates, gate passes etc. to prove the genuineness of material/purchases. The responsibility of procurement, genuine material of specialized works shall rest with the contractor.
14. **No inspection out side the country is permissible if required so the same will be deemed to be waived off and necessary test reports shall be submitted before the dispatch of equipment.**

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Additional Condition for CCTV System

1. The work shall be carried out as per CPWD general specifications of electrical works amended upto date and as per direction of Engineer-in-charge.
2. No. T&P shall be issued to the contractor.
3. The material shall be got approved before use at site of work from Engineer-in-charge.
4. Any damage done to the building / equipment shall be made good by the contractor at his own risk and cost.
5. The site shall be cleared properly after completion of work.
6. The contractor has to engaged his labour as per site condition. The department shall be not entertain any claim for the idle labour whatsoever.
7. The contractor shall make all safety arrangement during execution of work, if any accident occurs due to the negligence it will be the entire responsibility of the contractor.
8. All the equipments shall be guaranteed for one Year from the date of completion and hand over of the installation of CPWD, against unsatisfactory performance and /or beark down of the equipment or component or any other parts of installation so found defective in the guarantee period shall be replaced/repared by the contractor free of charges to the satisfaction of Engineer-in-charge.
9. The contractor shall provide all operating manual complete drawings and shall provide one months training to the personnel's of the department free of cost.
11. The successful supplier/firm shall give three years warranty and five years service support for the items from the manufacturer in written.
12. The successful firm shall support and will provide all necessary technical support in installation and successful commission of the entire system and nothing extra shall be paid on this account.
13. There will be not deviation regarding makes and specifications of the CCTV Camera etc taken in the tender. However department may consider higher specifications if it meets our requirement nothing extra will be paid on this account.
14. All equipments shall be delivered with technical catalogues, instructions manual, wiring diagram etc.
15. The contractor shall provide the STQC compliance certificate for CCTV camera and other allied equipments.

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16. Guarantee / Warranty

- 16.1 The equipment supplied by the contractor shall be guaranteed against failure due to quality of material, workmanship, circuit design of any other failure, for a period of at least. One year from the date of commissioning and acceptance of the equipment.
- 16.2 Contractor shall give warranty that all the equipment and material to be supplied under the contract are now and free any defects and faults in material, workmanship and manufactured and are of highest grade and consistent with the established and generally excepted standards for the same type of equipments and material and shall performing full conformity with the specifications and drawing. The contractor shall be responsible for any defect that may develop under the contract conditions and under proper use, arising from faulty material, design or workmanship such as corrosion, in adequate quantity of material to meet equipment requirement, in adequate contact protection, deficiency in circuit design and/or otherwise and shall remedy such defects at its own cost when called upon to do so by the purchaser. The contractor shall warrant that if system deficiency are notices in operation of the system for which software function are involved then the software update for correcting the deficiency shall be supplied free of cost for the purchaser. The warranty shall survive inspection or payment of complaints notified prior to such date 01 year after tile stores have been taken over after successful commissioning of the entire equipments.
- 16.3 Replacement under warranty shall be made by the contractor free of all charges at site including freight, insurance incidental charges.
- 16.4 With respect to parts needed to troubleshoot and maintain installation after the warranty period the contractor shall warranty the delivery of spares for at least 1 year. After this period the contractor shall inform CPWD where the parts can be procured in case contractor is able to provide.

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Additional Conditions for Solar Photovoltaic Power Plant

1. The work shall be carried out as per CPWD general specifications of electrical works amended upto date and as per direction of Engineer-in-charge.
2. No. T&P shall be issued to the contractor.
3. The material shall be got approved before use at site of work from Engineer-in-charge.
4. Any damage done to the building / equipment shall be made good by the contractor at his own risk and cost.
5. The site shall be cleared properly after completion of work.
6. The contractor has to engage his labour as per site condition. The department shall be not entertain any claim for the idle labour whatsoever.
7. The contractor shall make all safety arrangement during execution of work, if any accident occurs due to the negligence it will be the entire responsibility of the contractor.
8. All the equipments shall be guaranteed for one Year from the date of completion and hand over of the installation of CPWD, against unsatisfactory performance and /or beark down of the equipment or component or any other parts of installation so found defective in the guarantee period shall be replaced/repared by the contractor free of charges to the satisfaction of Engineer-in-charge.
9. The contractor shall provide all operating manual complete drawings and shall provide one months training to the personnel's of the department free of cost.
10. The successful firm shall support and will provide all necessary technical support in installation and successful commission of the entire system and nothing extra shall be paid on this account.
11. All equipments shall be delivered with technical catalogues, instructions manual, wiring diagram etc.

12. Terms of payments

Following payment terms shall be applicable.

- i) No advance payment shall be made.
- ii) Following percentage of contract rates shall be payable against the stage of work shown herein:

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Sl. No.	Stage of Work	
1.	After initial inspection (wherever specified) and delivery at site in good condition on pro-rata basis.	70%
2.	On completion of installation in all respect on pro-rata basis.	20%
3.	On successful Commissioning and taking over by the department.	10%

13 DRAWINGS & MANUALS: Two sets of Engineering, electrical drawings and Installation and O&M manuals are to be supplied. Bidders shall provide complete technical data sheets for each equipment giving details of the specifications along with make/makes along with basic design of the power plant and power evacuation, synchronization along with protection equipment. Approved ISI and reputed makes for equipment be used.

14 The following Statutory Clearances shall be obtained by the/Bidder(s) wherever applicable:

- (a) Building and Architectural Drawings approvals from relevant authorities/Primary Beneficiary Organisation.
- (b) Electrical Safety approval for system more than 10 KW (Chief Electrical Inspector)
 - i) All equipment, accessories, materials, civil construction & erection works should comply with statutory requirements, IS and required and highlighted IEC standards
 - ii) All statutory requirements for working at the Site like labour registration, workman compensation policy, ESIC etc. to be complied with by the vendor before deployment of resources at the Site.

15 Test Certificates and Reports to be Furnished

Test Certificates / Reports from IECQ / NABL accredited laboratory for relevant IEC / equivalent BIS standard for quoted components shall be furnished. Type Test Certificates / reports shall be provided for the solar modules and solar grid tied inverters up to 20kW to provide evidence of

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compliance with standards. For solar grid tied inverters above 20kW, self-certification by the manufacturer of the said inverter is acceptable.

General Instructions

- A Water and power supply for the construction shall be the responsibility of the Contractor/Bidder
- B Security, safety, watch, and ward of all materials at sites shall be the responsibility of the Contractor/Bidder
- C Liaison with the concerned distribution licensees, Uttar Pradesh New and Renewable Energy Development Agency, the Chief Electrical Inspector and any other statutory authorities as applicable for all the Project approvals
- D Expenses for any other works, supply of material, and providing services required for the successful commissioning and operation of the plant, but not specifically mentioned in this document.
- E Safety management to be strictly complied with by the Contractor/Bidder throughout implementation activity.
- F First-aid medical facilities at the Site during construction to be provided by the Contractor/Bidder(s)
- G All local labour, employment, and other issues shall be handled independently by the Contractor/ Bidder(s)
- H The entire responsibility and risk relating towards the workforce working at the Site, and compliance of different statutory regulations like Workman Compensation Act, Employees' State Insurance Corporation (ESIC), Factory Act 1948, Contract Labour Regulation, and Abolition Act 1970, Shop and Establishment Act 1948, and other Statutory regulatory bodies shall solely lie with the Contractor.

16 Technical specifications

A Grid Tied Solar Rooftop Photo Voltaic (SPV) power plant consists of SPV array, Module Mounting Structure, Power Conditioning Unit (PCU) consisting of Maximum Power Point Tracker (MPPT), Inverter, and Controls & Protections, interconnect cables, Junction boxes, Distribution boxes and switches. PV Array is mounted on a suitable structure. Components and parts used in the SPV power plants including the PV modules, metallic structures, cables, junction box, switches, PCUs etc., should conform to the BIS or IEC or international specifications, wherever

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such specifications are available and applicable. Solar PV rooftop system shall consist of following major equipment/components.

- ☐ Solar PV modules consisting of required number of Crystalline PV cells.
- ☐ Grid interactive Power Conditioning Unit with Remote Monitoring System
- ☐ Mounting structures
- ☐ Junction Boxes.
- ☐ Earthing and lightning protections.
- ☐ IR/UV protected PVC Cables, pipes and accessories

SOLAR PHOTOVOLTAIC MODULES: Solar PV modules should be of the crystalline silicon type, manufactured in India. Detailed specifications of the solar PV modules are given below Type Crystalline silicon Origin Manufactured in India

Efficiency $\geq 16.5\%$

Fill factor $\geq 70\%$

warranty Panel output (Wp) capacity to be $\geq 90\%$ at the end of 10 years and $\geq 80\%$ of at the end of 25 years. Module frame Non-corrosive and electrically compatible with the mounting structure material Termination box Thermo-plastic, IP 65, UV resistant Blocking diodes Schottky type Module minimum rated power The nominal power of a single PV module shall not be less than 330Wp. Identification tag for each solar module Shall be provided inside the module and must be able to withstand environmental conditions and last the lifetime of the solar module. Identification tag data a) Name of the manufacturer with logo Month and year of manufacture Model No (Should consists of the voltage and rate wattage) b) Module serial number c) Made in India Power output rating To be given for standard test conditions (STC). I- V curve of the each module shall be submitted. Compliance with standards and codes IEC 61215 / IS 14286 IEC 61730 Part 1 and 2 Salt Mist Corrosion Testing As per IEC 61701 The bidder shall carefully design & accommodate requisite numbers of the modules to achieve the rated power in his bid. The rated output power of any supplied module shall have tolerance of $\pm 3\%$. The peak-power point voltage and the peak-power point current of any supplied module and/or any module string (series connected modules) shall not vary by more than 2 (two) per cent from the respective arithmetic means for all modules and/or for all module strings, as the case may be.

WARRANTIES :

a) Material Warranty:

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i. Material Warranty is defined as: The manufacturer should warrant the Solar Module(s) to be free from the defects and/or failures specified below for a period not less than five (5) years from the date of sale to the original customer .

ii. Defects and/or failures due to manufacturing iii. Defects and/or failures due to quality of materials i. Non conformity to specifications due to faulty manufacturing and/or inspection processes. If the solar Module(s) fails to conform to this warranty, the manufacturer will replace the solar module(s), at the Owners sole option. ii. The performance warrant shall be as mentioned above.

17. **Solar PV Mounting Structure:** The PV modules shall be mounted on fixed metallic structures having adequate strength and as per specifications given below which can withstand the load of the modules and high wind velocities. The array structure will be made of pre galvanized sheet steel of size not less than 50mm x 50mm x 6mm size/Aluminium (L-angle – 50mm x 50mm x 5mm, U-channel – 33mm x 30mm x 33mm x 3mm). The support structure shall be hot dip galvanized steel or aluminium. The mounting structure steel shall be as per latest IS 2062: 1992 and galvanization of the mounting structure shall be in compliance of latest IS 4759.

17.1 Detailed specifications for the mounting structure are given below: Wind velocity withstanding capacity 150 km / hour The designs have been certified by a recognized Lab/ Institution in this regard and submit wind loading calculation sheet to users if they desire so. Suitable fastening arrangement such as grouting and calming should be provided to secure the installation against the specific wind speed.

Structure material Pre galvanized sheet steel with a minimum galvanization thickness of 80 microns and the structural patterns shall be made before galvanizing

Bolts, nuts, panel mounting clamps, fasteners (with spring washers)

Stainless steel SS 304

Mounting arrangement

RCC-flat roofs Installation

The structures shall be designed for simple mechanical on-site installation. There shall be no requirement of welding or complex machinery at the installation site. Minimum distance between

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roof edge and mounting structure 0.5m Access for panel cleaning and maintenance All solar panels must be accessible from the top for cleaning and from the bottom for access to the module-junction box. Panel tilt angle North – south orientation with a fixed tilt angle of 27-30 degrees(depending on location), south facing. However to accommodate more capacity the angle inclination may be reduced until the plant meets the specified performance ratio requirements.

Regarding civil structures the bfirm need to take care of the load bearing capacity of the roof and need arrange suitable structures based on the quality of roof. The total load of the structure (when installed with PV modules) on the terrace should be less than 60 kg/m². The array structure shall be grounded properly using maintenance free earthing kit suitable for mounting over building terrace

Solar Array Fuse

The cables from the array strings to the solar grid inverters shall be provided with DC fuse protection. Fuses shall have a voltage rating and current rating as required. The fuse shall have DIN rail mountable fuse holders and shall be housed in thermoplastic IP 65 enclosures with transparent covers.

18. Solar Grid Inverter

As SPV array produce direct current electricity, it is necessary to convert this direct current into alternating current and adjust the voltage levels to match the grid voltage. Conversion shall be achieved using an electronic Inverter and the associated control and protection devices. All these components of the system are termed the “Power Conditioning Unit (PCU)”. In addition, the PCU shall also house MPPT (Maximum Power Point Tracker). Inverter output should be compatible with the grid frequency. Typical technical features of the inverter shall be as follows:

1. Total output power (AC To match solar PV plant capacity while achieving optimum system efficiency
2. Input DC voltage range As required for the solar grid inverter DC input
3. Maximum power point (MPPT) Shall be incorporated
4. Number of independent MPPT inputs 1 or more
5. Operation AC voltage –Three phase 415V four wire Above 50 KW-11KV or as per availability of the main grid supply
6. Operating Frequency range 47.5 – 52.5 Hz

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7. Nominal frequency 50 Hz
8. Power factor of the inverter >0.98 at nominal power
9. Total harmonic distortion Less than 3%
10. Built-in Protection AC high / low voltage; AC high /low frequency
11. Anti-islanding protection As per VDE 0126-1-1 / IEC 60255.5/ IEC 60255.27 / IEC 62116
12. Operating ambient temperature range -0°C to $+50^{\circ}\text{C}$
13. Humidity 0 – 95% Rh
14. Inverter efficiency $\geq 97\%$
15. Inverter weighted efficiency $\geq 95\%$
16. Protection degree IP 65 for outdoor mounting, IP 54 for indoor mounting
17. Communication interface RS 485 / RS 232 / RJ45
18. Safety compliance IEC 62109-1, IEC 62109-2
19. Environmental Testing IEC 60068-2 (1, 2, 14, 30)
20. Efficiency Measurement Procedure IS/IEC 61683
21. Cooling Convection
22. Display type LCD for data display. LCD /LED for status display
23. Display parameters to include Output power(W), cumulative energy (Wh), DC voltage (V), DC current (A), AC voltage (V), AC frequency (Hz), AC current (A), cumulative hours of operation (h).

The combined wattage of all inverters should not be less than rated capacity of power plant under STC.

PCU/inverter shall be capable of complete automatic operation including wake-up, synchronization & shutdown. The output of power factor of PCU inverter is suitable for all voltage ranges or sink of reactive power, inverter should have internal protection arrangement against any sustainable fault in feeder line and against the lightning on feeder. Built-in meter and data logger to monitor plant performance shall be provided. The PCU/ inverters should be tested from the MNRE approved test centres /NABL /BIS /IEC accredited testing- calibration laboratories

GRID ISLANDING: In the event of a power failure on the electric grid, it is required that any independent power-producing inverters attached to the grid turn off in a short period of time. This prevents the DC-to-AC inverters from continuing to feed power into small sections of the grid,

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known as “islands.” Powered islands present a risk to workers who may expect the area to be unpowered, and they may also damage grid-tied equipment. The Rooftop PV system shall be equipped with islanding protection. In addition to disconnection from the grid (due to islanding protection) disconnection due to under and over voltage conditions shall also be provided. A manual disconnect 4pole isolation switch beside automatic disconnection to grid would have to be provided at utility end to isolate the grid connection by the utility personnel to carry out any maintenance. This switch shall be locked by the utility personnel The AC output of the solar grid inverter shall be connected to the building’s electrical system after the Discom service connection meter and main switch on the load side. The solar grid inverter output shall be connected to a dedicated module in the Main Distribution Board (MDB) of the building. It shall not be connected to a nearby load.

19. DATA ACQUISITION SYSTEM / PLANT MONITORING

Data Logging Provision for plant control and monitoring, time and date stamped system data logs for analysis with the high quality, suitable PC, Metering and Instrumentation for display of systems parameters and status indication to be provided. Solar Irradiance: An integrating Pyranometer / Solar cell based irradiation sensor (along with calibration certificate) provided, with the sensor mounted in the plane of the array. Readout integrated with data logging system.

Temperature: Temperature probes for recording the Solar panel temperature and/or ambient temperature to be provided complete with readouts integrated with the data logging system The following parameters are accessible via the operating interface display in real time separately for solar power plant: □ AC Voltage. □ AC Output current. □ Output Power □ Power factor. □ DC Input Voltage. □ DC Input Current. □ Time Active. □ Time disabled. □ Time Idle. □ Power produced Protective function limits (Viz-AC Over voltage, AC Under voltage, Over frequency, Under frequency ground fault, PV starting voltage, PV stopping voltage.

All major parameters available on the digital bus and logging facility for energy auditing through the internal microprocessor and read on the digital front panel at any time) and logging facility (the current values, previous values for up to a month and the average values) should be made available for energy auditing through the internal microprocessor and should be read on the digital front panel. PV array energy production: Digital Energy Meters to log the actual value of AC/ DC voltage, Current & Energy generated by the PV system provided. Energy meter along with CT/PT should be of 0.5 accuracy class. Computerized DC String/Array monitoring and AC output monitoring shall be provided as part of the inverter and/or string/array combiner box or

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separately. String and array DC Voltage, Current and Power, Inverter AC output voltage and current (All 3 phases and lines), AC power (Active, Reactive and Apparent), Power Factor and AC energy (All 3 phases and cumulative) and frequency shall be monitored. Computerized AC energy monitoring shall be in addition to the digital AC energy meter. The data shall be recorded in a common work sheet chronologically date wise. The data file shall be MS Excel compatible. The data shall be represented in both tabular and graphical form. All instantaneous data shall be shown on the computer screen. Software shall be provided for USB download and analysis of DC and AC parametric data for individual plant. Provision for Internet monitoring and download of data shall be also incorporated. Remote Server and Software for centralized Internet monitoring system shall be also provided for download and analysis of cumulative data of all the plants and the data of the solar radiation and temperature monitoring system. Ambient / Solar PV module back surface temperature shall be also monitored on continuous basis. Simultaneous monitoring of DC and AC electrical voltage, current, power, energy and other data of the plant for correlation with solar and environment data shall be provided. Remote Monitoring and data acquisition through Remote Monitoring System software at the owner/ with latest software/hardware configuration and service connectivity for online / real time data monitoring/control complete to be supplied and operation and maintenance/control to be ensured by the supplier. Provision for interfacing these data on client server and portal in future shall be kept.

PROTECTIONS The system should be provided with all necessary protections like earthing, Lightning, and grid islanding as follows:

LIGHTNING PROTECTION

The SPV power plants shall be provided with lightning & overvoltage protection. The main aim in this protection shall be to reduce the over voltage to a tolerable value before it reaches the PV or other sub system components. The source of over voltage can be lightning, atmosphere disturbances etc The entire space occupying the SPV array shall be suitably protected against Lightning by deploying required number of Lightning Arrestors. Lightning protection should be provided as per IEC 62305 /IS 2309 standard. The protection against induced high-voltages shall be provided by the use of metal oxide varistors (MOVs) and suitable earthing such that induced transients find an alternate route to earth.

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SURGE PROTECTION Surge protection shall be provided on both the DC and the AC side of the solar system. The DC surge protection devices (SPDs) shall be installed in the DC distribution box adjacent to the solar grid inverter.

The AC SPDs shall be installed in the AC distribution box adjacent to the solar grid inverter. The SPDs earthing terminal shall be connected to earth through the above mentioned dedicated earthing system. The SPDs shall be of type 2 as per IEC 60364-5-53

EARTHING PROTECTION

(i) Each array structure of the PV yard should be grounded/ earthed properly as per IS:30431987. In addition the lighting arrester/masts should also be earthed inside the array field. Earth Resistance shall be tested in presence of the representative of Discom /UPNEDA as and when required after earthing by calibrated earth tester. PCU, ACDB and DCDB should also be earthed properly. (j) Earth resistance shall not be more than 5 ohms. It shall be ensured that all the earthing points are bonded together to make them at the same potential.

CABLES : Cables of appropriate size to be used in the system shall have the following characteristics:

- a) Shall meet IEC 60227/IS 694, IEC 60502/IS1554 standards Temp. Range: -10°C to $+80^{\circ}\text{C}$. Voltage rating 660/1000V
- b) For the DC cabling, Solar cables with multi stranded copper conductors XLPE or XLPO insulated and sheathed with the voltage rating of 1000 V DC or higher UV stabilised single core flexible copper cables shall be used. Multi-core cables shall not be used.
- c) For the AC cabling, PVC or XLPE insulated and PVC sheathed single or multi-core flexible copper cables shall be used. Outdoor AC cables shall have a UV-stabilised outer sheath
- d) The total voltage drop on the cable segments from the solar PV modules to the solar grid inverter shall not exceed 1.0%.
- e) The total voltage drop on the cable segments from the solar grid inverter to the building distribution board shall not exceed 2.0%
- f) The DC cables from the SPV module array shall run through a UV-stabilised PVC conduit pipe of adequate diameter with a minimum wall thickness of 1.5mm or through a High Density Poly

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Ethylene (HDPE) conduit. The conduits shall not run across the path way of the terrace. Flexible corrugated PVC conduits shall not be used.

g) Cables and wires used for the interconnection of solar PV modules shall be provided with solar PV connectors (MC4) and couplers.

h) All cables and conduit pipes shall be clamped to the rooftop, walls and ceilings with thermo-plastic clamps at intervals not exceeding 50 cm. The minimum DC cable size shall be 4.0 mm² copper. The minimum AC cable size shall be 4.0 mm² copper for up to 10kWp and 16.0mm² for above 10kWp / required standard size. In three phase systems, the size of the neutral wire shall be equal to the size of the phase wires. The following colour coding shall be used for cable wires:

i) DC positive: red (the outer PVC sheath can be black with a red line marking)

j) DC negative: black

k) AC single phase: Phase: red; neutral: black

l) AC three phase: Phases: red, yellow, blue; neutral: black Earth wires: green

m) Cables and conduits that have to pass through walls or ceilings shall be taken through a PVC pipe sleeve.

n) Cable conductors shall be terminated with tinned copper end-ferrules to prevent fraying and breaking of individual wire strands. The termination of the DC and AC cables at the Solar Grid Inverter shall be done as per instructions of the manufacturer, which in most cases will include the use of special connectors.

o) Cable lugs and end –ferrules for all cable conductor and wire terminations shall be crimped with crimping pliers and end-ferrule pliers

p) All cable ties shall be UV resistant.

q) The Cable should be so selected that it should be compatible up to the life of the solar PV panels i.e. 25years

r) The ratings given are approximate. Bidder to indicate size and length as per system design requirement. All the cables required for the plant provided by the bidder. Any change in cabling sizes if desired by the bidder/approved after citing appropriate reasons. All cable schedules/layout drawings approved prior to installation.

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ADDITIONAL CONDITION FOR LIFT WORK.

1. General

- (i) This specification covers manufacture, testing as may be necessary before dispatch, delivery at site, all preparatory work, assembly and installation, commissioning putting into operation of lifts.
- (ii) LOCATION: The lifts will be installed in **Multipurpose Hall, NBSC/BIRD Campus Lucknow (UP)**. The work shall be executed as per CPWD General Specifications for Electrical works (Part III Lifts & Escalators-2003) and NBC-2016 as well as per relevant IS and as per directions of Engineer-in-charge.
- (iii) These additional specifications are to be read in conjunction with above and in case of variations, specifications given in these additional conditions shall apply. However, nothing extra shall be paid on account of these additional specifications & conditions as the same are to be read along with schedule of quantities for the work.
- (iv) The tenderer should in his own interest visit the site and familiarize himself with the site conditions before e-tendering.
- (v) No T & P shall be issued by the department and nothing extra shall be paid on account of this.
- (vi) The contractors have provided fund code number and all the workers employed by them have activated Universal Account Number (UAN).
- (vii) Payment to contractor shall be made after obtaining the certificate from the contractor that all the workers employed by him directly or indirectly are enrolled as member of PF and due contribution have been made into their account.

2. Terms of payments

The following percentage of contract rates for the various items included in the contract shall be payable against the stage of work shown herein.

- (i) 70% after initial inspection and delivery at site in good condition of pro-rata basis
- (ii) 20% after completion of installation in all respect.
- (iii) Balance 10% will be paid after testing, commissioning trial run & handing over to the department for beneficial use.

3. Rates

The rates quoted by the tenderer/firm shall be inclusive of GST and all charges for packing forwarding, insurance, freight and delivery, installation, testing, commissioning etc at site i/c temporary constructional storage, risks, overhead charges general liabilities/obligations and clearance from local authorities.

The contractor has to carry comprehensive maintenance for 24 months from the date of handing over. Nothing extra shall be paid for this.

Octroi duty shall not be paid separately but octroi exemption certificate can be furnished by the department on demand. However, the department is not liable to re-imburse the octroi duty in case exemption certificate are not honoured by the concerned authorities.

The rates quoted by the firm should be inclusive of all related minor civil works and nothing extra shall be paid on this account.

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4. Completeness of tender

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

5. For item/equipment requiring initial inspection at manufacturer's works the contractor will intimate the date of testing of equipments at the manufacturer's works before dispatch. The department also reserves the right to inspect the fabrication job at factory and the successful tenderer has to make the arrangement for the same. The successful tenderer shall give sufficient advance notice regarding the dates proposed for such tests /inspection to the department's representative (s) to facilitate his presence during testing/fabrication. The Engineer-in-charge at his discretion may witness such testing/fabrication. The cost of the Engineer's visit to the factory will be borne by the Agency. Also equipment may be inspected at the manufacturer's premises before dispatch to the site by the contractor.

6. Storage and custody of materials

The lift machine room maybe used for storage of sundry materials and erection equipments if available or else the agency has to make his own arrangement. No separate storage accommodation shall be provided by the department. Watch and ward of the stores and their safe custody shall be the responsibility of the contractor till the final taking over of the installation by the department.

7. Care of building

Care shall be taken by the contractor while handling and installation the various equipments and components of the work to avoid damage to the building. He shall be responsible for repairing all damages and restoring the same to their original finish at his cost. He shall also remove at his cost all unwanted and waste materials arising out of the installation from the site of work.

Guarantee

All equipments shall be guaranteed for a period of 24 months from the date of taking over the installation by the department against unsatisfactory performance and /or break down due to defective design, workmanship of material. The equipments or components, or any part thereof, so found defective during guarantee period shall be forthwith repaired or replaced free of cost, to the satisfaction of the engineer-in-charge. In case it is faulty the department that undue delay in being caused by the contractor in doing this, the same will be done by the department at the risk and cost of the contractor. The decision of the engineer-in-charge in this regard shall be final.

8. Power supply

Responsibility for supply of power for execution of work shall be of main contractor.

9. Water supply

Responsibility for supply of water for execution of work shall be of main contractor.

10. After award of work

The successful tenderer would be required to submit the following drawing within 15 days of award of work for approval before commencement of installation.

a) All general arrangement drawings.

b) Details of foundations for the equipments, load data, location etc. of various assembled equipment as may be needed generally by other agencies for purpose of their

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work. The data will include breaking load on guides, reaction of buffers on lift pits reaction on support points in machine room, lift well etc.

c) Any other drawing /information not specifically mentioned above but deemed to be necessary for the job by the contractor.

d) Any other drawing/information not specifically mentioned above but deemed to be necessary for the job by the contractor.

11. The successful tenderer should furnish well in advance three copies of detailed instruction and manual of manufacturer for all items of equipments regarding installation, adjustment, operation and maintenance i/c preventive maintenance & trouble shooting together with all the relevant data sheets, spare parts catalogue and workshop procedure for repairs, assembly and adjustment etc all in triplicate.

12. Extent of work

The work shall comprise of entire labour i/c supervision and all materials necessary to make a complete installation and such tests and adjustments and commissioning as may be required by the department. The term complete installation shall not only mean major items of the plant and equipments covered by specifications but all incidental sundry components necessary for complete execution and satisfactory performance of installation with all layout charts whether or not those have been mentioned in details in the tender document in connection with this contract.

Minor building work necessary for installation of equipment, foundation, making of opening in wall or in floors and restoring to their condition, finish and necessary grouting etc as required.

The work is turnkey project. Any item required for completion of the project but left inadvertently shall be executed with in the quoted rates.

13. Inspection and testing

Copies of all documents of routine and type test certificated of the equipment, carried out at the manufacturers premises shall be furnished to the engineer –in – charge and consignee. The agency shall intimate in writing to Engineer-in-charge for factory inspection well in advance before dispatch.

After completion of the work in all respect the contractor shall offer the installation for testing and operation.

Dummy load for testing of lift after installation at site shall be arranged by the contract. Nothing extra shall be payable on this account.

14. Compliance with Regulations and Indian standards

All works shall be carried out in accordance with relevant regulation, both statutory and those specified by the Indian Standards related to the works covered by these specifications. In particular, the equipment and installation will comply with the following:

I. Factories Act.

II. Indian Electricity Rules

III. I.S & BS Standards as applicable

IV. Workmen's compensation Act

V. Statutory norms prescribed by local bodies like CEA, DFO etc.

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Nothing in this specification shall be construed to relieve the successful tenderer of his responsibility for the design, manufacture and installation of the equipment with all accessories in accordance with currently applicable statutory regulations and safety codes.

Successful tenderer shall arrange for compliance with statutory provision of safety regulation and departmental requirements of safety codes in respect of labour employed on the work by the tenderer. Failure to provide such safety requirement would make the tenderer liable for penalty of Rs. 50/- for each default. In addition, the department will be at liberty to make arrangement for the safety requirements at the cost of tenderer and recover the cost thereof from him.

15. Indemnity

The successful tenderer shall at all times indemnify the department, consequent on this works contract. The successful tenderer shall be liable, in accordance with the Indian law & Regulations for any accident occurring due to any cause and the department shall not be responsible for any accident or damage incurred or claims arising therefrom during the period of erection, construction and putting in to operation the equipments and ancillary equipment under the supervision of the successful tenderer in so far as the later is responsible. The successful tenderer shall also provide all insurance i/c third party insurance as may be necessary to cover the risk. No extra payment would be made to the successful tenderer due to the above.

16. Erection tools

No tools and tackles either for unloading or for shifting the equipments for erection purpose would be made available by the department. The successful tenderer shall make his own arrangement for all these facilities.

17. Co-operation with other agencies

The successful tenderer shall co-ordinate with other contractors and agencies engaged in the construction of building, if any, and exchange freely all technical information so as to make the execution of this works contract smooth. No remuneration should be claimed from the department for such technical cooperation. If any unreasonable hindrance is caused to other agencies and any completed portion of the work has to be dismantled and re-done for want of cooperation and coordination by the successful tenderer during the course of work, such expenditure incurred will be recovered from the successful tenderer if the restoration work to the original condition or specification of the dismantled portion of the was not undertaken by the successful tenderer himself.

18. Mobilization advance

No. mobilization advance shall be paid for this work.

19. Insurance and storage

All consignments are to be duly insured upto the destination from warehouse to warehouse at the cost of the supplier. The insurance covers shall be valid till the equipment is handed over duly installed, tested and commissioned.

20. Verification of correctness of Equipment at destination

The contractor shall have to produce all the relevant record to certify that the genuine equipment from the manufacturers has been supplied and erected.

21. Painting

This shall include cost of painting of entire exposed iron work complete in the installation. All equipments works shall be painted at the works before dispatch to the site.

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22. Training

The scope of works includes on technical training of two persons at site. Nothing extra shall be payment on this account.

23. Maintenance

Sufficient trained and experienced staff shall be made available to meet any exigency of work during the guarantee period of two years from the date of completion or handing over of the installation to the deptt whichever is later.

The routine as well as preventive maintenance for two years by manufacturer shall be carried out from the date of taking over the installation by deptt. i/c attending all call back of break down round the clock, for two years which shall be within the scope of work.

24. Interpreting specifications

In interpreting the specifications, the following order of decreasing importance shall be followed in case of contradictions:

- a) Schedule of quantities
- b) Technical Specifications
- c) Drawing (if any)
- d) General Specifications
- e) Relevant IS or other international code in case IS code is not available.

25. Technical specification for Lift

- i) Door safety: Temper proof Infra Red curtain covering the entire height of Lift door will be provided in the lifts.
- ii) Audio/Visual overload alarm with load plate indicating the rated load and permissible number of passengers/load will be provided in the lifts.
- iii) Intercom system will be provided at suitable locations.
- iv) BARRIER FREE REQUIREMENTS
 - a) All the 20 Passenger and above lifts shall be made suitable for wheel chair users with suitable dimensions.
 - b) A hand rail not less than 600mm long at 900mm above floor level shall be fixed adjacent to the control panel to 3 sides of car body.
 - c) The time of an automatic closing door should be minimum 5 seconds and the closing speed should not exceed 0.25 mtrs. per second.
 - d) The interior of the lift shall be provided with a device that audibly indicate the floor the cage has reached and indicate that the door of the cage for entrance/exit is either open or closed.
 - e) Brail operating buttons as required in car an all levels.
- v) All the required test certificate and safety certificates has to be submitted by agency.
- vi) If any discrepancies in Schedule of Work and detailed specification than detailed specification will be valid.

26. Technical requirement for Lift

S. No.		
1	Name of Manufacturer	
2	Country of Manufacturer	
3	Capacities (Persons/Weight)	20 Passengers (1360 Kg.) (MRL)

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4	Service	Passenger lift
5	Speed of Travel	0.5 MPS
6	Nos. of floors served	5 (G+4)
7	Nos. of openings/Stops	5 Nos./ 5 Nos.
8	Position of counter weight	As per OEM
B.	Machine	
1	Position of Machine	Above lift shaft
2	Motor	Permanent magnet synchronous motor
3	Electric supply particulars for which it is suitable for operation	415 volt 3 phase 50 Hz. ($\pm 10\%$)
C.	Brake	
1	Type	Electro mechanical
D.	Car and Doors:	
1	Outside dimension of car	Suitable for 20 passenger lift as per IS
2	Inside clear dimensions	Suitable for 20 passenger lift as per IS
3	Construction of car	Stainless Steel 304 Grade with minimum 1.5 mm thick.
4	Design/type of enclosure of car	Moon rock/Hairline finish Stainless Steel.
5	Details of flooring	Granite flooring
6	Attachment & fitting inside the car	As per OEM
a)	Car Size:	Suitable for 20 passenger lift as per IS
b)	Operation:	Central opening
c)	Construction, design & finish:	Moon rock/Hairline finish Stainless Steel.
7	Landing doors	Stainless Steel SS 304 with minimum 1.5 mm thick.
a)	Door clear opening	Minimum 900mm
b)	Operation:	Centre opening power doors with permanent magnet synchronous motor
c)	Construction & Finish:	Moon rock/Hairline finish Stainless Steel
E.	Safety Devices:	
1	Car safety – Type	Over speed governor
2	Counter weight safety – Type	Spring buffer/As per OEM
3	Door interlocks in car – Type	Electro mechanical
4	Door locks in landing – Type	Electro mechanical
5	Direction and position indicator in car	Dot matrix (Red LED) / As per OEM
6	Emergency alarm	Battery operated high intensity DB level
7	Facia plate	Stainless Steel
8	Fireman drive	Required
9	3 Way Hands free press & speak intercom	Required
10	Full height infra red safety curtains	Required
11	Pit Ladder	Required
12	Signal fixtures in stainless steel finish	Required
13	Emergency light with rechargeable battery	Required
14	Adjustable guide shoes	Required
15	Micro movement LED based buttons	Required
16	+10% to -10% volt fluct. Withstand capacity	Required
17	Automatic phase reversal	Required
18	Automatic voltage regulator	Required
F.	Other safeties included in the offer	ARD suitable for 20 passenger lift as per IS specification

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Additional Condition for Audio Video System

1. All the work shall be carried out as per CPWD General specifications for Electrical& Civil works, amended upto date and should also comply with relevant provisions of the Indian Electricity Rules and Acts as applicable amended upto date.
2. The contractor is advised to visit the site & understand the scope of works before participate the bid. He shall go through the technical as well as general terms & condition of NIT before finalize the bid.
3. All repairs & patch work shall be neatly carried out to match with the original finish & all damages caused to the building installation during the execution of work shall have to be made good by the contractor immediately at his own cost to the entire satisfaction of Engineer-In-Charge. In case contractor fails to comply with the instructions of the Engineer-in-charge, Engineer-in-charge shall be at liberty to get the work done by any third agency and recover such amount paid from the bill(s) of the contractor.
4. The contractor shall make his own arrangement for storing the material at site. Watch and ward of material shall be responsibility of the contractor till the work is completed and installation is handed- over to the department.
5. Contractor shall provide ploythene/ PVC plastic cover for all SDBs/ meter boards so as to protect them rust/ damages during execution stage.
6. All debris/malba resulting due to electrical work shall be removed on daily basis and completion of the work shall only be accepted after the site has been cleaned of all malba.
7. Makes of all items which are not covered in the schedule of work/additional specifications shall conform to relevant Indian Standard/ International standards as applicable.
8. The contractor shall ensure that the staff employed by him for executing the elect. work possess the valid elect. License issued by competent authority. Consequences arising due to the fault of the contractor not complying with the above conditions will be the responsibility of the contractor.
9. Earthing lugs shall be provided for terminating copper wire /Aluminum cable/GI earth wire to all switch board for which nothing extra shall be paid.
10. All concealed work and earthing shall have to be done in the presence of the Engineer-in-charge or his authorized representative.
11. The schematic diagram/ dimensional drawings of the various electrical equipments/ switch boards/ cubical panel/ any other material shall be got approved from the engineer-in-charge and the same shall be supplied accordingly.

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12. The work shall be carried out according to drawing approved by the Engineer-in-charge. The layout once approved can only be changed by the Engineer-in-charge as per requirement at site or to suit conditions. It shall be the responsibility of the contractor to plan the layout and get the approval from the Engineer-in-charge before execution of work.
13. The contractor shall check the site order book for any instructions of the Engineer-in-Charge or his authorized representative and sign the site order book and ensure compliance with the instructions recorded therein.
14. Nothing shall be paid on account of cartage.
15. No octroi exemption certificate will be issued by department.
16. The contractor will submit the drawing for approval by the department before dispatch of material.
17. The firm should have valid registration with GST and up to date GST return shall be filed.
18. Firm shall be registered with ESI & EPF scheme of Govt. of India.
19. The staff deployed on the work shall be the employees of the contractor. The contractor shall pay the employees deployed on the work the Minimum wages and other admissible allowances as notified by Govt. of Delhi from time to time through Bank or ECS or online transfer. Any increase in these rates during the currency of the contract shall be borne by the contractor.
20. The contractor should provide the guarantee for the whole works for a period of 60.5 months from the date of supply and should be responsible for safe working of whole installation for the 60 months from the date of completion of agreement.
21. **TERMS OF PAYMENTS** The following percentage of contract rates for the items included in the contract shall be payable against the stage of work as per below criteria.
1. 70% of the contract value, of the sub work, on initial inspection and delivery of materials at site, in good condition, on pro-rata basis. 2. 20% on completion of installation of the equipments and accessories pro-rata basis. 3. 10% on testing, commissioning, and handing over to the department.
22. **GUARANTEE/WARRANTEE** The installation will be handed over to the department after necessary testing and commissioning. All installations pertaining to complete Works as per contract shall be guaranteed for a period of 12 months from the date of taking over the installation by the department, against unsatisfactory performance and/or break down due to defective design, workmanship of material. The material shall include all material that is required for the successful completion of the work. The equipments or components, or any part thereof, if found defective during warrantee period shall be forthwith rectified/

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repaired or replaced free of cost, to the satisfaction of the Engineer-in-Charge. In case it is felt by the department that undue delay is being caused by the contractor in doing this, the same will be got done by the department at the risk and cost of the contractor. The decision of the engineer-in-charge in this regard shall be final & binding on the contractor. Security Deposit shall be release after completion of defect liability period of 1 year.

23. DISCREPANCY BETWEEN THE NOMENCLATURE OF ITEMS, SPECIFICATIONS, AND /OR THE DRAWINGS The following specifications are applicable for the work. In case of discrepancy between the nomenclature of items, specifications, and /or the drawings or in case no specifications are specified (Refer clause 28 of the General Conditions of the Contract amended up to date) the following order of preference shall be observed:

- i) Nomenclature of items including the scope of work as given in Schedule of Quantities of this tender.
- ii) Technical / Particular Specifications, Special Conditions and other provisions of this tender.
- iii) Drawings.
- iv) CPWD Specifications (latest edition) with upto date correction slips issued upto the last date of the month prior to month of submission of tender.
- v) BIS Codes with latest revisions issued upto the last day of the month prior to month of submission of tender.
- vi) International standards and accepted international practices as approved and directed by Engineer- in-Charge
- vii) Sound Engineering Practice as per directions of the Engineer-in-Charge. If there are varying or conflicting provisions made in any document forming part of the contract, the Engineer-in-Charge shall be the deciding authority about the intention/interpretation of the tender and his decision shall be final and binding on the contractor.

24. The contractor shall submit the relevant test certificate from OEM at the time of supply of equipment.

25. The successful tenderer would be required to submit the following drawings after award of work for approval before commencement of installation. Cost of these drawing deemed to be included in the rates and nothing extra shall be paid on this account- a. All general arrangement drawings. b. Details of the equipment's/ component hardware's, software's, single line diagram, installation drawings, weight details i/c mounting/hanging

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arrangement, electrical load requirements, copy of standards and compliance standards, data's of power and communication cables, location details etc. of various assembled equipment as may be needed for purpose of their work. c. Complete layout dimensions with location of equipments for every unit/group of units with dimensions required for erection purposes. d. Any other drawing/information not specifically/mentioned above but deemed to be necessary for the job by the contractor.

26. The successful tenderer should furnish well in advance three copies of detailed instructions and manuals of manufactures for all items of equipments regarding installation, adjustments, operation and maintenance including preventive maintenance and troubleshooting together with all the relevant data sheets, spare parts catalogue and workshop procedure for repairs, assembly and adjustment etc all in triplicate.

27. DURING INSPECTION AND TESTING

27.1 All major equipments shall be offered for initial inspection by the engineer-incharge or officer authorized by him at manufacturer's works in India. The department may or may not inspect the material at its discretion. The contractor will intimate the date of testing of equipments at the manufacturer's works before dispatch. Contractor shall make all arrangements for inspection of material at works. The department reserves the right to get the equipment inspected by third party inspection also. Such inspection shall be of following categories:

- (a) Inspection of materials/ equipments to be witnessed at the manufacturer's premises/ at its authorized works in India, in accordance with relevant BIS/ Agreement Inspection Procedure.
- (b) To receive material at site with manufacturer's Routine & Type Test certificates.
- (c) To inspect material at the authorized dealer's go-down to ensure delivery of genuine material.
- (d) To receive material after physical inspection at site.

27.2 Adequate care to ensure that only tested and genuine materials of proper quality are used in work shall be ensured by firm. The firm shall ensure that:

- (a) Material will be ordered and delivered at site only with the prior approval of the department. The contractor shall, however, be responsible for timely delivery of material.
- (b) As and when the order is placed for the items, it shall be endorsed to the engineer-in-charge along with details of Agency, model no. and other delivery details including bills and challans.

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28. COMPLIANCE WITH REGULATIONS AND INDIAN STANDARDS Nothing in this specification shall be construed to relieve the successful tenderer of his responsibility for the design, manufacture and installation of the equipment with all accessories in accordance with currently applicable statutory regulations and safety codes.

29. SITE MAINTENANCE The Contractor shall maintain the Sites in good order during the whole construction period. It is strictly prohibited to bury any kind of waste materials, solid or liquid, in the ground. In the event of accidental discharge of polluting materials, the Contractor shall take immediate mitigating action and shall immediately inform the Client and the appropriate authorities.

30. PERSONAL PROTECTIVE EQUIPMENTS (PPEs)

30.1. The contractor shall provide required PPEs to workmen to protect against safety and/or health hazards. Primarily PPEs are required for the following protection.

- i. Head Protection (Safety helmets)
- ii. Foot Protection (Safety footwear, Gumboot, etc.)
- iii. Body Protection (High visibility clothing (waistcoat/jacket), Apron, etc)
- iv. Personal fall protection (Full body harness, Rope-grap fall arrester, etc)
- v. Eye protection (Goggles, Welders glasses, etc)
- vi. Hand protection (Gloves, finger coats, etc.)
- vii. Respiratory Protection (Nose mask, SCBAs, etc.)
- viii. Hearing protection (Ear plugs, Ear muffs, etc)
- ix. Protection from electricity The PPEs and safety appliances provided by the contractor shall be of the standard as prescribed by Bureau of Indian Standards (BIS). If materials conforming to BIS standards are not available the contractor as approved by the Engineer-in-charge shall procure PPE and safety appliances

30.2. All construction workers should be provided with high visibility jackets with reflective tapes conforming to the requirement specified under BS EN 471: 1994. The conspicuity of workmen at all times shall be increased so as to protect them from speeding vehicular traffic.

The contractor shall provide safety helmet, safety shoe and high visibility clothing for all employee including workmen, traffic marshal and other employees who are engaged for any work under this contract as per the following requirement.

30.3. In addition to the above any other PPE required for any specific jobs like, welding and cutting, working at height, tunneling etc shall also be provided to all workmen and also ensure that all workmen use the PPEs properly while on the job. The contractor shall not

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pay any cash amount in lieu to PPE to the workers/sub- contractors and expect them to buy and use during work. The contractor shall at all time maintain a minimum of 10% spare PPEs and safety appliances and properly record and show to the Engineer-in-charge during the inspections. It is always the duty of the contractor to provide required PPEs for all visitors. towards this required quantity of PPEs shall be kept always at the security post.

31. **VISITORS TO SITE** No visitor is allowed to enter the site without the permission of the Engineer-in-charge. All authorized visitors should report at the site office and contractor shall provide visitor's helmet (White helmet with visitor sticker) and other PPEs like safety shoe, reflective jacket, and respiratory protection etc. as per requirement of the site. All visitors shall be accompanied at all times by a responsible member of the site personnel. The contractor shall be fully responsible for all visitors' safety and health within the site.

32. EMPLOYER'S RISK

- a) In the event of any such loss or damage happening from any of the excepted risks defined in GCC 2023 (Construction) pertaining to permanent works, as in combination with other risks, the contractor shall, if so required by the Engineer-incharge, rectify the loss or damage. An addition to the contract price shall be determined treating the work done to rectify the loss or damage as variation/ extra/ substituted item, as given in the relevant clauses.
 - b) Whenever any event as mentioned above occurs, the contractor will notify the Engineer-in- charge, within 14 days and provide a forecast cost of repairs / rectifications of damages / losses. As soon as information demonstrating the effect of such event is available, the Engineer-in- charge shall assess the cost of repairs/ rectifications to be paid. In case contractor's forecast is deemed unreasonable, the Engineer-in-charge shall adjust the contract price and/ or extend the
 - c) During execution of work if any damage of false ceiling, paint, floors has arisen contractor has to repair the same without any extra payment from the department.
 - d) Failing which a recovery minimum 3% of tendered amount (non refundable) shall be made from the final bill.
33. The work shall have to be carried out entirely to the satisfaction of Engineer-in-Charge.
- 34 Defect liability period for entire work would be 1 year from date of completion.
35. Contractor has to submit CE/RoHS certificate for each equipment along with certified LAB Test Report at the time of submission of T.D.S.

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Additional Condition for VRV/VRF AC System

1. Specification:- The work shall be executed as per CPWD's general specification for Electrical Works, Part-I-2023, Part-II-2023 (External) & general specification for HVAC - 2024. Indian Standards amended upto date and as per direction of Engineer-in-Charge. The additional specifications are to be read with above and in case of any variations, specifications given along with the tender shall apply.
2. Location:- The VRV AC system is to be installed at **Multipurpose Hall, NBSC/BIRD Campus Lucknow (UP)** and the contractor is advised to visit the site before submission of their tender and ensure that equipment being offered by them shall be accommodated in the spaces available.
3. Terms of Payments:
 - 3.1 Following percentage of contract rates for the various items included in the contract shall be payable against the stage of work shown herein.
 - (i) No advance payment shall be made.
 - (ii) **70% after** initial inspection and delivery at site in good condition on pro-rata basis.
 - (iii) **20% after** completion of installation in all respect.
 - (iv) **Balance 10% will** be paid after Testing, Commissioning & Handing Over to the department for beneficial use.
4. Rates:-
The department will not issue Octroi exemption certificate.
5. Completion Period:-
The Completion period indicated in the tender documents is for the entire work of planning, designing, approval of drawings etc., arrangement of materials & equipments, delivery at site including transportation, installation, testing, commissioning and handing over of the entire system to the satisfaction of the Engineer-in-charge.
6. Storage :- Responsibility for storage space for execution of work shall be of main contractor.
7. Power & Water Supply:-Responsibility for supply of power & water for execution of work shall be of main contractor.

ADDITIONAL TECHNICAL SPECIFICATION

General

1. The scope of this section comprises the design, supply erection, testing and commissioning of inverter technology-based Scroll Type VRF type system of air conditioning conforming to these specification/ Explanatory Note and in accordance with the requirements of Drawing and Schedule of Quantities. The prices quoted shall include all the equipment ancillary material as specified and all such items whatsoever and which may be required to fulfill the intent and purpose as laid down in the specification and the approved drawings. The contractor shall calculate equipment capacity based upon design parameters specified for the system design & verify all the quantities and sizes of refrigerant pipe, fitting, cables, control cable, pipes, insulation, indoor units, and outdoor units etc. before installation to avoid any shortfall or surplus. The tenderer shall also include all necessary civil work MS

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frame work for installation of outdoor and indoor units in VRF based air condition system. The cost quoted by tenderer shall also include the refrigerant gas & its charging for proper & specified functioning of air conditioning system. Civil work/ MS frame work for indoor and outdoor units related to VRF / Split AC equipments, all cuttings should be properly finished as existing surrounding. The installation of outdoor unit on the floor/ terrace of building should be checked up structurally & their mounting should be structurally safe for the outdoor unit to ensure in such a way that after installation.

- a) Cutting of walls and floors/ ceiling.
 - b) Making holes.
 - c) Sleeves.
 - d) Foundation
2. The scope in the tender schedule also covers detailed designing of complete air-conditioning system based on inverter technology-based Scroll VRF air conditioner with air cooled outdoor units system capable of cooling and heating (reverse cycle) as per individual or season requirement suitable for operation on 415 V, 3 Phase, 50 Hz AC electric supply. The outdoor units shall have both cooling & heat pump mode, consisting of one / multiple outdoor unit with single circuit of refrigerant piping and multiple in door units of various types. Each indoor unit should have capability to cool or heat as per seasonal weather changes. This shall also include complete capacity calculation for indoor and outdoor units complete with CAD drawing, designing & layout of following.
- (i) Outdoor units.
 - (ii) Indoor units.
 - (iii) Refrigerant piping
 - (iv) Condensate water piping & disposal.
 - (v) Power & Control Cables between Outdoor units & Indoor units.
3. While designing the system care should be taken to select outdoor units of suitable capacity based on design data provided below & to economize on available floor area for installation of outdoor units as well as optimum utilization of outdoor units and type of indoor unit taken into considerations. The indoor units should be designed based upon the heat load calculations for individual rooms / areas to be air- conditioner and over capacities should be avoided.
- The design should also specifically take care of disposal of condensate drain water so that there is no leakage of condensate water inside the room as well in the route of condensate water pipe line. The layout of refrigerant piping is to be designed in such a way so that it should not disturb the aesthetic of the building/ room, inadvertent damage in the route of pipe should not occur in future & optimum length of pipe line for efficient air conditioning.
4. After completion of the work four sets of 'as erected/ commissioned drawing' of activities listed above shall be submitted. The work of air-conditioning outdoor and indoor units as specified in schedule of work is required to be carried out **at Multipurpose Hall, NBSC/BIRD Campus Lucknow (UP)**. The specified design parameters are only tentative in nature, however, all efforts shall be made to achieve the following specified design parameters and if at any design stage need for higher capacity outdoor HP is required, necessary approval shall be accorded based on design analysis and discussions on the subject. In case of any deviation from the parameters specified below, the technical issues

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involved shall be brought to the notice of Engineer-in-charge for seeking necessary approvals to achieve these parameters. Engineer-in-charge, however, reserves the right to permit any deviations from the parameters as specified.

Outside summer condition: 43.3°CDB;

23.9°CWB Monsoon:

35.0°CDB' 28.3°CWB

Winter: 7.2°CDB'

5.0°CWB

Inside conditions summer: 23.8°C ± 1°C

Winter: 23.8°C ± 1°C

Note: 1 HP unit = 0.8 TR (Approximately)

5. The project of VRF air-conditioning of **Multipurpose Hall, NBSC/BIRD Campus Lucknow (UP)** is required to be executed in time bound and professional manner. The equipment's involved in air-conditioning are complex in nature comprising of instrumentation, control and central management system. The job, therefore calls for highest order of technical expertise and also requirement of experience of air-conditioning installation with proven performance.

6. OUTDOOR UNIT

- (i) The outdoor unit shall be factory assembled, weather proof casing (Material of construction of casing shall be vendor's standard design), constructed from heavy gauge GI sheets steel panels and coated with baked enamel finish. The outdoor unit shall be completely factory wired, tested with all necessary controls & filled with first charge of refrigerant before delivering at site.
- (ii) The inverter technology based Scroll type VRF equipment should be capable so that refrigerant piping between indoor units and outdoor unit shall be extendable upto 165 m of equivalent length with maximum height difference between outdoor & indoor unit of 50m & level difference between two indoor units shall be maximum upto 15m. All the outdoor units comprising of multiple modules should have at least one inverter type compressor in each module.
- (iii) The outdoor unit shall be factory tested and filled with first charge of refrigerant R-410A before delivering at site.
- (iv) It should also be provided with duty cycling for Scroll compressors capable of changing the rotating speed of compressor by inverter controller to follow variation in cooling & heating loads & switching starting sequence for better stability and prolonging equipment life or similar features if available in Scroll will also be accepted.
- (v) The unit shall be provided with its own microprocessor control panel with provision for integration with the building management system for Air-conditioning system if required.
- (vi) The machine must have a sub cool feature to use coil surface more effectively through proper circuit / bridge so that it prevents the flushing of refrigerant from long piping due to this effect thereby achieving energy savings.
- (vii) The outdoor unit should be fitted with low noise level and should not be more than 67 db(A) at normal operation when measured at a point 1 mtr. In front of the unit at a height of 1.5 mtrs.
- (viii) The outdoor unit should be fitted with low noise aero spiral design fan with aero fitting

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grill for spiral discharge airflow to reduce pressure loss and should be fixed with DC/AC fan motor for better efficiency.

- (ix) In case of trouble occurs in an indoor unit (s), the continuous operation of system should be possible.
- (x) The unit shall be designed in such a way that cleaning of drain Pan should be easy & inspection/ replacement of compressor should be easy.
- (xi) The condensing unit shall be designed to operate safely when connected to multiple fan coil units.

7. Refrigerant Circuit

The refrigerant circuit shall include liquid and gas shut-off valves and a solenoid valve at condenser end.

The equipment must have inbuilt refrigerant stabilization control for proper refrigerant distribution. All necessary safety devices shall be provided to ensure the safe operation of the system.

8. Heat Exchanger

The heat exchanger shall be constructed with copper tubes mechanically bonded to aluminum fins to form a cross-fin coil. The aluminum fins shall be covered by anti-corrosion resin film. The unit shall be provided with necessary number of direct driven low noise level propeller type fans arranged for vertical discharge. Each fan shall have a safety guard.

9. Safety Devices

All necessary safety devices shall be provided to ensure safe operation of the system. Whatever safety devices are required shall be part of outdoor unit - high pressure switch, fuse, fan drive overload protector, fusible plug, crankcase heater, over load relay, overload protection for inverter-based technology.

The outdoor roof mounted units shall be provided in such a fashion that these do not affect the overall aesthetics and ambience of the building. If required these units shall be suitably camouflaged to give good aesthetic look. These provisions, however, shall be discussed, if required, at a later date and the prices for the same shall be worked out separately as extra item.

10. INDOOR UNITS

All indoor units as specified shall have; in general, noise levels less than 46 db. For critical applications noise levels below these limits may, however, be specified during design stage.

- (i) Each unit shall have electronic control valve to control refrigerant flow rate respond to load variation of the room.
- (ii) The address of the indoor unit shall be set automatically or through central controller in case of individual and group control.
- (iii) The fan shall be dual suction, aerodynamically designed, Turbo, multi blade type, statically & dynamically balanced to ensure low noise and vibration free operation of the system. The fan shall be direct driven type, mounted directly on motor shaft having support from housing.
- (iv) The cooling coil shall be made out of seamless copper tubes and having continuous aluminum fins. The fins shall be spaced by collars forming an integral part. The tubes

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shall be staggered in the direction of airflow. The tubes shall be hydraulically/mechanically expanded for minimum thermal contact resistance with fins. Each coil shall be factory tested at 21 kg/sqm air pressure under water.

- (v) Indoor unit shall have cleanable type filter fixed to an integrally moulded / moulded plastic frame. The filter shall be slide in and neatly insertable type. It shall be possible to clean the filters either with compressed air or water.

11. Reflet Joints/ Header Joints

Supply & installation of the Y-Joint/Ref-net separation refrigeration pipe joints and header in the appropriate orientation to enable correct distribution of refrigerant. The Distribution Joints should be factory insulated with close cell nitrile rubber tubular sections of class O fire ratting.

12. Refrigerant Piping

- (i) Before joining any copper pipe or fittings, its internals shall be thoroughly cleaned by passing a clean cloth via wire or cable through its entire length. The piping shall be continuously kept clean of dirt etc. while constructing the joints. Subsequently it shall be thoroughly blown out using nitrogen gas.
- (ii) After completion of installation of the refrigerant piping, the refrigerant piping system shall be pressure tested using nitrogen gas at a suitable pressure as specified by OEM (Original Equipment Manufacturer). Pressure shall be maintained in the system for 48 hours. The system shall then be evacuated to vacuum of not less than 700 mm Hg and held for 24 hours.
- (iii) The supplier of air-conditioning system shall choose sizes as designed and erect proper interconnections of the complete refrigerant circuit. The thickness of copper piping shall not be less than 18 SWG for pipes upto 19.1 mm and 16 SWG for larger dia.
- (iv) The suction line pipe size and the liquid line pipe sizes shall be selected according to the manufacturer's specified diameter. All refrigerant pipes shall be properly supported and anchored to the building/structure using steel hangers, fasteners, brackets and supports which shall be fixed to the building/structure by means of inserts or expansion shields or anchor fasteners of adequate size and number to support the load imposed thereon.
- (v) The refrigerant piping should be laid in such a way that it should not distort the interior of the room, wherever the refrigerant pipe has to be laid across the room, it should be laid in a concealed manner by making appropriate boxing arrangement matching with the interior of the room. All associated minor Civil Engineering works (like chasing on wall, ceiling & re-plastering & repainting etc.) related with the above items are included in the scope of work. The above scope does not include false ceiling wherever required.
- (vi) Entire liquid and suction refrigerant pipe lines including all fittings, valves and strainer bodies, etc. shall be insulated with electrometric nitrile rubber as specified in BOQ.
- (vii) For proper drainage of condensate U trap shall be provided in the drain piping wherever required. All pipe supports shall be prefabricated and pre-painted slotted angle support, properly installed with clamps. The condensate drains pipe

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arrangement for disposal of condensate water be made in such a way that there should not be any leakages of condensate water inside rooms as well in the route of drain water pipe line & water should be discharged at the location jointly decided with Engineer-in-Charge of work. All associated Civil Engineering works as per requirement at site in above connection like making chase in the wall & restoring it original shape by re-plastering & repainting, etc. are included in the scope of work. The arrangement of drain-pipe shall be made in such a way that it should not affect the aesthetic of the building as well as is maintenance friendly & easily accessible.

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Acceptable Makes for E&M works

Preferred makes of materials to be used in the work areas under. In case of non availability of these makes, the Engineer-in-Charge may allow use of alternative BIS makes of materials in the work. Non BIS marked materials may be permitted by the Engineer-in-charge.

Sl.	Details of Materials/Equipment	Manufacturer's Name
I.E.I, MCBDB & MCB, Cables and Wires		
1	FRLS PVC insulated copper conduct or single core cable for wiring. (ISI marked)	Finolex/ RR Kabel/ KEI/ Havells/ Polycab/ Grandlay/ Plaza Cables/ Anchor/ Bonton/ Paramount cables/ AKG/ Gloster/ Rallison
2	Modular switches, socket/ telephone socket/ cable TV socket/ data outlet socket/ fan regulator /GI boxes etc (Wiring accessories) /regulators etc.	Legrand / Schneider electric / Wipro/ Hager/M.K (Honeywell) / Havells / ABB/ Anchorby Panasonic/ Indoasian
3	MS Conduit (ISI marked) with heavy duty MS conduit pipe accessories	BEC / AKG / RMCON (Note: The make of accessories shall be same that of conduit pipe and will comply to IS/4768 part 22003)
4	MCB, Isolator, Industrial plug Socket, RCCB, RCBO's, ELCB (ISI Marked/ IEC Compliant)	Schneider Electric/ Legrand/ Hager/ L&T (LAURITZ KNUDSEN)/ ABB /Seimens/ IndoAsian/ C&S/ Anchor by Panasonic /Havells
5	MCBDB & Loose Wire Box	Schneider Electric/ Legrand/ Hager /L&T (LAURITZ KNUDSEN)/ ABB/Siemens/ IndoAsian/ C&S/ Havells
6	Change Over Switch	L&T (LAURITZ KNUDSEN)/ Havells/Hager/C&S
7	Automatic Transfer Switch(ATS)	Asco/ Russel/ Socomac/ Hager/ ABB/L&T (LAURITZ KNUDSEN)
8	Armoured/ Unarmoured Telephone cable, Coaxial Cable	Delton/ Finolex/ RRKabel/ Havells/ Grandlay/ Plaza Cables/ Anchor/ Bonton/ Paramount cables/ JMW Kable/ AKG/ Rallison
9	PVC conduit (ISI marked) with heavy duty PVC conduit pipe accessories	AKG/ Norpack/ BEC/ Polypack/ Precision/ Anchor/ Polycab/ Pressfit
10	Selector Switch & Toggle Switch	Salzer/(L&T (LAURITZ KNUDSEN)/ Siemens/ Kaycee/ Rishabh/ ABB
11	PVC Trunking	MK (Honeywell) /Schneider Electric/ Legrand/ Pressfit
12	GI Pipe	Tata/Jindal(Hissar)/Prakash Surya
13	Paints	ICI/ Asian/ Berger
14	Terminal Blocks & Connectors	Elmax/ Wago/ Hensel/ Connect well
15	Phenolic Laminated Sheet/Bakelite sheet	Hylam/ Formica (P-IGrade)/ Mylam/ Greenlam
16	Cat-6/ 6A Cable, Co-Axial cables, Telephone Wires & cable	Amp, Avaya /Beldon/ Legrand/ Molex/ Schneider/ Anchor / Plaza Cables/ Bonton/ AKG/ Rallison/ Agilon
Fans & Fittings		
1	LED Fittings (ISI Marked/BEE	Wipro/ Phillips/ Crompton Greaves/Havells/ Bajaj/

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	Certified)	Trilux/ Lighting Technology/ Orient Electric/ Jaquar/ Regent (Zumtobell)
2	Exhaust fan/Fresh Air Fan	Havells/ Crompton/ CG Power/ USHA/ Almonard/ Halonix/ Bajaj/ Polycab/ Orient Electric
3	BLDC Ceiling Fan/Wall Fan (ISI Marked /BEE Certified)	Havells /Crompton /CG Power/ USHA/ Anchorby Panasonic/ Halonix /Bajaj/ Polycab/ Orient Electric
4	Wall Bracket Fitting	Havells/ Crompton Greaves / Decon / Phillips/ Lighting Technology/ Luster/ Jaquar/ Anchor Panasonic/ Orient Electric/ Halonix/ Regent
5	LED lamp	Wipro/ Phillips/ Crompton Greaves/Havells/ Osram /Jaquar / Bajaj/ Polycab/ Orient Electric
6	Mirror Light	Jaquar / Philips/ Havells/ Crompton Greaves / Decon/ Wipro/ Regent
7	Geysers(BEE Certified)	Racold/ CG/ Havells/ Usha/ Venus/ AOSmith/ Jaquar/ Anchor by Panasonic/Bajaj
Street Lighting		
1	LED post Top fitting	Wipro/ Phillips/ Crompton Greaves / Havells/ Keselec Schreder/ Lighting Technology /Bajaj/ Polycab/ Orient Electric/ Regent
2	LED Street light fitting	Wipro/ Phillips/ Crompton Greaves / Havells/ Keselec Schreder/ Lighting Technology/ Bajaj/ Polycab/ Orient Electric
3	LED street lights with inbuilt Solar panel and controller	Wipro/ Phillips/ Crompton greaves/ Havells/ Lighting Technology/ Bajaj/ Jaquar /Insta Power
4	Ornamental MS & G.I pole (factory finish)	Keselec / Valmont/ Wipro/ Phillips/ Crompton greaves/ Bajaj/ Paruthi Engineers Pvt. Ltd./Luster/ Twinkle /VSTP
5	Hot Dipped Galvanized Octagonal Pole (Factory finish)	Valmont/ Wipro/ Phillips/ Crompton Greaves /Bajaj/ Paruthi Engineers Pvt. Ltd./ Consoul /VSTP.
6	Polycarbonate Junction Box/ Enclosure	Hensel/ Spelsberg/ Naptune-Bals
7	XLPE Insulated PVC Sheathed Alum./Copper Conductor Armored Cable of 1.1 KV Grade	Finloex/ RR Kabel /KEI/ Havells/ Polycab/ Nicco/ Grandlay/ Paramount cables/ Gloster/ Plaza Cables/AKG/ Bonton/ Rallison
Sub Station Equipment's		
1	LT panel/ Meter Panel Board/Outdoor Feeder Pillar/APFC panels /Bus ducts	Tricolite Electrical Industries/ C&S/Application/ Sterling & Wilson/ MILESTONE/ Adlec Control System Pvt. Ltd./ Advance Panels & Switchgears Pvt. Ltd./ Indo Asian /Associated Switchgears & Projects Ltd/ Allied Engineers/ Shalabh/ Engineers & Engineers/ Pristine/ Excel Control System/ Expert Engineers/ R.P. Controls/ Coronet Engineers Pvt. Ltd./ Havells/ NEC/ SPC Electrotech Pvt Ltd/ ASSES /MAK E-Products Pvt. Ltd./ Prestige Switchgears Pvt. Ltd./ Modern Switchgears (India)/ Asian Switchgear Pvt. Ltd./ Precision System Control
2	TTA Panels (LT distribution) (OEM or their system integrator)	Legrand, Schneider, Siemens, ABB, L&T (LAURITZ KNUDSEN)
3	Air insulated Rising Main/Bus Trunking	C&S/L&T (LAURITZ KNUDSEN)/ Schneider /Legrand /ABB/Siemens

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4	Sandwich type bus Trunking/ Rising Main	C&S/L&T (LAURITZ KNUDSEN)/ Schneider /Legrand /ABB/Siemens
5	Moulded Case Circuit Breaker (MCCB) Thermal Release/ Microprocessor Based (Ics = Icu =100%)	Schneider electric/ Legrand/ L&T (LAURITZ KNUDSEN) /ABB/ Siemens/ C&S / Havells /Indoasian
6	Power/Aux.Contactor3/4Pole	Schneider Electric/ Legrand/ Hager/ L&T (LAURITZ KNUDSEN)/ ABB/ Siemens /C&S/ BCH
7	Potential transformers /Current Transformers	Automatic Electric/ Gilbert & Maxwell/ Matrix/ Precise/ L&T (LAURITZ KNUDSEN)/ Kappa/ ESENNAR
8	LED Type Indicating Lamps/Push button	Schneider electric/ L&T (LAURITZ KNUDSEN)/ Siemens/ C&S /Vaishno/ Syska
9	Overload relays	Schneider Electric/ L&T (LAURITZ KNUDSEN)/ Siemens/ C&S /ABB
10	Conventional/ Electronic Digital Meters (A/V/PF/Hz/KW/KWH)	Conzerv/ L&T (LAURITZ KNUDSEN)/ Secure/ AE/ C&S
11	Timer	Schneider Electric/ Legrand/ Hager/ L&T(LAURITZ KNUDSEN) / ABB / Siemens/ C&S
12	Fasteners/GI Clamps	Hilti/ AFT/ Fisher/ Chilli/ GMGR
13	D.W. Corrugated HDPE Pipe(ISI Marked)	REX/ Triputi/ Duraline/ Gemini/ Durton/ Kisan/ Jain Irrigation/ Raksha
14	Transformer (Oil/Dry pipe)	Crompton /ABB/ Schneider/ Siemens/ VOLTAMP/ ESENNAR
15	HT Panel/ Ring main Unit	Compton/ Siemens/ ABB/ L&T (LAURITZ KNUDSEN) / Schneider
16	H.T. Cable (ISI marked)	KEI/ Havells/ Polycab/ Gloster/ Nicco/ Grandlay/ Finolex/ RR KABEL/ Rallison
17	HT End Termination/Cable Joining Kit	Reychem/ Denson/ CabSeal/ Safekei/ 3M
18	ACBs with Display	Schneider Elecric (MVS)/ Legrand (DMX3MP4) /L&T (LAURITZ KNUDSEN) (U-Power-OMEGA)/ ABB (Emax) PR122/ Seimens /C&S (WinMaster)
19	Rubber mat	Jyoti/ Deep Jyoti/ Premier (Duly ISI Marked)
20	Ammeter	Rishabh/ L&T (LAURITZ KNUDSEN)/ AE/ C&S
21	Voltmeter	Rishabh/ L&T (LAURITZ KNUDSEN)/ AE/ C&S
22	All Type Fire Extinguishers (ISI Marked)	Atasee/ Kalpex/ Lifeguard/ Ceasefire/ Minimax/ Safex/ GETECH
23	Capacitor and Reactors/APFC Relay	EPCOS/ L&T (LAURITZ KNUDSEN) /DUCATI/ ABB/ Siemens/ Schneider
24	XLPE Insulated PVC Sheathed Alum./Copper Conductor Armored/ Unarmored Cable of 1.1KV Grade	Finloex/ RR Kabel /KEI/ Havells/ Polycab/ Paragon (Electron)/ Universal /Nicco/ Grandlay/ Paramount cables/ V-marc/ JMW Kabel/ Gloster/ Plaza Cables/ AKG/ Bonton/ Rallison
25	Cable Glands Double Compression with Earthing Links	Baliga Lighting/Comet/Cosmos /Dowells/ Gripwell
26	Bimetallic Cable Lug	Comet/ Dowells (Biller India)/ HexBrass (Copper Alloy India)/ Jainson/ Action
27	MS/GI Cable Tray	Pilco/ Slotco/ Pasco/ MEM/ BEC/ Steelways /Legrand/ RMCON/ Trueleader/ R.P. Controls/ Prestige Switchgears Pvt. Ltd.

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28	Programmable Logic Controller (PLC)	Siemens/ Allen Bradley/ L&T (LAURITZ KNUDSEN) /ABB
29	Compact type sub station close along with Transformer, HT/LT switchgears, all functional & control/ Indicating equipments/ assemblies /Sub assemblies	ABB/ SIEMENS/ SCHNEIDER/ CROMPTON/ L&T (LAURITZ KNUDSEN) /VOLTAMP
Fire Fighting Equipments		
1	MS pipe	Tata/ Jindal (Hisar)/ Parkash Surya
2	GI Pipe	Tata/ Jinda l(Hisar)/ Parkash Surya
3	Forged Steel Fittings/flanges	Johnsons Industries/VS Forge/JK Forging/ Trueforge
4	Forged Steel Fittings and flanges (for welding joints)	VS Forge/ Rohini/ Kanwalforge/ Jhonson/ Trueforge
5	Pipe hangers	Chilli/ Hilti/ GMGR
6	Gun metal/ Brass Valve (ISI marked)/(Full way Globe valve/ Non return valve)	Sant/ Leader/ Advance/ Zoloto/ Kirloskar/ GETECH / Kartar
7	Butterfly/Sluice Valve (ISI marked)	Audco / Sant/ Leader/ Advance/ Zoloto/ Kirloskar/ GETECH/ Kartar
8	Check Valve (ISI marked)	Audco/ Sant/ Leader/ Advance/ Zoloto/ Kirloskar/ GETECH/ Kartar
9	Foot Valve (Cast Iron/Gun Metal)	Audco/Sant/ Leader/ Advance/ Zoloto/ Kirloskar/ GETECH/ Kartar
10	Y-Type Strainer	Audco/ Sant/ Leader /Zoloto/ Kirloskar/ GETECH/ Kartar
11	Fire/Sprinkler Pump/Terrace Fire Pump	Kirloskar/ KSB/ Grundfos/ WiloMather & Platt
12	Electrical Motor	ABB/ Siemens /Kirloskar/ Grundfos/ Crompton/ NGEF
13	Diesel Engine for fire pump	Cummins India/ Ashok Leyland/ KOEL/ Greaves
14	Couplings(Type-Type)	Lovejoy/ Fenner/ Dunlop
15	Anti Vibration Mounting	Kanwal Industrial Corporation/ Dunlop/ GERB/ Resistoflex
16	Pressure Switch (ISI marked)	SystemSensor/ Infoss/Danfoss/ Switzer/ Honeywell & Siemens
17	Pressure Guage (ISI marked)	HGuru/Fiebig/Dwyer
18	Double/Single Headed Landing Value (ISI marked)	Minimax/ NewAge/ Safeguard/ Lifeguard/ Padmini/ Omex/ Andex/ KalpEX/ Atasee/ GETECH/ Armorfire/ Kartar
19	Male Female Fire Hose Coupling (SS304)(ISI marked)	Minimax/ NewAge/ Safeguard/ Lifeguard/ Padmini/ Omex/ Andex/ KalpEX/ Atasee/ GETECH/ Kartar
20	First Aid Drum/ Fire Hose reels/Shutoff Nozzle (Gunmetal/ ABS)(ISI marked)	Minimax/ NewAge/ Safeguard/ Lifeguard/ Eversafe/ Padmini/ Omex/ Andex/ KalpEX/ Atasee/ GETECH/ Kartar
21	SS 304/ Gun metal Branch Pipe & Nozzle (ISI marked)	Minimax/ New Age/ Safeguard/ Lifeguard/ Padmini/ Omex /Andex/ Atasee/ GETECH/ Armorfire/ Kartar
22	Fireman Axe	Minimax/ New Age/ Safeguard/ GETECH
23	Water Flow Switch (FM/UL listed)	System Sensor/ Rapid Control/ Potter/ Switzer
24	Rust preventive polymeric 4mm thick tape for pipes directly buried in ground pipe protection pypcoat (AW4) wrapping (ISI marked)	Pypcoat/ Marphalt/ Rustech /Safex

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25	Level controller & indicator (water) (ISI marked)	Auto Pump/ Cirrus Engineering/ Techtrol
26	Fire brigade inlet connection (ISI marked)	Minimax/ New Age / Safeguard / Lifeguard/ Padmini/ Omex/ Eversafe/ KalpEX/ Atasee/ GETECH/ Armorfire
27	Thermoplastic pipe for first aid hose reel (ISI marked)	New Age / Safeguard/ Lifeguard/ Padmini/ Omex / Eversafe/ KalpEX/ Atasee/ GETECH/ Kartar
28	Fire Sealent	Promat/ Birla 3M/ Hilti
29	Overload relays	Schneider Electric / Larsen & Toubro/ Siemens/ C&S / ABB
30	Power/ Aux. Contractor 3 /4 pole	Schneider Electric / Legrand /Hager/ L&T (LAURITZ KNUDSEN)/ABB/ Seimens/ C&S/ BCH
31	LED Type Indicating lamps/ Push Button	Schneider Electric / L&T (LAURITZ KNUDSEN)/ Siemens/ C&S/ ABB
32	LT jointing Kit/Termination	Raychem/ Denson/ Cap Seal/ Safekei/ 3M
33	RRL hose pipe (ISI Marked)	New Age/ Safeguard /Lifeguard/ Padmini/ Omex/ KalpEX/ Atasee/ GETECH/ Armorfire/ Kartar
34	Dry Battery	Exide/ Amar Raja/ HBL/ Pulse/Amco
35	Battery Charger	Statcon /Amar raja/ CDC/ AE/ Expofyn/ Thycon India
36	Epoxy Paint	ICI/ Asian/ Berger/ Nerolac
37	Air release Valve	Rb/ Tbs/ Cimbrio/ Zoloto
38	Analogue/digital Measuring Instruments (Voltmeter/Ammeter/ Energy meter/KW /PF/Multi-Function Meter)	AE/ Rishab/ L&T (LAURITZ KNUDSEN)/ C&S/ Conzerve
39	Aluminum/Copper power Cable/ Control cable (Armored /Unarmored)	Finloex/ RR Kabel /KEI/ Havells/ Polycab/ Nicco/ Grandlay/ Paramount cables/ Gloster/ Plaza Cables/ AKG/ Bonton/ Rallison
40	Cable gland and Lugs	Comet/ Dowells /Hax brass (Copper Alloy India) /Jainson/ Action
41	Solenoid Valve/Spray nozzle	Perker / HD / Tyco/ Emersion/ Kartar
42	Sprinkler	HD/Tyco/ Reliable/ Wormald/ Viking/ Atasee/ GETECH/ Kartar
43	Sprinkler head/Water Curtain Nozzle	Tyco/Viking/ Omex/ Newage/ Lifeguard/ GETECH/ Kartar
44	Steel Flexible Extension	Omex/ Newage/ Tyco / Lifeguard/ GETECH/ Kartar
45	Vibration Eliminator	Resistoflex/D waren/ Kanwal
46	Welding Electrodes	Advani/ ESAB/ L&T (LAURITZ KNUDSEN)
47	Deluge Valve	Tyco/ Viking/ HD
48	Cast Iron Valve	Kirloskar/ Kartar/ Kalpana/ Joloto /Audco/ Advance/ GETECH
Fire Alarm System		
1	Addressable Manual call box	Notifier/ Johnson Control/ Honeywell /Siemens/ Bosch/ EST/ASES (Agni Suraksha) / Notofire
2	Addressable Type fault isolator	Johnson Control/ Honeywell/ Siemen/ Bosch/ EST (Edwards) /ASES (Agni Suraksha)/ Notofire
3	Strobe lights cum hooter	Notifier/ Johnson Control/ Honeywell/ Siemens/ Bosch /EST/ASES (Agni Suraksha)/ Notofire
4	Addressable control modules for hooter	Notifier/ Johnson Control/ Honeywell/ Siemens/ Bosch / EST /ASES (Agni Suraksha)/ Notofire

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5	Addressable monitor module for flow switch	Notifier/ Johnson Control/ Honeywell/ Siemens/ Bosch / EST/ASES (Agni Suraksha)/ Notofire
6	Addressable type fire alarm control panel	Notifier/ Johnson Control/ Honeywell/ Siemens/ Bosch / EST /ASES (Agni Suraksha)/ Notofire
7	Network repeater panel	Notifier/ Johnson Control/ Honeywell/ Siemens/ Bosch / EST/ ASES (Agni Suraksha)/ Notofire
8	Addressable multi sensing fire detector (combination of optical type smoke detector & ROR type heat Detector)	Notifier/ Johnson Control /Honeywell/ Siemens/ Bosch /EST /ASES (Agni Suraksha)/ Notofire
9	Fire Alarm / Fire Survival Cable	AKG/ Grandlay/ plaza/ Bonton/ Notofire/ Finolex RR Cable/ KEI/ Havells/ Rallison
10	Response Indicator	Notifier/ Johnson Control/ Honeywell/ Siemens /Bosch /EST/ASES (Agni Suraksha)
Water Supply Pump Sets		
1	Mono Submersible Pump Set	KSB/ CG/ Kirloskar/ Grundfoss
2	Submersible Pump Set	KSB/ CG/ Kirloskar/ Grundfoss
3	GI pipe	Tata/ Jindal Hisar/Prakash Surya
4	Sluice Valve/ Check Valve/ Butterfly valve/Non Return Valve	Kirloskar/ Sant/ Leader/ Joloto/ Audco/ Advance
5	Submersible Cable	Fionlex/ RR Kable /KEI/ Havells/ Polycab/ AKG/ Grandlay/ Plaza/ Rallison
EPABX System/ IP Based PBX System		
1	EPABX System	Siemens/ Cisco/ Alcatel/ Coral/ Panasonic/ Avaya
2	Master console phone	Siemens/ Cisco/ Alcatel/ Coral/ Panasonic/ Avaya
3	Telephone instrument	Beetal/ Tata/ Panasonic/ Coral
4	18SWGsheet(Chrono Box)	Topaz/ Coral/ Crown
5	Constant voltage transformer	Topaz/ Bhurji/ Delta/ Servokon
6	Unarmoured telephone wire	Delton/ Finolex/ RR Kabel/ Havells / Rallison
7	Cat-6cable, Wires & Fiber optic cable	Amp/ Avaya/ Beldon/ Legrand/ Molex/ Schneider /AKG/ Rallison
8	IP Based PBX System	Matrix/ Panasonic/ NEC/ CISCO/ Alcatel/ Ericsson /Siemens/ Tadiran
9	Managed Network Switches	CISCO/ Allied Tellies/ HP/ Netgear/ Juniper
10	Rack(Network/Server)	Netrack/ WQ/ Panduit /Rittal/ Derwiser Emersion/ Schneider (APC)/ Valrack
VRV/VRF, Air Conditioner & Water Purifier		
1	Split/Window type Air Conditioner	Mitshubshi/ Toshiba /O General/ Daikin/ Hitachi/ Voltas/ Carrier/ Bluestar / LG/ Panasonic
2	VRV/VRF	Mitshubshi Electric/ Mitshubshi Heavy Industries/ Toshiba/ Bluestar / O General/ Daikin / Hitachi/ Voltas/ Carrier/ LG
3	Voltage stabilizer	Vguard/ Bluebird/ Voltas/ Servokon/ Logicstate
4	RO/water purifier	Kent/ IonExchange/ Aquaguard/ VENZA
5	Drinking water cooler	Voltas/ Blue Star/ Usha
6	Refrigerant Copper Tube/pipes	Met-Tube/ Hindustan/ Rajco/ Totalline/ Mandav tubes /Jindal Refrigeration
7	UPVC Drain pipe	Polypack/ Supreme/ AKG/ BEC/ Ashirwad/ Astral/ Finolex
8	AHU (Dy. Coil Based)	Zeco /

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Insulation		
1	Nitrile Rubber	Armaflex/ Vidoflex/ Superflex/ K-flex/ ALP Aeroflex
2	Crossed linked polyethylene	Torcellene/ Thermo Break/ Armaflex / ALP Aeroflex
Ducting & Grills		
1	Factory Fabricated Duct	Zeco/ Techno Fabri Duct/ Rolastar/ Ductofab/ ETA
2	G.I. Sheet Metal Duct	SAIL/ Tata/ Jindal
3	Grilles/Diffusers	Air Master/ Airflow/ Dynamic/ Ruskintitus/ Carryaire / Revistar
4	Axial flow fan / Inline Fans	Kruger / Nicotra / Humidin/ Greenheck/ Flaktwood
Uninterrupted Power Supply (UPS)		
1	Online/Offline UPS	Numeric/ Eaton/ APC/ Vertiv/ Mitsubshi/ Toshiba/ Alliance Autometer/ Microtek/ Delta
Audio Video System		
1	Projector	Panasonic / Christie / Barco / Sony/NEC /EPSON
2	LED Display	Panasonic / LG / Samsung / Sony
3	Floor Cart for Display	Chief /Lumi /Acoustika
4	Digital Podium	AHA/ILS/ TECOM /EAPL/ ELKO/ Liberty/ UNI/ Amplexe / ATDSC
5	Motorised Projection Screen	Draper /Dalite/ Milan Lliberty/ Logic /Chief /Visico/ Teck/ Focus
6	Wall Plate	Atlona / Extron / Lightware/ Aurora/ Creston
7	Matrix Switcher / Spliter	Atlona / Extron / Lightware / Aurora/ Creston / Livertv AV
8	Matrix switcher with USB interface	Atlona / Extron / Lightware/ Aurora/ Creston
9	HD Base T receiver for HDMI with USB	Atlona / Extron / Lightware/ Aurora/ Creston
10	Transmitter and Receivers	Atlona / Extron / Lightware/ Aurora/ Creston
11	Wireless Presentation system	Atlona / Extron / Barco/ Creston/ Cramer/AMX
12	Goose neck microphone	Audio Technica / Shure / Bayerdynamic /AKG/ Electrovoice /Senheiser/ JBL
13	wireless Lapel microphone	Audio Technica / Shure / Bayerdynamic /AKG/ Electrovoice /Senheiser/ JBL
14	Handheld wireless / Wireless Headset	Audio Technica / Shure / Bayerdynamic /AKG /Electro voice / Senheiser/JBL
15	Antenna distribution system etc complete as per tender specification	Audio Technica / Shure / Bayerdynamic/ AKG/ Electro voice / Senheiser /JBL
16	Pair of UHF wide-band directional antennas etc complete as per tender specification	Audio Technica / Shure / Bayerdynamic/ AKG/ Electro voice /Senheiser /JBL
17	Speakers	L Acoustics / Community Audio/ Bose/ Martin Audio/ JBL/ Electrovoice/ Renkus Heinz / Sony /D&B Audiotechnik/ Meyer Sound
18	Amplifier	Labgruppen / Powersoft / Martin Audio/Bose/ Lab Gruppen/ Ashly Audio /Bose/Sony/JBL/D&B Audio technik/ Meyer Sound
19	Digital Signal Processor	Klark Teknik / Biamp / Clearone/ Ashly Audio /Bose / D&B Audio technik/ Meyer Sound
20	Control System	Atlona / Extron / AMX/ Aurora/ Creston
21	Touch Control Panel	APPLE/ SAMSUNG/ AMX

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22	Docking station for wireless touch panel	Launch Port / AMX / Vidda Box/ SAMSUNG
23	Wi fi access point	Linksys / Netgear / D-Link / CISCO/ Allied Tellies /HP / Aruba/ Juniper
24	POE Switch	Linksys / Netgear / D-Link / CISCO/ Allied Tellies/ HP/ Aruba/ Juniper
25	Cables (Speaker /HDMI /Contra /USB)	Sommer/ Gotham/ Belden/ Panduit/ Commscope /Simon /Atlona/ Sommer /Klotz/ Systimax/ Schneider/ Molex /Legrand/ Extreme/ Derwiser/ Systimax (Commscope) / Livity AV /Kramer / Polycab
26	Connectors	Amphenol, Neutrik, Switchcraft
27	Rack	Valrack/MIDDLE ATLANTIC /WQ/ Netrack/ Panduit/ Rittal/ Emerson/ Schneider (APC)/ Derwiser
28	Multi Input Recorder	Lumens/ Mediapointe /Media site/ Vbrick
29	PTZ Camera / VC Camera	Honey Well/ Bosch/Sony/ Pelco/ Tyco/ Samsung/ Stoples / Lumnes /AVER
30	Camera Control Joystick	Lumens/ Sony/ Vaddio/ Honeywell
31	Document Camera	Lumens / Elmo / Wolf Vision
32	Video conference Codec	Panasonic /Cisco /Polycom
33	Surface/ Ceiling mounted Loudspeaker (Array/Small Format/ Full Range)	D&B Audio Technik/ Meyer sound/ Bose
34	OEM Array Frame	D&B Audio Technik/ Meyer sound/ Bose
35	Subwoofer	D&B Audio Technik/ Meyer sound/ Bose
36	Zone Controller	D&B Audio Technik/ Meyer sound/ Bose
37	Analog Mixer	Yamaha/ Allen & Heath/ Digico
38	LED Video Wall/ All-in-One	Barco/ Delta/ Cristie/ Mutshubushi
39	Wireless Presentation System	Screen Beam/Extron/ Lightware
40	Conference Display System	Stapes/ Element One/ Aurthorhomes
41	Chairmen/Delegate/CentralControl Unit	Stapes/ Telvic/ Bosch
SIGNAGE		
1	Signage	Autoglo / Prolite / Ceasefire
HVAC System		
1	Chilled Water Machine (Screw/ centrifugal water cooled)	Johnson Control/ Daikin/ Carrier/ Bluestar/ Trane/ Voltas/ Dunhum- Bush 1
2	Brine Chilled Water Machine (Scroll water cooled)	Brine Chilled Water Machine (Scroll water cooled)
3	Pump	Grundfos / Kirloskar / Xylem / Armstrong/ Wilo
4	Variable Frequency Drive (VFD)	Danfoss/ Siemens / ABB / Carrier
5	Cooling Tower	Bell / Paharpur / Mihir / Advance / Belden
6	Air Handling Unit (AHU)	Zeco Aircon/ System Air/ Edgetech /Bluestar / Voltas / Carrier / VTS/ Waves
7	Cooling Coil	Zeco Aircon/ System. Air/ Edgetech/ Bluestar/ Voltas/ Carrier/ Waves
8	Plug Fan	Kruger/ Nicotra / Greenheck/ Camtree
9	Centrifugal Fan	Kruger / System Air / Nicotra / Greenheck/ Camtree
10	Wet Scrubber	Zeco Aircon/ System Air / Edgetch/ Waves
11	Servo Voltage Stabilizer	Servocon/ Servomax / Recons / NEEL / APLAB
12	Air Filter	Mechmaark / Pyramid / Thermodyne

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13	Propeller fan	Marathon/ Sphere / Kruger
14	GSS Sheet	Sail/Tata/ Jindal / National
15	Factory Fabricated Duct(MS/GSS)	Dustech/ Ductofeb/ Zeco / Rolasta / Atco
16	EPS Thermal Insulation	Beardcell/ Styrene/SHI/ Lloyd/ Armaflex/ U.P. Twiga/ ALP Aeroflex
17	Fibre glass Wool	Owns Canning /Lloyd/ Armaflex/ U.P. Twiga /ALP Aeroflex
18	Flexible pipe connection	Resitoflex / Dunlop / Easyflex / Cori
19	Butterfly Valve	Advance / Audco / Honeywell / Belimo
20	Y-Strainer	Rapid cool/ Emerald / Honeywell / SM
21	POT Strainer	Rapid cool/ Emerald / Honeywell / SM
22	Non Return Valve	Audco / Advance / Honeywell
23	Balancing Valve	Audco / Advance / Honeywell
24	Two way Control Valve with Actuator, Motor and Thermostat	Honeywell / Siemens / Belimo / Danfoss
25	Ball Valve	Sant/ Rapid cool / Danfoss / Belimo
26	Auto Air / Purge Valve	Anergy/ Rapidcool / AIP / Flamco
27	Thermometer / Pressure Gauge	Fiebig/ H-Guru / Emerald / Libra
28	Water Flow Switch	Siemens/ Anergy / Omiron / Danfoss/ Honeywell
29	Temp & RH Sensor	Honeywell / Siemens/ Omiron / Schneider
30	Air Differential Pressure Switch	Honeywell / Siemens/ Omiron / Schneider
31	Air Differential Sensor	Honeywell / Siemens/ Omiron
32	Fire Damper with Actuator	Trox/ Greenheck / Conaire / Sgsjemair
33	Grilles & Dampers	Pineair/ Conaire/ Caryaire/ Greenair/ System Air/ Sevea/ Tristar
34	Under deck Insulation	Beardsell/ Styrene/ Lloyd/ Modifoam/ Armaflex/ ALP Aeroflex
35	Motor for Centrifugal Fan	Crompton Greaves / Siemens / L&T (LAURITZ KNUDSEN)
36	VFD Enclosure (Flameproof)	Siemens/ Schneider / L&T (LAURITZ KNUDSEN) / Crompton Greaves / Sudhir/ Balliga/ Flexpro/ FCGI
37	Single Phase Preventor	Minilec / L&T (LAURITZ KNUDSEN)/ Ellsco
38	Current Transformer (Cast Resin)	AE/ Kappa
39	Switch / Fuse Unit / HRC Fuse	L&T (LAURITZ KNUDSEN) / Siemens / ABB / C&S
40	Ammeter / Voltmeter (Digital Type)	AE /L&T (LAURITZ KNUDSEN) / Crompton Greaves / Siemens / Conserve
41	LED indicating Lamp / Push Button	Siemens/ GE Power / ABB / L&T (LAURITZ KNUDSEN)/ Schneider Electric
42	Selector Switch	AE/ L&T (LAURITZ KNUDSEN)/ Kaycee
43	Relay Timer / Contactor / Starter/ Push Button	Siemens / L&T (LAURITZ KNUDSEN) / Schneider Electric / ABB / BIL
44	Paint	Nerolac / Asian / Berger
45	Power / Control Cable	Worldcab / Skytone / Polycab
46	Fire Survival Power / Control Cable	Belden / Fusion Polymers / Tyco / RR Kabel /Finolex/ Gloster/ Plaza/ Grandlay/ Rallison
47	Termination Kit	Raychem / Densons / Xicon / ABB
48	Perforated Cable Tray	B.E.C./Apex/ Aditya Steel
49	Fastener	Hilti / AFT / Wurth/ Fisher
50	ACB, Change Over Switch	L&T (LAURITZ KNUDSEN)/ Legrand /

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		Schneider / Siemens
51	Copper Tube/pipes	Met-Tube/ Hindustan/ Rajco /Total line/ Mandav tubes/ Jindal Refrigeration
CCTV System		
1	Bullet Camera	Honey Well/ Bosch/ Sony/ Pelco/ Tyco/ Samsung /PRAMA/CP Plus/Axis
2	Dome Camera	Honey Well/ Bosch /Sony/ Pelco/ Tyco/ Samsung /PRAMA /CP Plus/Axis
3	NETWORK SWITCH	Cisco/ Avaya/ Juniper/ Extreme/ Hp /Net Gear
4	WIRELESS CONTROLER	Cisco/ Avaya/ Juniper/ Extreme/ Hp / Net Gear
5	ACCESS POINT POE	Cisco/ Avaya/ Juniper/ Extreme/ Hp / Net Gear
6	NVR / KEYBOARD	Honey Well/ Bosch/ Sony/ Pelco/ Samsung /PRAMA/CP Plus
7	LED TV	Sony/ LG/ Panasonic/ Samsung
8	CAT 6A CABLE (23 AWG)	Panduit - Pannet/ Siemon/ Belden/ Systimax/ Kei /Legrand / Molex
9	PATCH PANEL / PATCH CORD/RJ45 WITH FACE PLATE	Panduit Pannet/ Siemon/ Belden/ Systimax / PRAMA
10	Communication Cables/ Signal Cable/ Control/ Power Cable	Finolex, Havells, Polycab, Techno flex, Lapp Cable, Beldon, Legrand, Molex, Comm Scope, Schneider /PRAMA
11	Optic Fiber Cable	Systemax, Panduit, Siemon, Belkin, Beldon, Comm Scope, Legrand, Molex, Schneider
12	FACE PLATE / ADAPTOR PLATE	Panduit - Pannet/ Siemon/ Belden
13	WALL MOUNTING CABINETS / CABLE MANAGE	Emerson/ Panduit /Rittal /Valrack
14	SFP MODULE	Cisco/ Avaya/ Huawei/ Juniper/ Extreme/HP
15	IPPBX	Panasonic/ Cisco/ Mitel/ Alcatel/ Progility/ Avaya /NEC / Coral / Matrix / Syntel
16	CCTV STORAGE HDD	Samsung /WD / Seagate
17	TELEPHONE (ANALOG)	Panasonic/ Cisco/ Mitel/ Alcatel /Progility/ Avaya /NEC
18	TELEPHONE (DIGITAL)	Panasonic/ Cisco/ Mitel/ Alcatel /Progility/ Avaya /NEC
19	DIGITAL KEY TELEPHONE WITH LCD DISPLAY	Panasonic/ Cisco/ Mitel/ Alcatel /Progility/ Avaya /NEC
Boom Barriers		
1	Boom Barriers	Motwane, Godrej, Faac, Gunnebo
LAN and Data Networking		
1	STP Cat6a Cable and Its Components Such as Patch Cords, Patch Panels, Face Plates and All Their Accessories	Comm Scope- SYSTIMAX/ Siemon/ Panduit-Pannet/ Belden/ Legrand/ Molex
2	Single Mode Fiber& Multi Mode Optic Cables of Various Core Capacities and Their Accessories — Wall Mounted or Rack Mounted Lius, Patch Cords and Pigtailes and Other Accessories	COMMScope- SYSTIMAX/ SIEMON/ PANDUIT-PANNET/ BELDEN/ MOLEX
3	NETWORKING ENCLOSURES, RACKS OF VARIOUS SIZES — 15U UP TO 42U	APW-VERO PRESIDENT/ RITTAL/ PANDUIT— PANNET/ VALRACK/ NETRECK
4	0.5 MM DIA FRLS PVC INSULATED ANNEALED Cable	Finolex/ RR Kable/ Havells/ Molex/ Bonton/ Delton/ Legrand/ Beldon/ Avaya/ Gloster/ Plaza/ AKG

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5	COPPER CONDUCTOR CABLE — 4 PAIRS Cat-6 cable, fiber optic	Finolex/ RR Kable/ Havells/ Molex/ Bonton/ Delton/ Legrand/ Beldon/Avaya/ Gloster /Plaza/ AKG
6	Networking Switches — Access Switches, Distribution Switches, Core Switches, Server Farm Switches and their components such as 1Gbps SFP, 10Gbps SFP+, 40Gbps QSFP+ & 100Gbps QSFP28 transceivers and modules and other accessories such as power supplies, fans, stacking cables.	Cisco/ Extreme Networks/ HPE (Aruba)/ Juniper Networks/ Allied Telesis / Net Gear
7	Wireless Controllers, Wireless Access Points and their accessories	Cisco/ Extreme Networks/ HPE (Aruba)/ Juniper Networks/ Allied Telesis/ Net Gear
8	Internet Router, Intranet Router and their accessories and Optic	Cisco/ Juniper Networks/ Extreme Networks/ HPE (Aruba) / Net Gear
9	Network Management System	Cisco/ Extreme Networks/ HPE (Aruba)/ Juniper Networks/ Allied Telesis/ Net Gear
10	AAA Solution for Campus LAN	Cisco/ HPE (Aruba)/ Juniper/ Extreme Networks/ Net Gear
11	Next Generation Firewall and its accessories	Check Point/ Cisco/ PaloAlto/ Annexagate/ Fortinet; F5/ HPE(Aruba) / Net Gear/ SAFES
ACCESS CONTROL SYSTEM		
1	Access control system & allied accessories	HID/ Lenen/ Genetec /Idcube
DG Set		
1	Diesel Operated Generating Engine	Cummins India/ Caterpillar / Ashok Leyland/ KOEL / Greaves / Perkins
2	Alternator	Stamford/ Lerroy Sommer / Kirloskar Electric / Caterpillar / Crompton Greaves / KOEL
3	DG Set Canopy / Enclosure	As Per OEM / OEA Of Respective DG Set Manufacturer.
4	MCB, MCBDB, RCBO'S/ RCCB'S	Schneider Electric /Hager/ L&T (LAURITZ KNUDSEN)/ Siemens/ ABB
5	MCCB 3 & 4 Pole	Schneider Electric/ Siemens/ Larsen & Toubro/ ABB
6	Ammeter/Voltmeter/ Selector Switch, Indicating Lamp/Relays	AE/IMP/ MECO/ L&T (LAURITZ KNUDSEN) (Only Digital Type To Be Used)
7	Contractors, Timer	L&T (LAURITZ KNUDSEN)/ Siemens/ Schneider Electric
8	HT Cable	KEI/ Havells /Polycab/ Gloster/ Nicco/ Grandlay/ Finolex /RR KABEL/ Rallison
9	LT Cable	Finolex/ RR Kabel/ KEI/ Havells/ Polycab/ Grandlay/ Plaza Cables/ Panasonic/ Anchor/ Bonton/ Paramount cables/ V-marc/ JMW Kable /AKG/ Gloster/ Rallison
10	Bus Trunking Make	GE/ C&S/ Schneider /L&T (LAURITZ KNUDSEN)/ ABB/ Legrand
11	HT Cable End Termination	M Seal/Denson/Raychem/Cab Seal
12	Battery	Panasonic/ Exide/ Amaron/ luminous/ SF
13	G.I. Pipe	Jindal (Hissar)/Tata. (ISI Marked)
14	ACB	L&T (LAURITZKNUDSEN) /ABB/ Siemens/ Schneider /Legrand
15	Vibration Isolators	Resistoflex/ Flenonics (USA)/ Gerv
16	Noise Control Silencer / Muffler	Intertec/ Sound Control India, As Per OEM
17	Fiberglass	UP Twiga, Kimmco/ Owing Corning
18	Alarm Annunciator	Advani Oralikon/ Larsen & Toubro Minilec
19	Motors	Kirloskar/ Bharat Bijlee/ Siemens
20	MS Pipes Upto 200 Mm Dia	Tata Steel/ Jindal (Hissar)

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21	G.I. Pipe Fitting	Unik/ Zoloto M
22	Flexible Pipe Connections	Resisto flex/ Flexionics (USA)
23	Welding Rod	Advani/ ESAB
24	Indicating Lamps, Selector Switch	Siemens/ L&T (LAURITZ KNUDSEN)/ Kaycee/ BCH
25	AMF/Synchronized Panel(DG Set)	As Per OEM of DG Set
26	Cable Glands Double Compression With Earthing Links	Baliga Lighting / Comet / Cosmos / Dowell's
Solar System Solar Power Generation System		
1	Solar Power Generation System	REIL/ BEL/ CEL/ REC/ SOLON/ TATA POWER /ADANI /INA/ WAAREE / VIKRAM/ ABB/ MOSER BEAR/ WIPRO
2	Junction Box	VNT/ SUN GARNER/ OEM of SPV Modules
3	SPV Inverter	Sungrow/ Delta/ SMA/ ABB
4	Module Mounting Structure	As per MNRE/ Manufacturer's standard
5	XLPE Alumunium / Copper cable	Finolex/ RR Kabel/ KEI/ Havells/ Polycab/ Paragon (Electron)/ Universal/Nicco/RPG Cables/ Grandlay/ Bonton/ Plaza cables/ Panasonic/ Anchor/ Paramount Cables/ V-marc/ JMW Kable /AKG/ Gloster/ Rallison
6	Solar cable XLPO Insulated (DC)	RR Kable / Polycab/ Havells/ Finolex/ Lapp/ Paragon (Electron)/ Bonton/ Svarn/ NEC/ KVVS/ HPL Finolex/ KEI/ Grandlay/ Plaza Cables/ Panasonic/ Anchor/ Paramount cables/ V-marc/ JMW Kable /AKG/ Gloster/ Rallison
EARTHING		
1	Earthing	Avon Earthing, Ashlok Safe Earthing, VRH Lightning Protection
FACADE LIGHTING		
1	Facade light	Trilux, Philips, LT, Ligman, Griven, Traxon, Unilamp

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SCHEDULE OF QUANTITY					
Name of Work : Construction of Multipurpose Hall of GRIHA-5 Star Including IEI & fans, Fire alarm & PA system, Wet Riser & Sprinkler system, VRF/VRV/ Split Air Conditioning system, online UPS system, audio visual system & Lifts etc. at NBSC/BIRD Campus Lucknow (UP) (Package-I).					
Sl. No.	Description	Qty.	Unit	Rate	Amount
	Sub Head-1 (Interanal/ External Electrical Installations)				
1	Wiring for light point/ fan point/ exhaust fan point/ call bell point with 1.5 sq.mm FRLS/HFFR PVC insulated copper conductor single core cable in surface/ recessed steel conduit, with modular switch, modular plate, suitable GI box and earthing the point with 1.5 sq.mm FRLS/HFFR PVC insulated copper conductor single core cable etc. as required				
	(a) Group C	650.00	Point	2101.00	1365650.00
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/ HFFR PVC insulated copper conductor single core cable in surface/ recessed steel conduit, and earthing the point with 1.5 sq. mm FRLS/HFFR PVC insulated copper conductor single core cable etc. as required.				
	(a) Group C	300.00	Point	1246.00	373800.00
3	Wiring for twin control light point with 1.5 sq.mm FRLS/HFFR 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/HFFR PVC insulated copper conductor single core cable etc .as required.	48.00	Point	2242.00	107616.00
4	Wiring for circuit/ submain wiring along with earth wire with the following sizes of FRLS/HFFR PVC insulated copper conductor, single core cable in surface/ recessed steel conduit as required				
	(a) 2 X 1.5 sq. mm + 1 X 1.5 sq. mm earth wire.	4000.00	Mtr.	370.00	1480000.00
	(c) 2 X 4 sq. mm + 1 X 4 sq. mm earth wire.	4000.00	Mtr.	476.00	1904000.00
	(d) 2 X 6 sq. mm + 1 X 6 sq. mm earth wire	200.00	Mtr.	652.00	130400.00
	(e) 4 X 6 sq. mm + 2 X 6 sq. mm earth wire	200.00	Mtr.	1001.00	200200.00
5	Supplying and fixing suitable size GI box with modular plate and cover in front on surface or in recess, including providing and fixing 3 pin 5/6 A modular socket outlet and 5/6 A modular	128.00	Nos.	545.00	69760.00

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	switch, connections etc. as required.				
6	Supplying and fixing suitable size GI box with modular plate and cover in front on surface or in recess, including providing and fixing 2 nos. 3 pin 5/6 A modular socket outlet and 2 nos. 5/6 A modular switch, connections etc. as required. (For light plugs to be used in non residential buildings).	55.00	Nos.	757.00	41635.00
7	Supply and fixing of suitable size GI box with modular plate and cover in FRLSont 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.	257.00	Nos.	659.00	169363.00
8	Supply 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.	2.00	Nos.	402.00	804.00
9	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	16.00	Nos.	807.00	12912.00
10	Supplying and fixing 30 A, 415 V, TPN Industrial type socket outlet, with 4 pole and earth, metal enclosed plug top along with 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.	12.00	Nos.	4358.00	52296.00
11	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) 8 way , Double door	2.00	Nos.	2773.00	5546.00
	(b) 12 way , Double door	2.00	Nos.	2871.00	5742.00
12	Supplying and fixing following way, surface / recess mounted vertical type, 415 V, TPN MCB distribution board of sheet steel, dust protected, duly powder painted, inclusive of 200A tinned copper bus bar, common neutral link, earth bar, din bar for mounting MCB's with provision of MCCB as incommer, interconnection between incomer MCCB and				

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	bus bar (without MCB/ MCCB) as reqd. (Note vertical type MCB TPDB is normally used where 3 phase outlets are reqd.)				
	(a) 8 way , Double door	4.00	Nos.	10621.00	42484.00
	(b) 12 way , Double door	1.00	Nos.	13143.00	13143.00
13	Supplying and fixing following way, horizontal type three pole and neutral, sheet steel, MCB distribution board, 415 V, on surface/ recess, complete with tinned copper bus bar, neutral bus bar, earth bar, din bar, interconnections, powder painted including earthing etc. as required. (But without MCB/RCCB/Isolator).				
	(a) 8 way (4 + 4 + 24), Double door	20.00	Nos.	6337.00	126740.00
	(b) 12 way (4 + 4 + 36), Double door	12.00	Nos.	10182.00	122184.00
14	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	944.00	Nos.	285.00	269040.00
	(b) Single pole and neutral	4.00	Nos.	643.00	2572.00
	(c) Triple pole and neutral	20.00	Nos.	1301.00	26020.00
15	Supplying and fixing following rating, 415 volts 'C' series, miniature circuit breaker (MCB)suitable for inductive load of following poles in the existing MCB DB complete with connections, testing and commissioning etc. as required.				
	(a) 40 amps 3P MCB	20.00	Nos.	2422.00	48440.00
	(b) 63 amps 4P MCB	12.00	Nos.	2530.00	30360.00
16	Supplying and fixing following rating, four pole, (three phase and neutral), 415 volts, 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 amps.	20.00	Nos.	3137.00	62740.00
	(b) 63 amps.	12.00	Nos.	3597.00	43164.00
17	Providing and fixing following rating and breaking capacity and pole MCCB with thermomagnetic release and terminal spreaders in existing cubicle panel board including drilling holes in cubicle panel, making connections, Ics=100% Icu and Operational				

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	Voltage 690V etc. as required. (Incomer of VTPN DB)				
	(a) 100 A, 25 KA,FP MCCB	4.00	Nos.	5961.00	23844.00
	(b) 125 A, 25 KA,FP MCCB	1.00	Nos.	8222.00	8222.00
18	Supplying & fixing single pole, blanking plate in the existing MCB DB complete etc. as required.	116.00	Nos.	14.00	1624.00
19	Supplying and fixing following size / modules, GI box along with modular base & cover plate for modular switches in recess etc as required				
	(a) 1 or 2 Module (75 mm x 75 mm)	58.00	Nos.	354.00	20532.00
20	Supplying and fixing following modular switch / socket on the existing modular plate & switch box including connections but excluding modular plate etc as required				
	(a) Telephone Socket outlet	58.00	Nos.	168.00	9744.00
21	Supply and drawing following pair, 0.5 sq.mm. FRLS PVC insulated annealed copper conductor, unarmoured telephone cable in the existing surface / recessed steel/ PVC conduit as required.				
	(a) 2 Pair	1500.00	Mtr.	39.00	58500.00
22	Supplying and drawing 20 Pair 0.5 mm dia FRLS PVC insulated annealed copper conductor, unarmoured telephone cable in the existing surface/ recessed steel/ PVC Conduit etc. complete as required.	100.00	Mtr.	344.00	34400.00
23	Supply and Installation, testing & commissioning of Telephone Tag Block of following sizes with all assories complete in all respect.				
	(a) 50 Pair	5.00	Nos.	14433.00	72165.00
24	Providing & fixing of size following uPVC trunking along with cover on surface or wall complete including making good the damages etc as reqd.				
	(a) 100 mm x 50 mm /105 mm x 50 mm	200.00	Mtr.	1122.00	224400.00
	(b) 50 mm x 50 mm	100.00	Mtr.	775.00	77500.00
25	Providing & fixing of following accessories in existing uPVC trunking system of size 100 mm x 50 mm /105 mm x 50 mm including making good the damages complete etc as required				
	(a) External Angle	10.00	Nos.	521.00	5210.00
	(b) Flat Tee	10.00	Nos.	632.00	6320.00
	(c) End Cap	10.00	Nos.	321.00	3210.00

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	(d) Joint Cover	10.00	Nos.	359.00	3590.00
26	Providing & fixing of following accessories in existing uPVC trunking system of size 50 mm x 50 mm including making good the damages complete etc as required				
	(a) External Angle	10.00	Nos.	451.00	4510.00
	(b) Flat Tee	10.00	Nos.	393.00	3930.00
	(c) End Cap	10.00	Nos.	287.00	2870.00
	(d) Joint Cover	10.00	Nos.	242.00	2420.00
27	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) 25 mm dia	500.00	Mtr.	289.00	144500.00
	LED Fittings/ Fans				
28	Supplying, Installation, Testing & Commissioning of LED surface Down lighter (Round /square/Rectangular) SMD type of following body material with PMMA and prismatic diffuser and construction as per IS : 10322 with driver as per the requirement with Driver efficiency >85%, Operating voltage AC 140-270 Volt, frequency 50/60 hz, Operating temp range - 5 0C to 40 0C, internal surge protection of 2.5 KV with Short & Open circuit protection ,THD < 10% , P. F.≥0.95, IP20, CRI >80, UGR (Unified Glare Rating) < 19, Flicker free, (flicker should be below 5 %), life time (LED, Driver & electrical circuitry), life time of minimum 50000 Burning Hours with 70% of initial Lumen maintained till life ends as per LM80 extrapolation IES TM-21-11 report, CCT 4000°K (As per ANSI Bin), SDCM(Standard Deviation Color Matching) <3, Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard. Manufactures Word Mark/ Name Engraved/ Embossing/ Screen printing on housing. complete in all respect i/c external connections with 1.5 sq mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty. System lumen efficacy >135 lm/Watt output. LM79 & LM80 Test report with ULR code while submitting TDS and all testing required for				

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	LED fixtures as per BIS shall be submitted. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above 90°C). Powder coated die cast / Extruded aluminium Body including trim .				
	(a) 12-15 Watt	36.00	Nos.	756.00	27216.00
29	Supplying, Installation, Testing & Commissioning of non dimmable LED Recessed Downlighter COB type of PDC Aluminium housing with deep recessed reflectors for glare free light & unique macro reflectors optics to allow precise accent lighting with driver as per the requirement with Driver efficiency >85%, Operating voltage AC 140-270 Volt, frequency 50 hz, Operating temp range -0 C to 40C, internal surge protection of 6 KV with Short & Open circuit protection, THD < 10% , P. F. ≥ 0.95, IP20, CRI > 80, UGR (Unified Glare Rating) < 16, Flicker free (flicker should be below 5%), life time (LED, Driver & electrical circuitry), of minimum 50000 Burning Hours with 70% of initial Lumen maintained till life ends, CCT 4000°K (As per ANSI Bin), SDCM (Standard Deviation Colour Matching) < 3, Beam angle 60 degree . Maximum power consumption should not more than the specified rating and Fixture shall be confirming to relevant BIS standards. Manufactures Word Mark/ Name Engraved/ Embossing/ Screen printing on housing Complete in all respect i/c external connections with 1.5 sq.mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty. System lumen efficacy ≥ 100 LPW . LM79 & LM80 Test report with ULR code while submitting TDS and all testing required for LED fixtures as per BIS shall be submitted.				
	(a) 12 watt (with max, outer dia, 100 mm)	312.00	Nos.	2676.00	834912.00
	(b) 18 watt (with max, outer dia, 120 mm)	256.00	Nos.	3468.00	887808.00

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30	Supplying, installation, Testing & Commissioning of recessed Panel light 2x2 ft., having CRCA /Extruded Aluminium housing (Thickness > 1.20 mm) with specific architectural layout T rails using narrow recessed centre slots(min. size 9/16 inch (15mm) slot grid) structure to compress the glare down to UGR<16 with Driver efficiency >85%, Operating voltage AC 140-270 Volt, frequency 50/60 hz, Operating temp range - 0 0C to 40 0C, internal surge protection of 2.5 KV with Short & Open circuit protection, THD < 10% , P. F.≥0.95, IP20, CRI >80,UGR (Unified Glare Rating) < 16, Flicker free, (flicker should be below 5 %), life time (LED, Driver & electrical circuitry), of minimum 50000 Burning Hours with, 70% of initial Lumen maintained till life ends as per LM80 extrapolation IES TM-21-11 report, CCT 4000°K (As per ANSI Bin), SDCM (Standard Deviation Colour Matching) <3, Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard. Manufactures Word Mark/ Name Engraved/ Embossing/ Screen printing on housing. complete in all respect i/c external connections with 1.5 sq mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty. System lumen efficacy ≥130 lm/Watt output . LM79 & LM80 Test report with ULR code while submitting TDS and all testing required for LED fixtures as per BIS shall be submitted.				
	(a) 32 watt	95.00	Nos.	7381.00	701195.00
31	Supplying, installation, Testing & Commissioning of DALI Dimmable recessed Panel light 2x2 ft., having CRCA /Extruded Aluminium housing (Thickness > 1.20 mm) with specific architectural layout T rails using narrow recessed centre slots(min. size 9/16 inch (15mm) slot grid) structure to compress the glare down to UGR<16 with Driver efficiency >85%, Operating voltage AC 140-270 Volt, frequency 50/60 hz, Operating temp range - 0 0C to 40 0C, internal surge protection of 2.5 KV with Short & Open circuit protection, THD < 10% , P. F.≥0.95, IP20, CRI >80,UGR (Unified Glare Rating) < 16, Flicker free, (flicker should be below 5 %), The LED driver				

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	should comply to IEC61000-3-2 ed.3.2, 2009 for Harmonics, IEC61347 -2 -13, 2006 in Conjunction with IEC61347-1 ed.2.0, 2007 for Electrical Safety, IEC62384 ed.1.1, 2011 for performance and IEC61547 ed.2.0, 2009, CISPR-15 for EMI. life time (LED, Driver & electrical circuitry), of minimum 50000 Burning Hours with, 70% of initial Lumen maintained till life ends as per LM80 extrapolation IES TM-21-11 report, CCT 4000°K (As per ANSI Bin), SDCM(Standard Deviation Colour Matching) <3, Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard. Manufactures Word Mark/ Name Engraved/ Embossing/ Screen printing on housing. complete in all respect i/c external connections with 1.5 sq mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty. System lumen efficacy ≥ 125 lm/Watt output . LM79 & LM80 Test report with ULR code while submitting TDS and all testing required for LED fixtures as per BIS shall be submitted.				
	(a) 32 watt	98.00	Nos.	8388.00	822024.00
32	Supplying, installation, Testing & Commissioning of min. size 575 mm LED surface mounted batten light, PDC Aluminium/extruded Al. body with built in driver, Operating voltage AC 100-240Volt, freq 50 hz, Operating temprange -0 deg to 40 deg centigrade, internal surge protection of 2.5KV with Short & Open circuit protection, THD<15%, P.F>0.95, IP20, CRI>80, life time of minimum 25000 Burning Hours with, 70% of initial Lumen maintained till life ends, CCT 5700°K, Maximum power consumption should not more than the specified rating and complete in all respect i/c connections with 1.5 sqmm FRLS, PVC insulated copper conductor single core cable and earthing etc. as required",System lumen efficacy ≥ 100 lm/W at out put with Minimum 5 year OEM warranty. LM79 & LM80 Test report with ULR code while submitting TDS and all testing required for LED fixtures as per BIS shall be submitted.				
	(a) 10 watt	44.00	Nos.	682.00	30008.00

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33	Supplying, installation, Testing & Commissioning of 750 lumen, LED bulk head, pressure die cast aluminium with built in driver, Operating voltage AC 140- 270Volt, freq 50 hz, Operating temprange 0 deg to 45 deg centigrade, internal surge protection of 2.5KV with Short & Open circuit protection, THD<10%, P.F.≥0.95, IP65, IK-08, CRI>80, SDCM <5, life time of minimum 50000 Burning Hours with, 70% of initial Lumen maintained till life ends, CCT 5700°K/6500°K and complete in all respect i/c connections with 1.5 sqmm FRLS, PVC insulated copper conductor single core cable and earthing etc. as required",System lumen efficacy ≥ 110 lm/W at out put with Minimum 5 year OEM warranty. LM79 & LM80 Test report with ULR code while submitting TDS and all testing required for LED fixtures as per BIS shall be submitted.	42.00	Nos.	738.00	30996.00
34	Supplying, installation, Testing & Commissioning of DALI dimmable deep recessed Round shape downlighter COB type, made up of pressure die-cast aluminium housing and white trim with Aluminum finish reflector. The luminaire shall deliver minimum of 3600Lumens. Powered by electronic LED driver with Output Short-circuit protection, Surge protection 3.5KV. Color temperature 4000K & IP20. CRI≥ 80, & SDCM <3. Beam Angle option of 60 deg.The driver of the LED downlighter shall be isolated driver and shall have minimum operating voltage of 140V to 270V, PF ≥0.95 & THD ≤10%, Driver efficiency of ≥85%. The luminaire shall have Class B serviceability and the life of luminaire shall be 50000hrs @ L70B50. and complete in all respect i/c connections with 1.5 sqmm FRLS, PVC insulated copper conductor single core cable and earthing etc. as required", System lumen efficacy ≥ 130 lm/W at out put with Minimum 5 year OEM warranty. LM79 & LM80 Test report with ULR code while submitting TDS and all testing required for LED fixtures as per BIS shall be submitted.	119.00	Nos.	5704.00	678776.00

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35	Supplying, installation, Testing & Commissioning of min. size 1120 mm LED surface mounted batten light, Polycarbonate housing with built in driver, Operating voltage AC100-240Volt, freq 50/60hz, Operating temprange -0 deg to 40 deg centigrade, internal surge protection of 2.5KV with Short & Open circuit protection, THD<10%, P.F.≥0.95, SDCM > 5 IP-65 , IK-08, CRI>80, life time of minimum 50000 Burning Hours with, 70% of initial Lumen maintained till life ends, CCT 5700 K , Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard. Manufactures Word Mark/ Name Engraved/ Embossing/ Screen printing on housing. complete in all respect i/c external connections with 1.5 sq mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty, test report and all testing required for LED fixtures as per BIS shall be submitted. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement ",System lumen efficacy ≥120.				
	(a) 20 Watt	16.00	Nos.	1879.00	30064.00
	(b) 40 Watt	56.00	Nos.	2550.00	142800.00
36	Supplying, installation, testing and commissioning of non dimmable pendant / recess type luminaire with HE-high efficiency LED of size min. 44mm height, 70 mm width & 1000 mm lenght with flange suitable for circle formation having profile in aluminium, nano technology based powder-coated, opal diffuser for uniform illumination, electronic control gear & system power- 20w/mtr, CCT-4000K, CRI > 80, white (PC), constant current driver, 70% of luminous flux after 50,000 operating hours, protection class I, IP 20 complete etc as reqd. with Minimum 5 year OEM warranty	30.00	Mtr.	22171.00	665130.00
37	Supply, Installation, testing & commissioning of 1200 mm linear pendent LED Luminaire having width 50 mm suitable for direct downward light application with extruded aluminium housing, PDC aluminium end cap and following technical specifications with all accessories including connection with 1.5 sq.mm FRLS PVC insulated copper conductor	23.00	Nos.	4295.00	98785.00

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	single core cable and earthing as required.with Minimum 5 year OEM warranty (i) Minimum lumen output 3000 lumen (ii) System lumen efficacy ≥ 120 lm/Watt (iii) CCT ≥ 40000 (SDCM < 5), CRI > 80 , PF ≥ 0.95 , (iv) THD $< 10\%$, IP 20, IK 02. (v) L 70 rated life of 50 K hours				
38	Supplying, installation, testing and commissioning of IP 20, 5 mtr. long LED strip with driver (30 watt input/ 25 watt output), self adhesive tape, base colour white having Min. 60 LEDs per meter to maintain uniform brightness with 600 lumens per meter, CCT 3000 K, CRI > 80 , burning hours 20000, power factor > 0.8 i/c connection with 1.5 Sq. mm FRLS PVC insulated copper conductor single core cable, earthing i/c connection, interconnection etc. complete as reqd. with Minimum 5 year OEM warranty	15.00	Nos.	1114.00	16710.00
39	Supplying, installation, testing and commissioning DALI dimmable Suspended Down Truematrix 4ft long & 60-65mm wide linear standalone LED luminaire made of extruded aluminum, with special lens of dew drop facet design (housed in antiglare shield) & sunflower tessellation to have Delta wing distribution. The luminaire shall have system efficacy of ≥ 140 lm/W with 2400Lm & beam angle of 65-70 degree & UGR < 16 . The LED shall be with CRI ≥ 90 SDCM < 3 , CCT option of 4000K. Operating temperature of the luminaire shall be 0°C to +45°C and driver shall comply to the minimum electronic parameters of THD $< 10\%$, PF ≥ 0.95 , & Internal surge protection of 3.5KV. The life shall be 50K Hrs. at L70B50 @ 45deg C, Operating voltage range of 140V - 270V having Class - I protection & serviceability of Class B. The luminaire shall be IP20 & IK02 compliance. The driver shall be of the same make as that of LED luminaire. Luminaire manufacturer must have IN-house NABL accredited lab to conduct LM79, Type test as per IS10322. The successful bidder must submit the NABL accreditation certificate for Luminaire manufacturer. The LED Luminaire & it's driver both should be BIS registered. The luminaire shall be supplied with adjustable suspension wires. The manufacturer shall	42.00	Nos.	12682.00	532644.00

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	submit the following reports before supply of material for approvals LM79 issued by NABL accredited lab, LM80 issued by LED manufacturer with ULR code while submitting TDS. Luminaire should be ROHS/REACH/EPD/LEED & Well Compliant. with Minimum 5 year OEM warranty				
40	Supplying, installation, Testing & Commissioning of circular architectural pendant luminaire of diameter 450 mm produced from round aluminium profile with superior white powder coating corrosion resistance using nano technology with suspension kit and all accessories directly on false ceiling including connection with 1.5 Sq. mm FRLS PVC insulated copper conductor single core cable and earthing etc. as reqd. with Minimum 5 year OEM warranty (i) Minimum lumen output 2600 lumen (ii) Luminaires lumen efficacy ≥ 110 lm/Watt (iii) CCT ≥ 4000 , CRI > 80 , PF ≥ 0.95 , THD $< 10\%$ IP-20 (iv) L 70 rated life of 50 K hours (v) in built surge protection device of minimum 6 KV. (vi) operating voltage range 140V-270 V	40.00	Nos.	21783.00	871320.00
41	Supply, Installation, Testing and Commissioning of ceiling fan with Brush Less Direct Current (BLDC) Motor, class of insulation: B, 3 nos. metal (Aluminium alloy) blades, 30 cm long down rod, 2 nos. canopies, shackle kit, safety rope, copper winding, steel/Al body. Power Factor not less than 0.9, Service Value (CM/M/W) minimum as below, 350 RPM (tolerance as per IS : 374-2019), THD (Total Harmonic Distortion) less than 10%, remote (preferably mobile app based) for speed control and all remaining accessories including safety pin, nut bolts, washers, temperature rise $= 75^{\circ}\text{C}$ (max.), insulation resistance more than 2 mega ohm, suitable for 230 V, 50 Hz, single phase AC supply Ceiling Fan compliant to IS 374:2019 fan i/c external connections with 1.5 sq. mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required				
	(a) 1200mm, service value ≥ 6.0 CM/Min/Watt, air delivery 210 CM/Min	2.00	Nos.	2882.00	5764.00

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	(Minimum)				
42	Supplying, Installation, Testing and commissioning of Passive Infrared(PIR) technology based occupancy sensor with day light dimming(lightning level shall be regulated as per availability of natural day light in an area along with occupancy detection.) having high performance, regulating programmable suitable for connected load upto 10Amp , for mounting height up to 3 mtr and for 5 m diameter coverage area along with necessary fixing arrangements i/c programming at site etc. complete as required.	20.00	Nos.	9670.00	193400.00
	(Lighting Automation)				
	Mezznine floor-1, second floor- 2, third floor-1				
43	Supply and drawing of following sizes of Heavy duty Industrial Flexible cables, PVC insulated, and FRLS round sheathed with multi core bright annealed bare copper conductor suitable for rated voltage of 1.1 KV grade, ISI marked conforming to IS:694:2010 with latest amendments in existing steel/PVC conduit/trunking/pipe etc. as required.				
	(a) 3C x 1.5 sq. mm	1500.00	Mtr	251.00	376500.00
	(b) 2C x 1.5 sq. mm	1500.00	Mtr	185.00	277500.00
44	SITC of Relay Actuator at 2 independent, interlockable channels suitable for mounting on DIN rail, for operating LED and linear/circular LED Fixture with DALI driver, each channel is capable of switching up to a maximum of 10A and making function at Zero crossing for the proper management of energy-saving fixture. The device is configurable through physical configurators for light switch.	8.00	Nos.	5476.00	43808.00
45	SITC of senerio programmer used to manage up to 300 simple and advanced scenarios suitable for mounting on DIN rail, LED indication and programable with ethernet having following specification i/c all connections, inetconnections, programming etc as required at site. Power supply from SCS BUS: 18-27 Vdc Max. absorption: 55 mA Operating temperature: 5 – 45 °C	4.00	Nos.	34686.00	138744.00

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46	SITC of DALI 2 gateway having 1 independent output to manage up to 64 DALI-2 ballasts suitable for mounting on DIN rail, LED indication and programable with ethernet having following specification i/c all connections, inetrconnections, programming etc as requied at site. Operating temperature: 5 – 40 °C BUS SCS input Power supply: 18 – 27 Vdc Absorption: 6 mA Input 230 Vac Voltage: 110 – 240 Vac Operating frequency: 50/60 Hz Absorption: 70 mA max DALI output Rated voltage; 16 Vdc Rated power: 4 W Max. current: 250 mA Guaranteed current: 150 mA Maximum Start-up Time: 25 ms Number of DALI devices that can be controlled: 64 Maximum length of the cable: 300 m Cable section: 1,5 mm ²	4.00	Nos.	21655.00	86620.00
47	SITC of SCS server designed to interact with the MyHOME system which allows the creation and realisation of high-level installations to manage SCS BUS Smart Home solutions while occupying fewer DIN modules, resulting in an optimised solution for the control cabinet. It natively integrates humidity management functions and natively supports 175 addresses with the possibility of extension by adding up to 2 F422A SCS interfaces. The Server is suitable for: - Device pairing during system start-up by the installer using the Home+Project app. With regard to Light Automation , Temperature Control and Energy systems, start-up takes place via the Server directly using the Home+Project application Power supply from SCS BUS: 18 – 27 Vdc Supplementary power supply (optional): 20 – 27 Vdc Absorption from SCS BUS without additional power supply: 18 Vdc/128 mA, 27 Vdc/85 mA Absorption from SCS BUS with additional power supply: 3mA Absorption from additional power supply: 20 Vdc/106 mA, 27 Vdc/87 mA Operating temperature: 5 – 35 °C	4.00	Nos.	33493.00	133972.00

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48	SITC of Power supply for automation system in 6 DIN modular enclosure. Power supply 110 – 240 Vac @ 50 – 60 Hz. The output provides two power supplies in very low safety voltage The device is electronically protected against overload and short circuit. It is a SELV double insulation safety device. Operating temperature: (-10) – (+55) °C Protection index: IP20 Rated input data (PRI): Rated voltage 110 – 240 Vac; 50 / 60 Hz Rated current 730 – 400 mA Power absorption - full load (max): 40 W Power consumption (max): 8 W Full load yield: 80 % typ. Stand by power: < 1 W Rated voltage 27 Vdc Rated output data (SCS): Rated current 1,2 A Rated power 32,4 W Rated voltage 28,5 Vdc Rated output data (for clamps 2 - 1): Rated current 1,2 A Rated voltage 34,2 W Integrated fuse (PRI side): F1 T 3,15A 250 V Maximum cable section for each clamp: 1 x 2.5 mm2 Number of DIN modules: 6	4.00	Nos.	9439.00	37756.00
49	SITC of 4 key touch control multifunction panel with capacitive sensors suitable for operation by moving a finger close to surface Power supply from SCS BUS: 18 – 27 Vdc Max. consumption : 25 mA with LED=MAX 20 mA with LED= MED 17 mA with LED= MIN Operating temperature: 0 – 40 °C Depth: 18.3 mm	4.00	Nos.	20917.00	83668.00
50	Supplying, installation, testing & commissioning of protection module for Power Supply of automation system suitable for 110 - 240 Volt AC, 50Hz including interconnection etc. complete as required at site.	4.00	Nos.	5828.00	23312.00
	<u>Panel and Cabling</u>				
	Main LT Panel				
51	Supplying, installation, testing & commissioning of Indoor cubical type LT panel suitable for 415 V, 3 Phase, 4 Wire 50 Hz AC supply system fabricated in compartmentalized design from CRCA sheet steel as per IEC 61439-1&2 -Totally Type Tested panel with IP 42 (indoor type).TTA Panel shall be tested for all type test as per IEC 61439-1&2 & IEC61641 with aluminumbusbar, OEM shall submit the type test document during drawing approval. OEM shall provide third party type test certificates for all ratings in compliance of IEC 61439-1&2. TTA Panel shall be tested for 12KV				

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impulse withstand. The switchboard Main distribution panel shall restrict the internal arcs faults within the compartment to ensure maximum safety to the operating personnel and also to minimize the downtime for replacement and repairs. Type test report shall be carried out to verify the arc containment within the compartment for 50kA, 0.3sec as per IEC 61641. The Switchboard shall have Seismic withstand of Zone –IV. TTA Panel shall be tested for IK10 level. The Panel shall have arrangement of connection with cables and to be installed on new suitable foundations with proper provision of incoming and outgoing LT Cables i/c providing following switch gears :- The switchboard shall be factory manufactured by OEM or manufactured by authorized Franchisee of OEM based on design given by OEM. All TTA Panel shall have top Entry/Out going type. including provision for Inert type Novec 1230/FM200 or equivalent Fire Detection Tube based Gas suppression system for electrical panel. It includes all the require accessories/equipments to complete the panel protection, as per detail specification and as per direction of Engineer in Charge. Cable Entry - Top or bottom shall be decided by Engineer-in-charge & Front Operated Panel. Every Cable alley compartment of TTA Panel shall have wired or wireless overheating sensors for cable.				
Bus Bars:				
Horizontal and vertical TPN Aluminium bus bars of 1250 Amps capacity with heat shrinkable coloured sleeves and i/c DMC/SMC bus bars supports at required intervals complete suitable for withstanding fault level of 31 MVA for 1 Sec. - 1 Set				
Incoming No-1				
(i) 01 Nos. 1000A FP 65 kA Microprocessor based EDO ACB with Under Voltage Release, Shunt Release, 100% rated neutral pole, LSIG protection along with variable current setting for L,S,I,G & variable time delay setting for L,S,G. All ACB shall have inbuilt display for current measurement & detection of faulty phase along with magnitude of fault. It should have arc chute interlocking, Mechanical & Electrical anti-pumping. Each incomer ACB should have below mentioned accessories as per				

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	proposed scheme				
	Locking arrangement for OFF button with R - Lock (on breaker)				
	1 Set of multifuction meter with basic parameters like frequency, V, In, Ay, Ar, Ab, KW, KVA, KVAR, Power Factor, total harmonic distortion etc. shall be suitable for EMS function with RS 485 port for communication.				
	220V AC Indication LED Type (R/Y/B Phase On)				
	240V AC Indication LED Type (Breaker On/Off/Trip)				
	Incoming No-2				
	(i) 01 Nos. 1000A FP 65 kA Microprocessor based EDO ACB with Under Voltage Release, Shunt Release, 100% rated neutral pole, LSIG protection along with variable current setting for L,S,I,G & variable time delay setting for L,S,G.All ACB shall have inbuilt display for current measurement & detection of faulty phase along with magnitude of fault. It should have arc chute interlocking, Mechanical & Electrical anti-pumping. Each incomer ACB should have below mentioned accessories as per proposed scheme				
	Locking arrangement for OFF button with R - Lock (on breaker)				
	1 Set of multifuction meter with basic parameters like frequency, V, In, Ay, Ar, Ab, KW, KVA, KVAR, Power Factor, total harmonic distortion etc. shall be suitable for EMS function with RS 485 port for communication.				
	220V AC Indication LED Type (R/Y/B Phase On)				
	240V AC Indication LED Type (Breaker On/Off/Trip)				
	Bus coupler				
	(i) 01 No. 1000A FP 65 kA Microprocessor based EDO ACB with Under Voltage Release, Shunt Release, 100% rated neutral pole, LSIG protection along with variable current setting for L,S,I,G & variable time delay setting for L,S,G.All ACB shall have inbuilt display for				

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	current measurement & detection of faulty phase along with magnitude of fault. It should have arc chute interlocking, Mechanical & Electrical anti-pumping. Each incomer ACB should have below mentioned accessories as per proposed scheme				
	Interlocking				
	Mechanical & electrical interlocking along with required control wiring and accessories & Mechanical interlocking for Breakers so as to ensure that only one supply is available at a time on each section of bus and to eliminate any possibility of accidentally approaching two supplies at one bus section/parallel operation of two transformers -				
	Out going:				
	(i) 630 Amps. 4 pole, Moulded Case Circuit Breaker (MCCB), 50 KA breaking capacity ($I_{cs}=100\%I_{cu}$) with Microprocessor release along with spreader links, rotary handle etc. - 4 nos (ii) 3 Nos. Phase indication LED lamps with 2 Amp backup MCB, breaker ON / OFF, LED indicating lamps with 2 Amp backup MCB, test terminal block set, circuits as per standard practice, as required. - 4 set (iii) Digital type Multi-function meter with RS485 communication port including 3 nos of 630/5 A, CI-0.5, 15 VA CT's - 4 Set				
	(ii) 400 Amps. 4 pole, Moulded Case Circuit Breaker (MCCB), 50 KA breaking capacity (I_{cs}) with Microprocessor release along with spreader links, rotary handle etc. - 2 Nos (ii) 3 Nos. Phase indication LED lamps with 2 Amp backup MCB, breaker ON / OFF, LED indicating lamps with 2 Amp backup MCB, test terminal block set, circuits as per standard practice, as required. - 2 set (iii) Digital type Multi-function meter with RS485 communication port including 3 nos of 400/5 A, CI-0.5, 15 VA CT's - 2 Set.				
	(iii) 125 Amps. 4 pole, Moulded Case Circuit Breaker (MCCB), 25 KA breaking capacity (I_{cs}) with thermal release along with spreader links, rotary handle etc.- 10 nos (ii) 3 Nos. Phase indication LED lamps with 2 Amp backup MCB, breaker ON / OFF,				

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	LED indicating lamps with 2 Amp backup MCB, test terminal block set, circuits as per standard practice, as required. - 10 sets, (iii) Digital type Multi-function meter with RS485 communication port including 3 nos of 125/5 A, CI-0.5, 15 VA CT's - 10 Set.				
	(iv) 100 Amps. 4 pole, Moulded Case Circuit Breaker (MCCB), 25 KA breaking capacity (Ics) with thermal release along with spreader links, rotary handle etc.- 5 nos (ii) 3 Nos. Phase indication LED lamps with 2 Amp backup MCB, breaker ON / OFF, LED indicating lamps with 2 Amp backup MCB, test terminal block set, circuits as per standard practice, as required. - 5 sets, (iii) Digital type Multi-function meter with RS485 communication port including 3 nos of 100/5 A, CI-0.5, 15 VA CT's - 5 Set.				
	(v) 250 Amps. 4 pole, Moulded Case Circuit Breaker (MCCB), 50 KA breaking capacity (Ics) with Microprocessor release along with spreader links, rotary handle etc. -2 no (ii) 3 Nos. Phase indication LED lamps with 2 Amp backup MCB, breaker ON /OFF, LED indicating lamps with 2 Amp backup MCB, test terminal block set, circuits as per standard practice, as required. - 2 set (iii) Digital type Multi-function meter with RS485 communication port including 3 nos of 250/5 A, CI-0.5, 15 VA CT's - 2 Set.				
	(vi) Spare Compartment of size to fit 250A MCCB - 2 No				
	(vii) Danger plates and lettering of the Panel for display of incoming and outgoing switchgear etc., as required.	1.00	Job	4705034.00	4705034.00
	UPS Output Panel				
52	Supplying, installation, testing and commissioning of floor standing indoor type extendable cubical LT panel (IP 42 protection) (as per general arrangement drawing approved by engineer-in-charge) suitable for operation on 415V, 3 Phase, 4 Wire, 50 Hz, AC supply system, fabricated in totally enclosed compartmentalized flush finish design from CRCA sheet steel of 2mm thick for frame work and covers, 3mm thick for gland plates in split sections, including cleaning and finishing complete with 9 tank process for powder coating in approved				

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	shade, provision for incoming & outgoing termination from top/bottom at rear side of the panel with cable chamber, busbar chamber having horizontal and vertical 4 strip bus bars of high conductivity and DMC/SMC bus bar supports, suitable and fabrication of the panel shall be done in transportable sections, entire width of the panel shall have a common GI earth bar of size 25 mm x 5 mm at the rear with 2 Nos. earth stud, connection and interconnections from main bus bar to switch gears with required size of aluminium bus bars and control wiring 1.5 sq.mm. FRLS/HFFR insulated copper conductor single core cable, CT wiring with 2.5 sq.mm. FRLS/HFFR insulated copper conductor single core cable, cable alleys, detachable cable gland plates including providing and fixing the following MCCB/ Switchgears /metering accessories etc complete as required. bottom base frame with MS channel of section not less than 100mm X 50mm X 5 mm thick. The cubical panel shall generally conform to CPWD General Specification for Electrical works, Part-I Internal 2023, Part II External 2023 and Part IV substation equipment 2023 as ammendedupto date. All MCCBs shall be (Ics=100%Icu). The panel shall have incoming cable bottom entry and outgoing cables top entry or / As per the approval of engineer-in- charge.				
	Bus Bars:				
	Horizontal and vertical TPN Aluminium bus bars of 150 Amps capacity with heat shrinkable coloured sleeves and i/c DMC/SMC bus bars supports at required intervals complete etc as reqd.- 1 Set				
	Incoming No-1				
	(i) 100 Amps. 4 pole, Moulded Case Circuit Breaker (MCCB), 25 KA breaking capacity (Ics) with thermal release along with spreader links, rotary handle etc.- 1 no (ii) 3 Nos. Phase indication LED lamps with 2 Amp backup MCB, breaker ON / OFF, LED indicating lamps with 2 Amp backup MCB, test terminal block set, circuits as per standard practice, as required. - 1 sets, (iii) Digital type Multi-function meter with RS485 communication port including 3 nos of				

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	100/5 A, CI-0.5, 15 VA CT's - 1 Set.				
	Incoming No-2				
	(ii) 100 Amps. 4 pole, Moulded Case Circuit Breaker (MCCB), 25 KA breaking capacity (Ics) with thermal release along with spreader links, rotary handle etc.- 1 no (ii) 3 Nos. Phase indication LED lamps with 2 Amp backup MCB, breaker ON / OFF, LED indicating lamps with 2 Amp backup MCB, test terminal block set, circuits as per standard practice, as required. - 1 sets, (iii) Digital type Multi-function meter with RS485 communication port including 3 nos of 100/5 A, CI-0.5, 15 VA CT's - 1 Set.				
	Out going:				
	(i) 63 Amps. 4 pole, Moulded Case Circuit Breaker (MCCB), 25 KA breaking capacity (Ics) with thermal release along with spreader links, rotary handle etc.- 15 nos (ii) 3 Nos. Phase indication LED lamps with 2 Amp backup MCB, breaker ON / OFF, LED indicating lamps with 2 Amp backup MCB, test terminal block set, circuits as per standard practice, as required. - 15 sets, (iii) Digital type Multi-function meter with RS485 communication port including 3 nos of 100/5 A, CI-0.5, 15 VA CT's - 15 Set.				
	(ii) Danger plates and lettering of the Panel for display of incoming and outgoing switchgear etc., as required.	1.00	Job	476949.00	476949.00
	Lift Panel (Passenger Lift)				
53	Supplying, installation, testing and commissioning of floor standing indoor type extendable cubical LT panel (IP 42 protection) (as per general arrangement drawing approved by engineer-in-charge) suitable for operation on 415V, 3 Phase, 4 Wire, 50 Hz, AC supply system, fabricated in totally enclosed compartmentalized flush finish design from CRCA sheet steel of 2mm thick for frame work and covers, 3mm thick for gland plates in split sections, including cleaning and finishing complete with 9 tank process for powder coating in approved shade, provision for incoming & outgoing termination from top/bottom at rear side of the panel with cable chamber, busbar chamber having horizontal and vertical 4 strip bus bars of high conductivity and DMC/				

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SMC bus bar supports, suitable and fabrication of the panel shall be done in transportable sections, entire width of the panel shall have a common GI earth bar of size 25 mm x 5 mm at the rear with 2 Nos. earth stud, connection and interconnections from main bus bar to switch gears with required size of aluminium bus bars and control wiring 1.5 sq.mm. FRLS/HFFR insulated copper conductor single core cable, CT wiring with 2.5 sq.mm. FRLS/HFFR insulated copper conductor single core cable, cable alleys, detachable cable gland plates including providing and fixing the following MCCB/ Switchgears /metering accessories etc complete as required. bottom base frame with MS channel of section not less than 100mm X 50mm X 5 mm thick. The cubical panel shall generally confirm to CPWD General Specification for Electrical works, Part-I Internal 2023, Part II External 2023 and Part IV substation equipment 2023 as ammendedupto date. All MCCBs shall be (Ics=100%Icu). The panel shall have incoming cable bottom entry and outgoing cables top entry or / As per the approval of engineer-in- charge.				
Bus Bars:				
Horizontal and vertical TPN Aluminium bus bars of 150 Amps capacity with heat shrinkable coloured sleeves and i/c DMC/SMC bus bars supports at required intervals complete etc as reqd. - 1 Set				
Incoming No-1				
(i) 100 Amps. 4 pole, Moulded Case Circuit Breaker (MCCB), 25 KA breaking capacity (Ics) with thermal release along with spreader links, rotary handle etc.- 1 no (ii) 3 Nos. Phase indication LED lamps with 2 Amp backup MCB, breaker ON / OFF, LED indicating lamps with 2 Amp backup MCB, test terminal block set, circuits as per standard practice, as required. - 1 sets, (iii) Digital type Multi-function meter with RS485 communication port including 3 nos of 100/5 A, CI-0.5, 15 VA CT's - 1 Set.				
Out going:				

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	(i) 63 Amps. 4 pole, Moulded Case Circuit Breaker (MCCB), 25 KA breaking capacity (Ics) with thermal release along with spreader links, rotary handle etc.- 5 nos (ii) 3 Nos. Phase indication LED lamps with 2 Amp backup MCB, breaker ON / OFF, LED indicating lamps with 2 Amp backup MCB, test terminal block set, circuits as per standard practice, as required. - 5 sets, (iii) Digital type Multi-function meter with RS485 communication port including 3 nos of 63/5 A, CI-0.5, 15 VA CT's - 5 Set.				
	(ii) 32 Amps. 2 pole, MCB 'C, Curve, 10 KA breaking capacity - 4 nos				
	(iii) Danger plates and lettering of the Panel for display of incoming and outgoing switchgear etc., as required.	1.00	Job	235135.00	235135.00
	HVAC Panel No-1 & 2				
54	Supplying, installation, testing and commissioning of floor standing outdoor type extendable cubical LT panel (IP 54 protection) (as per general arrangement drawing approved by engineer-in-charge) suitable for operation on 415V, 3 Phase, 4 Wire, 50 Hz, AC supply system, fabricated in totally enclosed compartmentalized flush finish design from CRCA sheet steel of 2mm thick for frame work and covers, 3mm thick for gland plates in split sections, including cleaning and finishing complete with 9 tank process for powder coating in approved shade, provision for incoming & outgoing termination from top/bottom at rear side of the panel with cable chamber, busbar chamber having horizontal and vertical 4 strip bus bars of high conductivity and DMC/SMC bus bar supports, having short circuit withstand capacity of 31 MVA for 1 Sec., suitable and fabrication of the panel shall be done in transportable sections, entire width of the panel shall have a common GI earth bar of size 32 mm x 5 mm at the rear with 2 Nos. earth stud, connection and interconnections from main bus bar to switch gears with required size of aluminium bus bars and control wiring 1.5 sq.mm. FRLS/HFFR insulated copper conductor single core cable, CT wiring with 2.5 sq.mm. FRLS/HFFR insulated copper conductor				

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	single core cable, cable alleys, detachable cable gland plates including providing and fixing the following MCCB/ Switchgears /metering accessories etc complete as required. bottom base frame with MS channel of section not less than 100mm X 50mm X 5 mm thick. The cubical panel shall generally confirm to CPWD General Specification for Electrical works, Part-I Internal 2023, Part II External 2023 and Part IV substation equipment 2023 as ammendedupto date. All MCCBs shall be (Ics=100%Icu). The panel shall have incoming cable bottom entry and outgoing cables top entry or / As per the approval of engineer-in- charge.				
	Bus Bars:				
	Horizontal and vertical TPN Aluminium bus bars of 800 Amps capacity with heat shrinkable coloured sleeves and i/c DMC/SMC bus bars supports at required intervals complete suitable for withstanding fault level of 31 MVA for 1 Sec. - 1 Set				
	Incoming No-1				
	(i) 630 Amps. 4 pole, Moulded Case Circuit Breaker (MCCB), 50 KA breaking capacity (Ics=100%Icu) with Microprocessor release along with spreader links, rotary handle etc. - 1 no (ii) 3 Nos. Phase indication LED lamps with 2 Amp backup MCB, breaker ON / OFF, LED indicating lamps with 2 Amp backup MCB, test terminal block set, circuits as per standard practice, as required. - 1 set (iii) Digital type Multi-function meter with RS485 communication port including 3 nos of 630/5 A , CI-0.5, 15 VA CT's - 1 Set				
	Out going:				
	(i) 63 Amps. 4 pole, Moulded Case Circuit Breaker (MCCB), 25 KA breaking capacity (Ics) with thermal release along with spreader links, rotary handle etc.- 16 nos (ii) 3 Nos. Phase indication LED lamps with 2 Amp backup MCB, breaker ON / OFF, LED indicating lamps with 2 Amp backup MCB, test terminal block set, circuits as per standard practice, as required. - 16 sets, (iii) Digital type Multi-function meter with RS485 communication port including 3 nos of 63/5 A, CI-0.5, 15 VA CT's - 16 Set.				

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	(ii) Danger plates and lettering of the Panel for display of incoming and outgoing switchgear etc., as required.	2.00	Job	699540.00	1399080.00
55	Supply of following sizes of LT cables, XLPE insulated, cores laid up, PVC outer sheathed, armoured with galvanized round steel wire or steel strip cables with stranded Copper conductor suitable for rated voltage of 1.1 KV grade, ISI marked conforming to IS:7098(Part-I)/1988 with latest amendments etc. as required.				
	(a) 3c x 6 sq.mm CU. Arm. XLPE CABLE	310.00	Mtr.	675.00	209250.00
	(b) 4c x 6 sq.mm CU. Arm. XLPE CABLE	235.00	Mtr.	876.00	205860.00
	(c) 4c x 10 sq.mm CU. Arm. XLPE CABLE	150.00	Mtr.	1435.00	215250.00
	(d) 4c x 16 sq.mm CU. Arm. XLPE CABLE	220.00	Mtr.	2116.00	465520.00
56	Supply of following sizes of LT cables, XLPE insulated, cores laid up, PVC outer sheathed, armoured with galvanized round steel wire or steel strip cables with stranded Aluminium conductor suitable for rated voltage of 1.1 KV grade, ISI marked conforming to IS:7098(Part-I)/1988 with latest amendments etc. as required.				
	(a) 3.5c x 300 sq.mm Al. Arm. XLPE CABLE	450.00	Mtr.	3872.00	1742400.00
	(b) 3.5c x 185 sq.mm Al. Arm. XLPE CABLE	280.00	Mtr.	2449.00	685720.00
	(c) 3.5c x 120 sq.mm Al. Arm. XLPE CABLE	170.00	Mtr.	1660.00	282200.00
	(d) 3.5c x 95 sq.mm Al. Arm. XLPE CABLE	200.00	Mtr.	1469.00	293800.00
	(e) 3.5c x 70 sq.mm Al. Arm. XLPE CABLE	200.00	Mtr.	1171.00	234200.00
	(f) 3.5c x 35 sq.mm Al. Arm. XLPE CABLE	125.00	Mtr.	576.00	72000.00
	(g) 4c x 25 sq.mm Al. Arm. XLPE CABLE	975.00	Mtr.	479.00	467025.00
57	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size direct in ground including excavation and refilling the trench etc as required, but excluding sand cushioning and protective covering.				
	(a) Upto 35 sq. mm	50.00	Mtr.	253.00	12650.00
	(b) Above 35 sq. mm and upto 95 sq. mm	10.00	Mtr.	276.00	2760.00
	(c) Above 95 sq. mm and upto 185 sq. mm	10.00	Mtr.	298.00	2980.00
	(d) Above 185 sq. mm and upto 400 sq. mm	350.00	Mtr.	364.00	127400.00
58	Laying of one number additional PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size cables in the existing RCC/ HUME/ Stoneware/ Metal pipe as required				
	(a) Upto 35 sq. mm	50.00	Mtr.	47.00	2350.00

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	(b) Above 35 sq. mm and upto 95 sq. mm	10.00	Mtr.	72.00	720.00
	(c) Above 95 sq. mm and upto 185 sq. mm	10.00	Mtr.	97.00	970.00
	(d) Above 185 sq. mm and upto 400 sq. mm	10.00	Mtr.	170.00	1700.00
59	Laying and fixing of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size on cable tray as required.				
	(a) Upto 35 sq. mm (clamped with 1mm thick saddle)	1790.00	Mtr.	53.00	94870.00
	(b) Above 35 sq. mm and upto 95 sq. mm (clamped with 25x3mm MS flat clamp)	115.00	Mtr.	109.00	12535.00
	(c) Above 95 sq. mm and upto 185 sq. mm (clamped with 25/40x3mm MS flat clamp)	50.00	Mtr.	138.00	6900.00
	(d) Above 185 sq. mm and upto 400 sq. mm (clamped with 40x3mm MS flat clamp)	370.00	Mtr.	226.00	83620.00
60	Supplying and making end termination of following sizes with brass compression gland including providing and crimping solderless plugs/ferrules of sizes PVC insulated PVC sheathed aluminum conductor armoured cable 1.1 KV grade.				
	(a) 3 X 10 sq. mm (22mm)	20.00	Set	312.00	6240.00
	(b) 4 X 10 sq. mm (25mm)	20.00	Set	325.00	6500.00
	(c) 4 X 16 sq. mm (28mm)	8.00	Set	366.00	2928.00
	(d) 4 X 25 sq. mm (28mm)	56.00	Set	373.00	20888.00
	(e) 3½ X 35 sq. mm (32mm)	8.00	Set	437.00	3496.00
	(f) 3½ X 120 sq. mm (45mm)	2.00	Set	710.00	1420.00
	(g) 3½ X 185 sq. mm (57mm)	4.00	Set	1001.00	4004.00
	(h) 3½ X 300 sq. mm (70mm)	12.00	Set	1336.00	16032.00
61	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) 100mm width X 50mm depth X 1.6 mm thickness	450.00	Mtr.	623.00	280350.00
	(b) 150mm width X 50mm depth X 1.6 mm thickness	250.00	Mtr.	686.00	171500.00
	(c) 300mm width X 50mm depth X 1.6 mm thickness	200.00	Mtr.	866.00	173200.00
	(d) 450mm width X 50mm depth X 2.0 mm thickness	80.00	Mtr.	1243.00	99440.00

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	(e) 600mm width X50mm depth X 2.0 mm thickness	60.00	Mtr.	1482.00	88920.00
62	Supplying and installing following size of perforated Hot Dipped Galvanised Iron cable tray "bends" (galvanisation 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) 100mm width X 50mm depth X 1.6 mm thickness	14.00	Nos.	948.00	13272.00
	(b) 150mm width X 50mm depth X 1.6 mm thickness	14.00	Nos.	1105.00	15470.00
	(c) 300mm width X 50mm depth X 1.6 mm thickness	16.00	Nos.	1977.00	31632.00
	(d) 450mm width X 50mm depth X 2.0 mm thickness	4.00	Nos.	2844.00	11376.00
	(e) 600mm width X 62.5mm depth X 2.0 mm thickness	4.00	Nos.	3985.00	15940.00
63	Supplying and installing following size of perforated Hot Dipped Galvanised Iron cable tray "Tee" (galvanisation 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) 100mm width X 50mm depth X 1.6 mm thickness	6.00	Nos.	1089.00	6534.00
	(b) 150mm width X 50mm depth X 1.6 mm thickness	6.00	Nos.	1281.00	7686.00
	(c) 300mm width X 50mm depth X 1.6 mm thickness	8.00	Nos.	1826.00	14608.00
	(d) 450mm width X 50mm depth X 2.0 mm thickness	2.00	Nos.	2923.00	5846.00
	(e) 600mm width X 50mm depth X 2.0 mm thickness	2.00	Nos.	3628.00	7256.00
	<u>Earthing & Lightning Arresters</u>				
64	Earthing with G.I. earth pipe 4.5 metre long, 40 mm dia including accessories, and providing masonry enclosure with cover plate having locking arrangement and watering pipe etc. with charcoal/ coke and salt as required.	14.00	Set	5958.00	83412.00

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65	Providing and fixing 6SWG dia GI wire on surface or in recess for loop earthing along with existing surface / recessed conduit / submain wiring for connection as required.	1200.00	Mtr.	50.00	60000.00
66	Providing and fixing 25 mm X 5 mm G.I. strip on surface or in recess for connections etc. as required.	610.00	Mtr.	287.00	175070.00
67	Supplying and laying 50 mm X 6 mm G.I strip astrip on surface or in recess for connections etc. as required.	80.00	Mtr.	78.00	6240.00
68	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.	24.00	Nos.	609.00	14616.00
69	Fixing of lightning conductor finial (single prong) with base plate including holes etc. complete as required.	24.00	Mtr	422.00	10128.00
70	Providing and fixing G.I. tape 20 mm X 3 mm thick on parapet or surface of wall for lightning conductor complete as required.(For horizontal run)	420.00	Mtr	148.00	62160.00
71	Providing and fixing G.I. tape 20 mm X 3 mm thick on parapet or surface of wall for lightning conductor complete as required.(For vertical run)	240.00	Mtr	238.00	57120.00
72	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.	8.00	Mtr	140.00	1120.00
73	Providing and laying G.I. tape 32 mm X 6 mm from earth electrode directly in ground as required.	180.00	Nos.	221.00	39780.00
External Electrical Installations					
74	Providing, laying and fixing following dia RCC pipe NP2 class (light duty) in ground complete with RCC collars, jointing with cement mortar 1:2 (1 cement : 2 fine sand) including trenching (75 cm deep) and refilling etc as required.				
	(a) 100 mm dia	40.00	Mtr.	771.00	30840.00
	(b) 150 mm dia	40.00	Mtr.	846.00	33840.00

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75	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)	300.00	Mtrs	289.00	86700.00
	(b) 120 mm dia (OD-120 mm & ID-103 mm nominal)	220.00	Mtrs	417.00	91740.00
76	Supply and erection of 6 Mtr height Octagonal pole having 130 mm dia at bottom & 70mm dia on top with openable door/window made with 3mm thick hot dip galvanised sheet welded with 200mm x 200 mm x12mm thick GI Base Plate at bottom & supplying and fixing 1 No. 16 Amp 'C' series MCB i/c suitable size 3 Nos aluminium bus bar strip, 6mm thick bakelite sheet, din bar with accessories & making cement concrete foundation strictly as per OEM issued Foundation drawing & details supported with OEM issued design calculation for sizing of Foundation, Finalising the Design Mix of the Foundation and approved by Engineer-in-charge including supplying fixing of 4 Nos. OEM Recommended (as per design and drawing issued by OEM and approved by CPWD) J type GI foundation bolt & nuts, (Foundation bolts & Nuts to be provided by OEM of GI Pole only) & Templates for Foundation Bolts and including Excavation Centering, shuttering, compacting, Refilling, levelling etc for Foundation work Providing HDPE/HARD 65mm dia pipe for cable entry and supplying and fixing of 1 Mtr long single arm suitable GI bracket for installation of fitting (To be provided by OEM of pole) i/c connection and testing etc. complete as read.	13.00	Nos	18506.00	240578.00
77	Supplying, Installation, Testing and Commissioning of following height decorative tubular street light pole made out of Galvanised Mild steel (min 114mm dia at bottom upto 1000 mm and 75 mm dia at Top) with primer coated and painted with Polyurethane paint suitable for single/ double/triple/ four side post top/ drop down luminaires installation, along with a				

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	service window at the bottom comprising four way 25Amp connector terminal and a MCB. The Poles has a mild steel base plate of size 250 mm x 250 mm x 12 mm having four numbers mounting holes and suitable Cement Concrete foundation of size not less than 0.50 mtr x 0.50 mtr x 1.0 mtrs. with 1:3:6 CC (1 cement:3 coarse sand :6 graded stone aggregate 20 mm nominal size), 4 Nos hot dip galvanized L-type Anchor bolts of minimum 12 mm dia x 600mm long including providing 63 mm dia DWC pipe sleeve 1.00 mtr. length in the CC foundation for cable entry, plastering the same with fine sand and having horizontal top surface without any slope including two coats of exterior paint complete as required.				
	(a) 3 Mtrs	27.00	Nos	13565.00	366255.00
78	Supplying, installation, Testing & Commissioning of LED Post top luminaire, powder coated die cast aluminium/Extruded aluminium with built in driver, Operating voltage AC100-240Volt, freq 50/60hz, Operating temprange -0 deg to 35 deg centigrade, internal surge protection of 4KV with Short & Open circuit protection, THD<10%, P.F20.95, IP65, IK-05, CRI>70, suitable for fixing upto 65mm dia pipe, life time of minimum 50000 Burning Hours with, 70% of initial Lumen maintained till life ends, CCT 3000/4000°K, Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard. Manufactures Word Mark/ Name Engraved/ Embossing/ Screen printing on housing. complete in all respect i/c external connections with 1.5 sq mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty, test report and all testing required for LED fixtures as per BIS shall be submitted. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement ",System lumen efficacy >100 lm/W at out put.				
	(a) 40 watt	35.00	Nos	8902.00	311570.00
79	Supplying, installation, Testing & Commissioning of Street light LED fixture powder coated pressure die cast aluminium body with driver as per the requirement with Driver efficiency >85%, Input voltage: 140-270				

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	Volt AC, frequency 50/60 hz, Operating temp range -5 0C to 50 0C, internal surgeprotection of 5 KV L,N,E as per IEC 61000-4-5, Driver efficiency >85%,THD < 10% as per IEC 61000-3-2, P. F.≥0.95, IP-66,IK-10, CRI >70,under voltage and over voltage protection, EMIEMC As per CISPR 15 , lenses for beam angle as per IESNA type I/II/III as per the width of the road and the project requirement., suitable to fit in up to 65mm dia pipe, life time (LED, Driver & electrical circuitry) of minimum 50000 Burning Hours with 70% of initial Lumen maintained till life ends as per LM80 extrapolation IES TM-21-11 report, CCT 3000°K / 4000°K / 5700°K /6500°K (As per ANSI Bin), SDCM(Standard Deviation Colour Matching) <5, Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard complete in all respect i/c external connections with 1.5 sq mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty. System lumen efficacy ≥120 <135 lm/Watt output . LM79 & LM80 Test report and all testing required for LED fixtures as per BIS shall be submitted. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above 90°C).				
	72 watt	13.00	Nos	2128.00	27664.00
80	Supply of following sizes of LT cables, XLPE insulated, cores laid up, PVC outer sheathed, armoured with galvanized round steel wire or steel strip cables with stranded Aluminium conductor suitable for rated voltage of 1.1 KV grade, ISI marked conforming to IS:7098(Part-I)/1988 with latest amendements etc. as required.				
	(a) 2 x 10 Sq. mm	300.00	Mtr.	285.00	85500.00
81	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size direct in ground including excavation and refilling the trench etc as required, but excluding sand cushioning and protective covering.				
	(a) Upto 35 sq. mm	258.00	Mtr.	253.00	65274.00

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82	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size in the existing RCC/ HUME/ METAL pipe as required.				
	(a) Upto 35 sq. mm	12.00	Mtr.	47.00	564.00
83	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size in the existing masonry open duct as required.				
	(a) Upto 35 sq. mm	30.00	Mtr.	36.00	1080.00
84	Providing and fixing 6SWG dia GI wire on surface or in recess for loop earthing along with existing surface / recessed conduit / submain wiring for connection as required.	300.00	Mtr.	50.00	15000.00
	Sub Head-2 (Fire Alarm And Detection Systems)				
1	Supplying, installation, testing and commissioning of micro processor based intelligent addressable main fire alarm panel, central processing unit with the following loop modules and capable of supporting not less than 240 devices (including detectors) and minimum 120 detectors per loop and loop length up to 2 km, network communication card, minimum 320 character graphics/ LCD display with touch screen or other keypad and minimum 4000 events history log in the non volatile memory (EPROM), power supply unit (230 ± 5% V, 50 hz), 48 hrs back-up with 24 volt sealed maintenance free batteries with automatic charger. The panel shall have facility to connect printer to printout log and facility to have seamless integration with analog/ digital voice evacuation system (which is part of the schedule of work under SH: PA System) and shall be complete with all accessories. The panel shall be compatible for IBMS system with open protocol BACnet/ Modbus over IP complete as per specifications.				
	(a) Ten Loop Panel	1.00	Nos.	476893.00	476893.00
2	Supplying, installation, testing & commissioning of intelligent analog addressable photothermal detector complete with mounting base complete as required.	371.00	Nos.	3004.00	1114484.00
3	Supplying, installation, testing & commissioning of response indicator on surface/recessed MS Box having two LED,	228.00	Nos.	306.00	69768.00

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	metallic cover complete with all connections etc as required.				
4	Supplying, installation, testing & commissioning of fault isolator complete with base as required.	38.00	Nos.	3434.00	130492.00
5	Supplying, installation, testing & commissioning of addressable phone control module complete as required.	12.00	Nos.	3432.00	41184.00
6	Supplying, installation, testing & commissioning of addressable manual call point complete as required.	12.00	Nos.	4063.00	48756.00
7	Supplying, installation, testing & commissioning of addressable horn cum strobe complete as required.	12.00	Nos.	3682.00	44184.00
8	Supplying & laying of 2x1.5 sqmm fire survival armoured cable, 600/1000V rated with annealed copper conductor having glass mica fire barrier tape covered by an extruded layer of Cross Linkable Ethylene Propylene Rubber (EPR) insulation and LSZH inner bedding, steel wire armouring & LSZH outer sheath complete as required	2500.00	Mtr.	386.00	965000.00
9	Supplying, installation, testing & commissioning of addressable beam detector with short circuit isolator (inbuilt or separate) complete with emitter and receiver including connections with remote test features etc complete as required	1.00	Nos.	78525.00	78525.00
10	Supplying, installation, testing & commissioning of intelligent addressable duct detector including suitable Photo detector complete with base as required	12.00	Nos.	8183.00	98196.00
11	Supplying, installation, testing & commissioning of fire fighter telephone handset complete as required.	12.00	Nos.	6016.00	72192.00
12	Supplying, installation, testing & commissioning of fire fighter phone jack complete as required	12.00	Nos.	1689.00	20268.00
	PA SYSTEM				
13	Supplying, installation, testing & commissioning of 6 zone, voice alarm controller with USB, MP4 player (including 6 zone button paging station) with seamless integration facility with main fire alarm panel for voice evacuation complete as required.	1.00	Nos.	132115.00	132115.00

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14	Supplying, installation, testing & commissioning of 1.5/3/6W ceiling speaker complete as required.	107.00	Nos.	1025.00	109675.00
15	Supplying, installation, testing & commissioning of digital audio amplifier 75 Watt, 25V rms operating at 240 Volt AC Supply complete as required.	4.00	Nos.	152368.00	609472.00
16	Supplying, installation, testing & commissioning of Voice command keypad 6 zone, with microphone assembly complete as required	1.00	Nos.	85450.00	85450.00
17	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	1500.00	Mtr	61.00	91500.00
18	Supplying and fixing 25 mm dia MS flexible pipe with PVC coating along with all ancillaries and accessories like coupler etc. as required.	1000.00	Mtr	60.00	60000.00
	<u>Sub Head-3 (UPS System)</u>				
1	Online UPS- Input supply: Three Phase, Output supply: Three Phase. Supplying, installation, Testing & Commissioning of following capacity at full load (Unity Power Factor) at operating temperature 0 to 40 0C, Relative humidity 0 to 95%, Online double conversion true sine wave Uninterrupted hot swappable (allow for the replacement or addition of battery modules without shutting down the entire system) modular Power Supply (UPS) system with N+1 modules (N denotes total number of modules required for rated capacity). The UPS shall include a Rectifier, inverter, battery bank suitable for 30 minutes back up (Battery VAH capacity shall not be less than 1600 VAH per KVA of UPS rating per Hour backup time) on full load (Battery shall be VRLA, SMF in ABS Container) and Static Bypass switch along with provision for manual bypass, suitable isolation transformer for additional protection against neutral faults etc. UPS shall have inbuilt phase sequence correction. The UPS systems offered are to be of the latest technology with Digital Control Microprocessor based for reliable operation using InsulatedGate Bipolar Transistor				

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(IGBT)'s both for the rectifier & inverter (3 Level) with PWM (Pulse Width Modulation). The quality of design, manufacturing and inspection process should confirm to the relevant Inter-national standards such as IEC/EN/VDE. The operating efficiency of the UPS systems shall be >96% while operating on battery mode and delivering quality power to the 100% non-linear loads. Current total harmonic effect(ITHD) on the input grid shall be < 5% at 50 %load. (The required LC (inductor (L) and a capacitor (C)) filters shall be included in UPS cost), extreme power factor kit to be included to limit the input power factor (PF) to 0.99 and output power factor shall be unity (i.e. kw rating of the UPS shall be kva rating x 1), however UPS shall be suitable to take load at 0.7lagging to 0.7 leading power factor loads. UPS shall be suitable for incoming supply AC : 3Phase 400V +/-20%, 50 Hz +/-5 Hz, AC Output voltage: 3Phase 415 Volt, 50 Hz +/- 0.2Hz, Overload capacity of 120% for 10 mins, Sine wave output. Non condensing, noise level less than 60db at 1 meter distance, protections: Input Under voltage over voltage, abnormal out voltage, battery over charging,output over current, short circuit protection, battery deep discharge protection, 10KV surge. UPS must comply with low voltage electromagnetic compatibility (EMC) achieved as per EN 6204, EN6204 Part I and Part 2, it shall be a Voltage and FrequencyIndependent (VFI)-type UPS. Communication RS232/ RS485/ SNMP port open protocol for BMS integration, all hardware & software for IoT Communication as per approved by Engineering in charge. Required battery racks and interconnecting copper conductor cables of suitable size and connectors and all required accessories are inclusive of the cost).				
This system must provide a means for logging and alarming of all monitored points plus email notification. Forced air-cooling with integral inbuilt fans with redundancy (if one fan fail UPS should be able to handle at least 80% of the load, Noise Level 65 DB at 1 meter distance. The system shall be in compliance IEC 62040- 1,2 & 3, IS: 16242 and CPWD Specification. Display Panel (minimum) (In-				

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	build 5 inch or more LC Display / LED) to display : a) Input: Voltage, current, Frequency. b) Bypass: Voltage, Frequency. c) Output: Voltage, frequency, Current.d) Battery: Voltage, Capacity. e) Load: KVA, KW, Percentage. f) Temperature: STS, Inverter, PFC. g) Event Logging & Statistical Data (On LCD/LED): UPS should capture and display up to 3000 events like: Over temperature / DC Bus Fail / Fan Fail / Fuse Fail / Overload / Short-circuit / Device Fail / Inverter Fail / Rectifier Fail / Bypass Fail, etc. h) Statistical Data: No. of power failures / Transfers to Bypass / Total Running time, etc. i) Mains Mode of Operation / Battery Mode of Operation / Bypass feeding the load / UPS Fault / Battery charging and discharging, overload, battery voltage and battery capacity. j) Audible Alarms : Mains Failure, Battery Low Alarm, UPS Overload, Fault, Shutdown, Input Over, Under Voltage, Output Over, Under Voltage, Battery Over, Under Voltage, Over Load and short circuit, Over Temperature. The UPS should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location etc				
	(a) 30KVA (Each Power module shall be < 10 KVA)	2.00	Each	505748.00	1011496.00
	Sub Head- 4 (CCTV/ LAN System)				
	CCTV System				
1	Supplying Installation Testing and Commissioning of 4MP IP IR Dome Camera having following specifications and features etc :- 1) Signal System: PAL/NTSC, Signal to Noise Ratio: >50 dB, Camera should display Camera title, Date & Time in live & recorded video 2) Image Sensor: 1/2.8" or better progressive ScanCMOS to get color image even at night condition (Minimum Illumination: 0.006 Lux@ F1.4, AGC ON, 0 lux with IR or better) True Day & Night High Performance Mechanical IR cut filter with autoswitch, Integrated IR Source (Auto, Manual)- Inbuilt IR LED's with effective distance upto 50 meter or better and 30 meter for colour view in night, Imaging: 1/3 to 1/30000s electronic shutter support, Auto Gain Control, White Balance- Auto, Back Light Compensation, Multi zone Privacy Masking, HLC, Digital Watermarking.				

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3) Compression (Minimum): Video:- H.265 or better, Audio:- G.711U/A, G.711Mu, G.726, AAC, G.7234) Wide Dynamic Range:- WDR (120dB or more)5) Digital Noise Reduction:- DNR (3D) On/Off6) Video Streaming & Frame Rates :- Triple streaming, configurable Main stream: 4MP (2560×1440)25/30fps, Sub streams minimum: 720P@25/30 fps7) Image Setting: Rotate Mode, saturation, brightness,contrast, sharpness adjustable through client software or web browser, Edge Analytics: Tripwire, Intrusion, Motion Detection8) Cyber Security: AES 256-bit Encryption, Configuration encryption, trusted execution, Digest, security logs, account lockout, video encryption, IP/MAC filtering, HTTPS, trusted upgrade9) Onboard Storage: Camera should support built-in Micro SD/ SDHC/ SDXC Card slot upto 512 GB. It should be supplied with minimum 128GB memory Card.10) Recording Management: Format SD, overwrite, storage management, video to NAS device,				
11) Alarm Trigger : Motion/tampering detection; network disconnection detection; IP conflict detection; memory card state detection; memory space detection12) Network Protocol: SFTP, IPv6, IPv4, DNS, RTCP, NTP, RTP, HTTP, HTTPS, SNMP TCP/IP, PPPoE, NFS, UDP, ICMP, SSL, DHCP, SMTP, RTSPS, unicast,13) System Capability: ONVIF, Camera shall support open source VMS14) Ethernet: 1 RJ 45 10/100 Ethernet port 15) Audio : It should support 1 x Built-In Mic and 1/1 Alarm In/ Out for External Mic. and Speakers as per site requirement.16) Power Input: The camera should support simultaneous dual power input—12 VDC (via power adapter) and PoE (802.3af)—to ensure continuous operation in the event of a failure in one power source.17) Power Requirement: 12VDC/24 VDC/PoE(802.3af)/ePoE18) Housing/ Enclosure:- IP67 weather proof, IK10, Metallic body19) Operating Condition:- Ambient Temperature:- (0)5°C to 50°C, humidity 95% (max) (non-condensing)20) IR life: 40000 hours or higher21) Video Bit rate: 32 KBPS - 8 MBPS or better22) Standards: BIS with ER, STQC Certified, CE, FCC and RoHS				

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	(a) 4MP @ 25/30fps@1440P (2560x1440) Dome Camera with 2.7 to 4 mm ~12 to 13.5mm or better Varifocal Motorized lens	75.00	Nos.	23754.00	1781550.00
2	Supplying Installation Testing and Commissioning of 4MP IP IR Outdoor Bullet Camera having following specifications and features etc :- 1) Signal System: PAL/NTSC, Signal to Noise Ratio: >50 dB, Camera should display Camera title, Date & Time in live & recorded video 2) Image Sensor: 1/2.8" or better progressive ScanCMOS get color image even at night condition (Minimum Illumination: 0.006 Lux@ F1.4, AGC ON, 0 lux with IR or better) True Day & Night High Performance Mechanical IR cut filter with auto switch, Integrated IR Source (Auto, Manual)- Inbuilt IR LED's with effective distance upto 50 meter or better and 30 meter for colour view in night, Imaging: 1/3s to 1/30000s electronic shutter support, Auto Gain Control, White Balance-Auto, Back Light Compensation, Multi zone Privacy Masking, HLC, Digital Watermarking. 3) Compression (Minimum): Video:- H.265 or better, Audio:- G.711U/A, G.711Mu, G.726, AAC, G.723 4) Wide Dynamic Range:- WDR (120dB or more) 5) Digital Noise Reduction:- DNR (3D) On/Off 6) Video Streaming & Frame Rates :- Triple streaming, configurable Main stream: 4MP (2560x1440) 25/30fps Sub streams minimum: 720P@25/30 fps 7) Image Setting: Rotate Mode, saturation, brightness, contrast, sharpness adjustable through client software or web browser, Edge Analytics: Tripwire, Intrusion, Motion Detection				
	8) Cyber Security: AES 256-bit Encryption, Configuration encryption, trusted execution, Digest, security logs, account lockout, video encryption, IP/MAC filtering, HTTPS, trusted upgrade 9) Onboard Storage: Camera should support built-in Micro SD/SDHC/SDXC Card slot upto 512 GB. It should be supplied with minimum 128GB memory Card. 10) Recording Management: Format SD, overwrite, storage management, video to NAS device, 11) Alarm Trigger : Motion/tampering detection; network disconnection detection; IP conflict detection; memory card state detection; memory space detection 12) Network Protocol: SFTP,				

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	IPv6, IPv4, DNS, RTCP, NTP, RTP, HTTP, HTTPS, SNMP TCP/IP, PPPoE, NFS, UDP, ICMP, SSL, DHCP, SMTP, RTSPS, unicast, 13) System Capability: ONVIF, Camera shall support open source VMS 14) Ethernet: 1 RJ 45 10/100 Ethernet port 15) Audio : It should support 1 x Built-In Mic and 1/1 Alarm In/ Out for External Mic. and Speakers as per site requirement.				
	16) Power Input: The camera should support simultaneous dual power input—12 VDC (via power adapter) and PoE (802.3af)—to ensure continuous operation in the event of a failure in one power source. 17) Power Requirement: 12VDC/24 VDC/PoE (802.3af)/ePoE 18) Housing/ Enclosure:- IP67 weather proof, IK10, Metallic body 40.4.1 40.4.2 19) Operating Condition:- Ambient Temperature:- () 05°C to 50°C, humidity 95% (max) (non-condensing) 20) IR life: 40000 hours or higher 21) Video Bit rate: 32 KBPS - 8 MBPS or better 22) Standards: BIS with ER, STQC Certified, CE, FCC and RoHS				
	(a) 4MP @ 25/30fps@1440P (2560x1440) Outdoor Bullet Camera with 2.7 to 4 mm ~12 to 13.5mm or better Varifocal Motorized lens	7.00	Nos.	23754.00	166278.00
3	Supplying Installation Testing and Commissioning of following Channel Network Video Recorder (NVR) with camera licenses to record for all channels having specifications and features etc as mentioned below :				
	(1) Network Video Recorder Embedded/ Installed OS (Linux) along with Camera Licenses to record per NVR and to provide a live view, storage and simultaneously Multi-channel playback of all IP camera or more and must be ONVIF with minimum support of 384 Mbps incoming Bandwidth.				
	(2) NVR should support video compressions : H.265 or better, H.264, MJPEG				
	(3) Must support 1 channel RCA Input, 2 channel RCA Output for Two-way Talk with G.711U/A, G.711u, PCM, G726 audio				

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	compressions.				
	(4) Intelligent auto power on when power resumes after power outage				
	(5) Storage: It should support minimum 4 SATA Slots with 16 TB capacity/ Slot and RAID support of RAID 0/1/5/6/10.				
	(6) Connectivity Interface : 2 Nos. x 10/100/1000 Mbps Ethernet Ports, 1x RS485, 1x RS232, 1x eSATA Port				
	(7) Backup Interface : Its should have 4 Nosx USB port (2x USB3.0, 2xUSB2.0				
	(8) Video Output Ports: 2x HDMI and 2 VGA				
	(9) Alarm Ports: It should have 16/8 Ch In/ Out ports to connect various type of external sensors and output devices like hooter/ Siren etc				
	(10) Email & SMS Alert options: Option for SMS/ Email Alerts to minimum 5 designated mobile number for power failure, HDD failure, vandalism, tempring, network disconnection and panic				
	(11) Web & Mobile Application: Web, Mobile app (For iPhone, iPad, Android Phone) for alerts and viewing				
	(12) Protocols: HTTP, HTTPS, TCP/IP, IPv4/IPv6, UDP, DHCP, DNS, SMTP, UPnP, IP Filter, PPPoE, FTP, DDNS, Alarm Server, IP Search, Multicast, Auto Registration, ONVIF (Profile T, Profile S, Profile G), CGI, SDK and OEM Cloud for remote monitoring without any public IP need.				
	(13) Standards: CE, FCC, RoHS, BIS Certified				
	(14) Power Supply : Should support AC100-240V, 50/60Hz Power supply				
	(15) Operating Condition : -5°C to 50°C, humidity 90% (max) (non-condensing)				
	(16) The VMS application shall support all the features & functionalities of the offered cameras				
	(17) VMS should consist Licenses for all channels to record Cameras with General, motion detection, intelligent, alarm and POS recording modes. VMS should be provided with Camera Licenses , with no dependency of VMS licenses by binding with the MAC address of the cameras to achieve the functionality				

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	(18) The NVR OEM shall be responsible for providing a mobile application compatible with both Android and iOS devices, enabling remote monitoring and playback of cameras/NVR footage				
	(19) The OEM must provide its own DDNS server hosted in India, eliminating the need for a public IP address for remote monitoring over the Internet.				
	(20) Must support Continuous, Alarm, Motion, Instant, Panic Recording Mode				
	(21) It should support Resolution: 32MP; 24MP; 16MP; 12MP; 8MP; 5MP; 4MP; 1080p; 720p; D1; CIF; QCIF				
	(22) When alarm recording is enabled and an event occurs, you can click the alarm icon on monitoring page to view the alert details. The snapshot function is supported on monitoring and playback page				
	(23) The Network Video Recorder (NVR) shall be configured to send email whenever a system message is created or an alarm event occurs. The email server shall be a valid SMTP server. Each recipient email address shall be configured to receive any combination of critical, warning, or informational messages or alarm notifications. When an alarm occurs, the email message includes the NVR name, time of alarm and a list of camera that is configured to record upon alarm				
	(24) It should have Web and GUI interface				
	(25) Built-In Artificial Intelligence: NVR should have built-in AI :- - 2 Channel face detection and recognition, - Minimum 4 Channel perimeter protection, - Minimum 8 Channel Smart Motion Detection				
	(26) Face Recognition Database Capacity: It should support total Blacklist and Whitelist capacity of Minimum 20,000 Faces or more with Face Detection speed of 12 face images/sec and facility to add Name, gender, birthday, address, credential type, credential No., countries & regions and state to each face image				

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	(27) Face & Human Attributes Search: Search Pictures/ Video by Gender, age group, glasses, expressions, face mask, beard, Top color, top type, hat, bag, age, gender and umbrella				
	(28) ANPR Capability: It should support ANPR Camera with License plate, plate color, vehicle body, vehicle model, vehicle logo, calling, seatbelt, vehicle registration location etc vehicle attributes				
	(29) Alarm Notifications based on: Motion detection, video tampering, video loss, scene changing, PIR alarm, Camera external alarm, Face detection, face recognition, perimeter protection (intrusion and tripwire), ANPR, people counting, stereo analysis, crowd distribution, heat map, Disk Full, Storage Error, IP Conflict and abnormal behavior of fan, cybersecurity exception				
	(30) Alarm Notification should be linked with Recording, snapshots, Camera external alarm output, buzzer, logs, presets and email				
	(31) General AI Based Search: Search Pictures by channel, time, event type, target classification (Fall Detection, People Approach Detection, People No. Exception Detection, People Staying Detection, Violence Detection				
	(32) Smart playback function: Should support smart search for the selected area in the video and smart playback to improve the playback efficiency				
	(33) VCA (Video Content Analytic): Should support multiple video contented analytics based on camera analytics				
	(34) Analytics by NVR: Perimeter protection and face recognition				
	(a) 32 Channel Network Video Recorder (NVR) having display split :- Main screen: 1/4/8/9/16/25/32(36), 2nd screen: 1/4/8/9/16	3.00	Nos.	64784.00	194352.00
4	Supplying, Installation, Testing and Commissioning following capacity Surveillance grade Hard Disk with upto 256MB/s Transfer Rate, 256 MB Cache, 7200 RPM Disk Speed, 3.5 inch form factor, SATA Interface, BSMI, ICES-003/NNB-003, CE, FCC, KC, Maghreb, RCM, UKCA, VCCI, CB-Scheme, TUV, UL Certifications.				
	(a) 10TB (Terabytes)	12.00	Nos.	24798.00	297576.00

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5	Supplying, Installation, Testing and commissioning of small form-Pluggable (SFP) for Network Switches. Must be hot Pluggable, RoHS Complaint, etc. complete as required				
	(a) 1G SFP Single Mode/Multi Mode	16.00	Nos.	4211.00	67376.00
	(b) 10 G SFP + Single Mode/Multi Mode	6.00	Nos.	14972.00	89832.00
6	Supplying and drawing following core Fiber Optic Cable having corrugated steel armoring. The Fiber should be SM Fiber Central -loose tube filled with Thixotropic jelly, duly following Standards: ISO 11801, IEC 60793-1/60794-1-2, ITU-T-REC G.652D and Telecordia GR-20-core, High quality Electro Chromium Coated Corrugated Steel tape (ECCS) and HDPE- Sheath, Operating ambient Temperature should be – 5 0C to +50 0C and Storage Temperature shall be – 5 0C to +50 0C, Max Attenuation ± 0.36 (db / km) at Operational Wavelength 1310 nm and ± 0.22 db / km at Operational Wavelength 1550 nm. type of fiber should be 9/125 / G.652D & Refractive Index should be 1.4670/1.4675. The value for Mode-filed, Cladding Diameter $9.2 \pm 0.4 \mu\text{m}$ and $125 \pm 0.7 \mu\text{m}$ correspondingly. The Dispersion value $< 3.5 < 18$ ps/nm-km and PMD value < 0.2 ps/km and Cable Cutoff wavelength < 1260 nm i/c splicing & marking etc complete as required				
	(a) Single Mode 6 Core Optical fiber cable	2000.00	Mtr	64.00	128000.00
7	Supply and fixing following port Rack Mount loaded LIU with pigtail, Front-mounted cable saddles for jumper management, suitable to manage both splices and terminations, Pre-assembled shelves in multiple configurations, Rubber fiber slotted bracket built-in, metal splice shelf to protect the fibers, 2 fiber spools built-in for 900 μm tight buffered fiber storing, Capable of storing up to 3 meters of 900 μm tight buffered fiber per adapter, Removable front and rear covers for better access to interior of LIU, Should be Single / Multi mode LC Type fully loaded. Accessory kit consists of cable ties, mounting ear screws, and spiral wrap tube etc complete as required.				
	(a) 6 Port LIU	6.00	Nos.	5471.00	32826.00
	(b) 12 Port LIU	5.00	Nos.	7040.00	35200.00
	(c) 24 Port LIU	2.00	Nos.	10049.00	20098.00

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8	Supplying and fixing Patch Cord of Optical Fiber Multi Mode or Single Mode LC to LC Fiber Duplex having high precision ceramic ferrule with good concentricity, Fiber corning single mode G652D, Cable Type 2mm with Mechanical specification Apex Offset $\leq 50 \mu\text{m}$, Fiber Height $\pm 100 \text{ nm}$, End-face radius of Curvature $7\text{mm} < R < 25\text{mm}$, Repeatability $\leq 0.2 \text{ dB}$, Working ambient Temperature $- 5^{\circ}\text{C}$ to $+50^{\circ}\text{C}$, Storage Temperature $- 10^{\circ}\text{C}$ to $+50^{\circ}\text{C}$, Length -- 2meter, Type -- LC-LC Duplex etc complete as required.	16.00	Nos.	705.00	11280.00
9	Supplying, Installation, Testing and commissioning of following armoured CAT6 Patch Cord should have ETL/UL verification program certificate for compliance with ANSI/TIA-568.2-D etc. complete as required				
	(a) Copper Patch Cords of length 1m (3ft)	10.00	Nos.	151.00	1510.00
10	Supplying, drawing, Installation, Testing and commissioning of CAT6 UTP LSZH 23AWG Twisted Pair Cable in existing conduit/ on surface, Category 6 Unshielded Twisted Pair, 4 pair should be complied as per UL/ETL verification program for compliance with ANSI/TIA-568.2-D standard. Outer diameter should be in the range of 6.1mm nominal with Operating Temperature Range : -5° to $+60^{\circ}\text{C}$, Bending Radius : $< 4 \times \text{Cable Diameter}$ at $-5^{\circ}\text{C} \pm 1^{\circ}\text{C}$ and Pulling Force : 11.5Kg etc. complete as required.				
	(a) 1 Run of cable	500.00	Meter	60.00	30000.00
11	Supplying and fixing of following size Wall Mount Rack having Fixed Structure with 0.8mm CRCA Sheet, completely knocked-down condition (CKD) Shape, Vertical Mounting Rail 1.6 mm with 'U' Marking, Minimum 2 cable entry/exit provision at Top and bottom with rubber protection, Front 5mm Toughened Glass with lock, wall mounting kit, Powder coated Color- RAL- 7035, complied with UL & RoHS, 2 x 6 sockets 16A power distribution units, 3 numbers closed cable organizer, Hardware mounting screws packet of 20 x 1 number, etc. complete as required.				
	(a) 9 U Rack	11.00	Nos.	8960.00	98560.00
	(b) 15 U Rack	1.00	No.	13330.00	13330.00

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12	Supply, Installation, Testing & Commissioning of 75 inch smart TV having min 440 nits Brightness, Smart Android OS/Tizen/webOS, 4K UHD Resolution, 24*7, Screen Mirroring , 16 Gb storage, inbuilt Wi-Fi, 178 Degree Viewing Angle, suitable for Landscape/Portrait Installation, RS232C Control, 10W+10W Speakers, HDMI 2.1 (3), USB (1), complete etc as required.	3.00	Nos.	208182.00	624546.00
13	Supplying & installation of 15-meter HDMI cable for connecting the NVR (Network Video Recorder) to the TV (Display). The cable shall be of high quality, ensuring high-definition video and audio transmission with minimal signal loss. The cable shall be HDMI 2.0 or higher, supporting 4K resolution, HDR (High Dynamic Range), and audio return channel (ARC) where applicable. The cable will have gold-plated connectors for improved conductivity and corrosion resistance complete etc as reqd.	1.00	Nos.	789.00	789.00
14	Supplying, installation, Testing and commissioning of following capacity 8 port Layer 2 indoor Network Switch having features and specifications etc. as mentioned here under: Minimum 8 X RJ-45 Gigabit Ethernet Ports and additional 2 X 1G SFP Ports with non-blocking architecture by having Switching capacity of minimum 20Gbps and packet forwarding rate of 14Mpps or higher, 8K MAC table. Internal dual AC Power supply with operating temperature of -5 0C to +50 0C. Jumbo frame: 9 KB or higher, IGMP Snooping, IGMP snooping querier and support for IGMP Snooping Fast Leave, Should create 250 or more MLD groups, MLD Snooping, Per VLAN MLD Snooping C MLD Snooping Fast Leave, STP, RSTP, MSTP, Loopback detection, Multicast filtering, VLAN Tagging, QOS: 8 Que per port, WRR, IPv4/IPv6 Interface : minimum 100 IPv4 static route entries and minimum 50 IPv6 static route entries, 700 Access Control entries, SSH CSSL for IPv4 and IPv6, 802.1x, ARP Spoofing, DHCP Snooping and server screening, IP+MAC+Port Binding, Per Port Bandwidth Control, 802.1X Authentication (Supports local/RADIUS database, Port-based Access Control and EAP, OTP, TLS, TTLS, PEAP Support) Cable Diagnostic feature, LLDP,				

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	LLDP-MED, SNTp/NTP, RMON, SNMP v1,v2c, v3 and SNMP Traps. Certifications: FCC, CE marked, UL/EN, RoHS and relevant MTCTE (TEC)/ BIS Compliance/ certification as applicable, complete as required				
	(a) 8 port PoE Layer 2 Network Switch with PoE Support of 130W or higher with each copper port supporting 802.3at PoE+	13.00	Nos.	35091.00	456183.00
15	Supplying & laying of PVC insulated and PVC round sheathed multicore copper conductor heavy duty industrial flexible cable of grade 1.1 KV of following size in open duct complete as reqd.				
	(a) 3 x 2.5 Sq. mm	2000.00	Mtr.	375.00	750000.00
16	Supply 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.	200.00	Mtr	151.00	30200.00
	(b) 25 mm.	500.00	Mtr.	168.00	84000.00
	LAN System				
17	Supplying, installation, Testing and commissioning of following capacity 24 port Layer 3 Network Switch having features and specifications etc. as mentioned here under: At least 20 X RJ-45 Gigabit Ethernet Ports and additional 4 combo 10/100/1000 base-t/SFP Ports with additional 4 SFP+ ports non-blocking architecture by having Switching capacity of min. 128Gbps and packet forwarding rate of 95Mpps or higher, 16 K MAC table. Console Port, USB port, Internal AC Power supply with operating temperature of 0 to +50 0C. Stacking port with stacking support of minimum 8 units per stack. 32 K Mac address, 9K or more Jumbo frame, ERPS with enabling ring to converge in less than 50 ms from node or link failure, Static routing, Static, 6to4, ISATAP and GRE, IPv6 Neighbor Discovery (ND), BGP, ISIS, MPLS, VRRP v2, OSPFv2/v3, PBR, Route Redistribution, RIPv1/v2/ng, IP Helper all L3 Protocols should support from day 1 for both IPv6 and IPv4, 802.1x, Port security , Radius C TACACS+ authentication C accounting, DAD, DAI, DoS attack prevention, SSH, Guest VLAN, IP Access List,	1.00	Each	193791.00	193791.00

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	MAC Access List. Multicast: VLAN, PIM-SM, PIMDM, PIM-SDM, PIM-SMv6, DVMRP v3 and MSDP, IGMP C MLD Snooping, Flow mirroring, IGMP C MLD Snooping Querier, Per-VLAN IGMP C MLD Snooping. SNMP, Dual configurations, Multiple images, RMON, LLDP/LLDP-MED, sFlow, DHCP/BOOTP Client, IPv4/IPv6, Syslog server, Debug command, 802.3ah Ethernet Link OAM, 802.1ag Connectivity Fault, Y.1731 OAM, 802.1Qbb Priority-based Flow Control (PFC), Dying Gasp, Cable Diagnostics, 6 kV surge protection on all Gigabit Ethernet ports and on all GE RJ-45 access ports. Certifications: FCC, CE marked, UL/EN RoHS & relevant, MTCTE (TEC)/BIS compliance / certifications as applicable, etc. complete as required				
18	Supplying, installation, Testing and commissioning of following capacity 24 port Layer 2 indoor Network Switch having features and specifications etc. as mentioned here under: At least 24 X RJ-45 Gigabit Ethernet Ports and additional 2 X 10G Base -T with 4 X SFP Ports with non-blocking architecture by having Switching capacity of min. 128Gbps and packet forwarding rate of 95 Mpps or higher, 16K MAC table. Console Port, USB port, Stacking support of min. 4 units per stack. Internal dual AC Power supply, STP, RSTP, MSTP, BPDU Filter, BPDU Restriction, Min. 9K Jumbo Frame, LBD, IGMP Snooping V1/V2/V3, MLD Snooping V1/V2. IGMP /MLD Groups 1K or more, IPv4/IPv6 Loopback Interface, 16 L3 IP Interface, Ipv6 ND, VRRPv3, UDP Helper, ECMP. VLAN: 802.1Q, Port based, Qin-Q, Multicast VLAN, Protocol VLAN, VLAN Trunking, DHCP Snooping, Server, server Screening. RADIUS, TACACS+ Authentication, QoS: 802.1P, 8 queues per port, QoS : WRR, Strict+WRR, WRED, 802.1p. ACL: MAC based, IPv4C IPv6, TCP/UDP Port number, time based ACL, TFTP Client, SNMP V1, v2c, v3, SNMP traps, RMON, DHCP server, relay, client, LLDP, LLDP-MED, OAM, Dying Gasp, 802.3ah, sflow, RIP, OSPF v2/v3, policy based route, SSL, SSH. 6 kV surge protection on all Gigabit Ethernet ports and on all GE RJ-45 access ports. Certifications: FCC, CE marked, UL/EN RoHS & relevant, MTCTE (TEC)/BIS compliance / certifications				

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	as applicable, etc. complete as required.				
	(a) 24 port PoE Layer 2 Network Switch with PoE Support of 370W or higher with each copper port supporting 802.3at PoE+ min	7.00	Each	125393.00	877751.00
19	Supplying, Installation, Testing and commissioning of indoor Wireless Access Point for High density use having features and specifications etc. as mentioned here under-WiFi6 802.11ax 574Mbps (2.4GHz) + 2402Mbps (5GHz), WIFI 6 Certified/WiFi alliance, MG 2.5G LAN POE Port, heavying console management function factory reset, WPA/WPA2/ WPA3™ Personal/Enterprise, WEP 64/128-bit, SSID broadcast disable, MAC address access control, Internal RADIUS server, SNMP, Customizable Captive Portal, Auto Channel, Works as Access Point, WDS, WDS with AP / Wireless Client/ MESH., Web (HTTP), Secure Socket Layer (SSL), Traffic control, Support ATF/Fast Roaming/Band Steering, Supports enhanced security – WPA-PSK/WPA2- PSK/WPA3-PSK and RADIUS client, and Cipher negotiation, and MAC/ IP ACL for networks, Certifications: FCC, CE, Marked UL?EN, ROHS and relevent MTCTE (TES) / BIS Compliance / certification as applicable Works as Standalone, Compatible with S/W & H/W Controller with additional features like - Real-Time Monitoring and Alerts, Rich Advanced Features, Centralized Device Management, Role-Based Administration, Real-Time Monitoring, VLAN and Access Control, Auto RF Management and Bandwidth Optimization, Multi-SSID and Captive Portal Authentication etc. complete as required.	24.00	Each	35559.00	853416.00
20	Supplying, Installation, Testing and commissioning of following CAT6A Patch Cord should have ETL/UL verification program certificate for compliance with ANSI/TIA-568.2-D				
	(a) Copper Patch Cords of length 1m (3ft)	100.00	Each	173.00	17300.00
21	Supplying, drawing, Testing and commissioning of Cat6A UTP 4 pair, 23 AWG solid copper cable in existing conduit/ on surface, U/FTP, LSZH, NonPlenum, Horizontal (solid) Cable suitable for high speed data networking application supporting upto 10Gbps over a 100 meter channel. The 4 Unshielded				

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	Twisted Pairs (UTP) cable with color coded insulation for easy identification should have FLAME PROPERTIES i.e. Flammability Test - IEC 60332-1, Smoke Density - IEC 61034, LSZH standards compliance: ANSI/TIA-568 C.2, ISO/IEC 11801, IEEE 802.3an, RoHS. Delay Skew should be < 45NS. The outer Cable Diameter should be 7.5 + 2 mm. Cable should have been tested and verified by UL/ ETL etc. complete as required.				
	(a) 1 Run of Cable	1220.00	Mtr.	62.00	75640.00
	(b) 2 Run of Cable	500.00	Mtr.	99.00	49500.00
	(c) 3 Run of Cable	1000.00	Mtr.	137.00	137000.00
22	Supplying, Installation, Testing and commissioning of CAT6A Copper Information Outlet (IO) with face plate of color as per site requirement, should have ETL/UL verification program certificate for compliance with ANSI/TIA-568.2-D. All copper Cable and Components should be from same OEM to maintain compatibility and interoperability etc. complete as required	96.00	Each	302.00	28992.00
23	Supply and fixing of following size Wall Mount Rack having Fixed Structure with 0.8mm CRCA Sheet, completely knocked-down condition (CKD) Shape, Vertical Mounting Rail 1.6 mm with 'U'Marking, Minimum 2 cable entry/exit provision at Top and bottom with rubber protection, Front 5mm Toughened Glass with lock, wall mounting kit, Powder coated Color- RAL- 7035, complied with UL & RoHS, 2 x 6 sockets 16A power distribution units, 3 numbers closed cable organizer, Hardware mounting screws packet of 20 x 1 number, etc. complete as required.				
	(a) 6U Rack	5.00	Each	6939.00	34695.00
24	Supplying and drawing following core Multi mode Fiber Optic Cable having corrugated steel armoring, lesser optimize 50/125µm with HDPE jacket, LSZH (Low smoke Zero Halogen), Tightbuffered or loose tube, maximum attenuation: < 3.5 dB/km at 850 nm, < 1.5 dB/km at 1300 nm, bandwidth > 2000 MHz-km at 850 nm, > 500 MHz-km at 1300 nm compliance and certifications: ISO/IEC 11801 Ed. 2.2,				

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	ANSI/TIA- 568-C.3, ITU-TG.651.1 RoHS compliant. Multi Mode Fiber shall be Central loose tube filled with Thixotropic jelly, duly following Standards: ISO 11801, IEC 60793-1 /60794-1-2, ITU-T-REC G.652D and Telecordia GR-20-core, High quality Electro Chromium Coated Corrugated Steel tape (ECCS) and HDPE Sheath, Operating ambient Temperature should be – 5 deg C to +50 deg C and Storage Temperature should be – 5 deg C to +50 deg C, Maximum Attenuation ± 3.5 db / km at Operational Wavelength 850 nm and ± 1.5 db / km at Operational Wavelength 1300 nm . type of fiber should be 50/125 / G.652D & Refractive Index should be 1.483/1.478, The value for Mode-field, Cladding Diameter $50 \pm 2.5 \mu\text{m}$ and $125 \pm 1 \mu\text{m}$ correspondingly i/c splicing and marking etc complete as required.				
	(a) 12 Core Multi Mode Optical Fiber Cable	300.00	Mtr.	109.00	32700.00
25	Supplying, Installation, Testing and commissioning of small form Pluggable (SFP) for Network Switches. Must be hot Pluggable, RoHS Complaint, etc. complete as required.				
	(a) 10 G SFP + Single Mode/Multi Mode	11.00	Each	14972.00	164692.00
26	Supplying and fixing Patch Cord of Optical Fiber Multi Mode or Single Mode LC to LC Fiber Duplex having high precision ceramic ferrule with good concentricity, Fiber corning single mode G652D, Cable Type 2mm with Mechanical specification Apex Offset $\leq 50 \mu\text{m}$, Fiber Height ± 100 nm, End-face radius of Curvature $7\text{mm} < R < 25\text{mm}$, Repeatability ≤ 0.2 dB, Working ambient Temperature – 5 0C to +50 0C, Storage Temperature – 10 0C to +50 0C, Length -- 2meter, Type -- LC-LC Duplex etc complete as required	16.00	Each	705.00	11280.00
	Sub Head- 5 (Solar PV System)				
1	Supplying Installation, Testing and Commissioning of on-grid Solar Photovoltaic Power Plant conforming to various applicable standards BIS, IEC, MNRE guidelines, the Central Electricity Authority Regulations and CPWD Specifications as amended up to date, consisting of Mono/Poly Crystalline silicon solar cells module, net metering facility, necessary control, protections, earthing, cabling, mounting structure, junction boxes,				

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

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	Mains Under / Over Voltage, Over current, Over/Under grid frequency, Over temperature, Surge voltage induced at output due to external source, Short-circuit, Lightening, Anti Islanding (for grid synch. Mode) and other protections as per applicable standards. LCD/LED display of minimum parameters: DC input voltage, DC current, AC Voltage and current (all 3 phases, in case of 3 phase), Instantaneous & cumulative AC output power, Daily DC energy produced and other parameters applicable standard. Communication interface RS 485 / RS 232				
	c) Module mounting structure: The roof top solar plant generation units shall be installed by using supporting Aluminium/Galvanized MS structure (mass of zinc coating shall be as per IS4759) having minimum head room clearance of 2.4 meter above the terrace level / ground level. The mounting structure would be designed to sustain wind load and seismic parameter of the site of installation. All the structure shall be design as per applicable BIS code and the material shall also confirm the applicable BIS Code. Structural material shall be corrosion resistant and electrolytically compatible with the materials used in the module frame, its fasteners, nuts and bolts. The suitable arrangements for maintenance and cleaning shall be provided				
	d) Real time online web interfaced Data Monitoring System complete with accessories for various parameters such as Solar Irradiance, temperature, AC Output Voltage and current, Output Power, Power factor, DC Input Voltage and Current, Time Active, Time disabled, Time Idle, Power produced and other parameters as per standard practices.				
	e) Array junction box & Main junction box with IP 65 protection and termination arrangement for incoming and outgoing cable along with glands, lugs and other accessories etc. as required. Each junction box shall be made of GRP/FRP/Powder Coated Aluminium /cast aluminium alloy with full dust, water & vermin proof arrangement with High quality Suitable capacity Metal Oxide Varistors(MOVs) (semiconductor diode with resistant applied voltage)/ surge arrestors and suitable Reverse Blocking Diodes, isolation				

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	switches isolate the DC input to Inverter, copper bus bar etc.				
	f) Lightning, surge voltage protection, earthing protection and grid islanding.				
	g) Cables: Connections & Interconnections by required size IR/UV protected XLPE insulated copper conductor 1.1 kV grade armored power and control cables(ISI Marked) along with supplying & fixing of necessary channel/conduit, GI cable trays, supports, lugs, thimble and other accessories etc. as required.				
	h) DC Distribution Board And AC Distribution Panel Board: IP65, free standing, metal clad, having copper bus bar, having required protection and control gears, connection-interconnection, etc. as required.	70.00	KWp	54280.00	3799600.00
	Sub Head-6 (Passenger Lift/ Goods Lift)				
	(20 passenger Lift)				
1	Supplying, Installation, Testing & Commissioning of following capacity passenger Machine room less (MRL) lift with regenerative drive as per CPWD General Specification for Electrical Works (Part-III Lift & Escalator) 2003, BIS Codes, NBC 2016 as amended upto date having provision for barrier free access as per Harmonised Guidelines & Standards for Universal Accessibility in India - 2021 of MoHUA, serving different floors in the lift shaft as per detailed specifications enclosed and as under including all other equipment and accessories complete as required :-(i) Speed-1.5 MPS(ii) Floors-5 (G+4)(iv) Stops & opening- 5 stops and 5 openings(v) Controller: A.C. variable voltage & variable frequency(vi) Automatic rescue device (ARD) complete with dry maintenance free batteries as required.(vii) Operation: Microprocessor based single automatic push button/simplex selective collective/ duplex collective selective with/without attendant(viii) Power-415 Volts+10%, 3 phase, 50 Hz, 4 wires system (ix) Car Enclosure: Stainless steel scratch proof (Moon Rock/Honeycomb/ Hairline Finish) on all sides and stainless steel decorative ceiling with fans (indirect throw) and LED fitting. (x) The car flooring should be smooth and antiskid as approved by engineer-in-charge. (xi) Type of doors				

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	a) Car: Power operated, centre opening horizontal sliding stainless steel scratch proof (Moon Rock/Honeycomb/ Hairline Finish). (b) Landing doors: stainless steel scratch proof. (xii) A hand rail not less than 600mm long at 900mm above floor level to be fixed adjacent to control panel in the lift car. (xiii) Voice announcement system in the car to announce the position of the elevator in the hoist way as the car passes or stops at floor served by the elevator. (xiv) Closed loop Control System, protection against power fluctuation, self diagnostic control, Landing doors 2 hours Fire rated, Overload detection and protection, Over speed Governor, Dot Matrix LED D & P Indicators In Car & Landings, BMS Compatibility, tamper proof infrared curtain covering almost the entire height of the lift car door, Alarm horn, Anti Nuisance Operation, CCTV camera system with 4 MP IP camera, suitable NVR and HDD for 30 days storage backup, Firemen switch, 2/3 way intercom, Emergency Stop Switch with battery backup for fan and light fitting for 1 hour, pit ladder.(xv) The lift doors shall have a vision panel to enable persons with hearing impairment to signal for help or assistance in the event of an emergency.(xvi) An appropriate technological support be provided (Through emergency messaging services or alarms etc.) to respond to the emergency requirements of person with hearing impairment or deafness.(xvii) In case of failure of ARD or other electronic devices, a provision of manual rescue be provided				
	(a) 20 Passenger (1360kg)	3.00	Nos.	2990002.00	8970006.00
	Goods Lifts				
2	Supplying, Installation, Testing & Commissioning of 2000kg Machine room less (MRL) goods lift with regenerative drive as per CPWD General Specification for Electrical Works (Part-III Lift & Escalator) 2003, BIS Codes, NBC 2016 as amended upto date, serving different floors in the lift shaft as per detailed specifications enclosed and as under including all other equipment and accessories complete as required :- (i) Speed - 0.5 MPS (ii) Floors - 5(G+4) (iv) Stops & opening : 5 stops and 5 openings				

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	(v) Controller: A.C. variable voltage & variable frequency (vi) Automatic rescue device (ARD) complete with dry maintenance free batteries as required. (vii) Operation: Microprocessor based single automatic push button/simplex selective collective/duplex collective selective with/without attendant (viii) Power-415 Volts+10%, 3 phase, 50 Hz, 4 wires system (ix) Car Enclosure: Stainless steel scratch proof (Moon Rock/ Honeycomb/ Hairline Finish) on all sides and stainless steel decorative ceiling with fans (indirect throw) and LED fitting. (x) The car flooring should be strong to take the rated load without any deformation or damage and antiskid as approved by engineer-in-charge. (xi) Type of doors:-(a) Car: Power operated, centre opening horizontal sliding stainless steel scratch proof (Moon Rock/ Honeycomb/ Hairline Finish).(b) Landing doors: stainless steel scratch proof .(xii) A hand rail not less than 600mm long at 900mm above floor level to be fixed adjacent to control panel in the lift car.(xiii) Voice announcement system in the car to announce the position of the elevator in the hoist way as the car passes or stops at floor served by the elevator.				
	(xiv) Closed loop Control System, protection against power fluctuation, self diagnostic control, Landing doors 2 hours Fire rated, Overload detection and protection, Over speed Governor, Dot Matrix LED D & P Indicators In Car & Landings, BMS Compatibility, tamper proof infrared curtain covering almost the entire height of the lift car door, Alarm horn, Anti Nuisance operation, CCTV camera system with 4 MP IP camera, suitable NVR and HDD for 30 days storage backup , Firemen switch, 2/3 way intercom, Emergency Stop Switch with battery backup for fan and light fitting for 1 hour, pit ladder. (xv) In case of failure of ARD or other electronic devices, a provision of manual rescue be provided				
	(a) 2000 kg	1.00	Nos.	3391945.00	3391945.00
	Sub Head-7 (Audio/ Videos system)				
	Multipurpose Hall				

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1	Supply, installation, testing & Commissioning of a Bi-amplified, 2 Way Loudspeaker Array for stage Left position. Individual loudspeaker modules within the array shall meet the following performance criteria: Usable Frequency Range (-10dB) of 55 Hz - 18 kHz, Continuous Power Handling of $\geq 1000W$ for LF & 250W for HF. Low Frequency: 1 $\times$ neodymium 14-inch woofer (4-inch voice coil), High Frequency: 6 $\times$ titanium-diaphragm, neodymium compression drivers (2-inch voice coil), The Loudspeaker shall have a Max. SPL (Peak) of ≥ 130 dB or better for LF and 131dB for HF. It should have Horizontal dispersion pattern of 60°-100° or better (with multiple waveguide options & Vertical dispersion of the array shall be 60 degrees or better (with at least 3 Array modules). The loudspeaker module shall be comprised of a of Baltic birch plywood construction and shall also have built-in 70/100V Transformer of at least 400W or better, Environmental Rated for direct-exposure outdoor installations (IP55 per EN60529; IP33C per EN54-24), Bidder should ensure to offer suitable number of modules to meet the desired vertical angle requirement etc. complete as per required.	2.00	Each	2567144.00	5134288.00
2	Supply, installation, testing & Commissioning of OEM array frames/ Hanging/ Mounting arrangement for Suspension of upto 8-10 array modules offered above, Shall offer multiple rigging points for achieving desired pitch settings. Coupling plate for array modules offered above etc. complete as per required.	2.00	Each	338942.00	677884.00
3	Supply, installation, testing & Commissioning of 18" arrayable subwoofer with same footprints as Main Line array elements for Arraying in the frame, having a Frequency Range (-10 dB) 29 – 300 Hz. It should have an axial Sensitivity(free field) of ≥ 92 dB (1W/1m) or more delivering a free field Max. Calculated SPL peak (free field) of ≥ 129 db. The loudspeaker should have a nominal impedance: 4ohm or more and Power Handling, peak 5000 W or more, Enclosure Material Baltic birch plywood, Environmental IPx4, Suspension / Mounting: 4-point "quick pin" rigging; 4x M10 top and 4x M10 bottom inserts; M20 pole cup complete with	4.00	Each	721485.00	2885940.00

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	installation as per the site requirement.				
4	Supply, installation, testing & Commissioning of Subwoofer Hanging arrangement etc. complete as per required.	2.00	Each	25602.00	51204.00
5	Supply, installation, testing and commissioning of Two-way Small Format high SPL IP55 rated (as per IEC 60529) all weather surface mount loudspeaker. The loudspeaker shall meet the following performance criteria: Frequency Range (-10 dB) of 70 Hz - 18 kHz or better; Nominal Dispersion : 90°H x 60°V (rotatable Horn); Power handling of 1600W peak or more; Sensitivity : 97 dB; Max SPL : 128dB Peak; Nominal impedance of 8 ohms and Integral multi-tap Transformer with selectable tap settings of 10/20/40/80W@70V & 100V. The loudspeaker system shall be comprised of a Powder- coated finish stainless steel grille with Two-part spray polyurea coating Enclosure; Enclosure Material Exterior-grade plywood, Dual 8-inch woofer; Single 2-inch voice coil high-frequency compression driver; U bracket shall be included.	2.00	Each	214277.00	428554.00
6	Supply, installation, testing and commissioning of Two-way Small Format high SPL IP55 rated (as per IEC 60529) all weather surface mount loudspeaker. The loudspeaker shall meet the following performance criteria: Frequency Range (-10 dB) of 90 Hz - 18 kHz or better; Nominal Dispersion : 100°H x 100°V; Power handling of 600W peak or more; Sensitivity : 92 dB and the Max SPL : 119dB Peak or better; Nominal impedance of 8 ohms and Integral multi-tap Transformer with selectable tap settings of 10/20/40/80W@70V & 100V. The loudspeaker system shall be comprised of a Powder- coated finish stainless steel grille with Two-part spray polyurea coating Enclosure; Enclosure Material Exterior-grade plywood, Single 5.25-inch woofer; Single 2-inch voice coil high-frequency compression driver; U bracket shall be included etc. complete as per required.	3.00	Each	20327.00	60981.00
7	Supply, installation, testing and commissioning of Two-way Small Format high SPL IP55 rated (as per IEC 60529) all weather surface mount loudspeaker. The loudspeaker shall meet the following performance criteria: Frequency Range (-10 dB) of 80 Hz - 18 kHz or better;	3.00	Each	172467.00	517401.00

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	Nominal Dispersion : 90°H x 60°V (rotatable Horn); Power handling of 1000W peak or more; Sensitivity : 93 dB; Max SPL : 122dB Peak; Nominal impedance of 8 ohms and Integral multi-tap Transformer with selectable tap settings of 10/20/40/80W@70V & 100V. The loudspeaker system shall be comprised of a Powder- coated finish stainless steel grille with Two-part spray polyurea coating Enclosure; Enclosure Material Exterior-grade plywood, Single 8-inch woofer; Single 2-inch voice coil high-frequency compression driver; U bracket shall be included etc. complete as per required..				
8	Supply, installation, testing and commissioning of Full range IP55 rated indoor/outdoor surface mounted music loudspeaker. The loudspeaker shall meet the following performance criteria: Usable Frequency range (-10dB) of 70Hz to 17kHz; Power handling of 200 Watt peak; Nominal Coverage Angle (1 – 4 kHz) 130° × 125°; Sensitivity of 89 dB SPL and Max SPL of 112 dB SPL peak; Nominal impedance of 8 ohms and Integral multi-tap Transformer with selectable tap settings of 5/10/20/40W@70V & 100V. The loudspeaker system shall be comprised of a 4.5-inch woofer; enclosed in engineered-plastics and a powder-coated tamper- resistant steel grille. UL-1480 rated and EN54-24 compliant for Life safety/VA applications. Environmental: IP55 Rated for direct- exposure outdoor installations etc. complete as per required.	4.00	Each	51885.00	207540.00
9	Supply , installation , testing and commissioning of digital zone controllers provide volume control for zones with respect to DSP 's and they shall be of Ethernet-based and uses PoE for power; Powered using PoE, multiple processors can be used simultaneously on an Ethernet-based network etc. complete as per required.	2.00	Each	26446.00	52892.00
10	Supply, installation, testing and commissioning of Class D configurable amplifier with PowerShare Technology a digital signal processing 4 channel power amplifier with total of 4800W power and power sharing feature for Asymmetric power allocation. Shall support Dante Digital as well as Analog line level audio inputs and GPIO connections for muting. Power output: Upto 4x1200W @ 4–8 Ω, 70 V, 100 V , upto 4x1500W @ 2ohms, SNR: 110dB(A) or	4.00	Each	771941.00	3087764.00

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	better, THD+N: <0.1 %, Crosstalk (1 kHz): -70dB or better, A/D and D/A converters: 24-bit, 48 kHz Sample rate converter: 24-bit, 44.1 kHz – 192 kHz, Latency 2.5 ms fixed-latency architecture, Input-to-output signal routing: 4 × 4 matrix signal processing: Matrix mixer, 5-band PEQ, array EQ, band pass, Spkr EQ, limiter, delays, Programmable speaker EQs, Input impedance : 20 kΩ Sta-tus indicators: metering-LEDs, system status LEDs, power status LEDs Protections: Thermal, excess high/low AC mains voltage, DC, high frequency, output short circuit, inrush current, clip, peak, etc. Cooling system: variable-speed fan, front-to-back airflow etc. complete as per required.				
11	Supply , installation , testing and commissioning of Class D configurable amplifier with PowerShare Technology a digital signal processing 4 channel power amplifier with total of 2400W power and power sharing feature for Asymmetric power allocation. Shall support Dante Digital as well as Analog line level audio inputs and GPIO connections for muting. Power output: Upto 4x600W @ 4–8 Ω, 70 V, 100 V , upto 4x800W @ 2ohms, SNR: 108dB(A) or better, THD+N: <0.1 %, Crosstalk (1 kHz): -70dB or better, A/D and D/A converters: 24-bit, 48 kHz Sample rate converter: 24-bit, 44.1 kHz – 192 kHz, Latency 2.5 ms fixed-latency architecture, Input-to-output signal routing: 4 × 4 matrix signal processing: Matrix mixer, 5-band PEQ, array EQ, band pass, Spkr EQ, limiter, delays, Programmable speaker EQs, Input impedance : 20 kΩ Sta-tus indicators: metering-LEDs, system status LEDs, power status LEDs Protections: Thermal, excess high/low AC mains voltage, DC, high frequency, output short circuit, inrush current, clip, peak, etc. Cooling system: variable-speed fan, front-to-back airflow etc. complete as per required.	1.00	Each	616894.00	616894.00
12	Supply , installation , testing and commissioning of class D amplifier with 4 x 300 W Load-independent outputs deliver full channel power to either low-impedance (4-8 Ω) or high-impedance (70/100V) loads without bridging. Amplifier shall have frequency response of 20 Hz to 20 kHz, THD+N at rated power less than 0.04%. Dynamic Range ≥ 100	1.00	Each	250761.00	250761.00

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	dBA (at rated power). Audio Latency < 1 ms (any analog or Digital input to loudspeaker output), The amplifier shall meet or exceed the following performance specifications: channel separation (crosstalk) greater than 80 dB. The amplifier shall have 4 line-level inputs with selectable input sensitivity settings (-10 dBV, 4 dBu and 14 dBu) for balanced line-level inputs and possibility of 8 or more no .of digital Audio channels . The amplifier shall offer a master mute connection for use with external dry contacts, normally open or normally closed, to mute all outputs of the amplifier, Indicators & Controls: Power LED, Input Signal LED, Output Limit LED, Mains Voltage 100 VAC – 240 VAC (±10%, 50/60 Hz)etc. complete as per required.				
13	Supply, installation, testing and commissioning of digital audio DSP with 32-bit fixed/floating-point DSP 456 MHz/ARM Cortex-A8 600 MHz processor or better with following features and specifications are required: The audio DSP shall have 12 analog balanced mic/line level inputs and 8 balanced output channels & 8 additional digital output channels on an RJ-45 jack. Each independently controllable . The DSP shall have Dante 64 × 64, primary/secondary, an Ethernet connection for control and programming on an RJ-45 jack, USB audio Micro-B type, stereo in/out, Audio Latency 1.05 ms (analog in to analog out) or less, DSP shall have GPIO – 5 x 5 general-purpose control, Phantom Power +48 VDC, software selectable per input, RS-232/485 ports: RS-232 (DTE) and RS-485 for control devices DSP shall have Display 256 x 64 OLED with rotary encoder, LED Status Indicators Power/Status, Audio Signal Indication On Display The audio DSP shall include onfigurable signal processing, like signal routing and mixing, equalization, filtering, dynamics, delay, room combining, as well as control, monitoring, and diagnostic tools. The audio DSP shall control and proxy all expansion devices and other Dante® endpoints. It shall have following specs : Frequency Response: 18 Hz to 20 kHz, THD+N < 0.003%, Channel Separation (Crosstalk) < -105 dB, Dynamic Range > 115 dB, A- weighted 20 Hz – 20 kHz, analog input to analog output etc.	1.00	Each	462208.00	462208.00

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	complete as per required.				
14	Supply , installation , testing and commissioning of smart mixer amplifier high impedance Class D, with Amplifier Power as 2 x 50 W @ 4Ω ; Frequency Response - 40 Hz - 18 kHz ; THD+N ≤0.3 % (at full rated power); Dynamic Range 88 dB or better; A/D and D/A Converters - 24-bit / 48 kHz; Audio Latency - 10.4 ms - (any input to speaker output or aux output) ; Maximum Input Level : +10 dBV or better. (2) unbalanced line, (1) balanced mic/line, (1) balanced mic/line Page Input; Embedded quick-start QR code in the OLED screen simplifies installation Up to 30 selectable EQ presets ensure sound performance and long-term reliability mixer amplifier must have Bluetooth 5.0 connectivity and RCA connectivity—no wire splicing required Indicators & Controls: Power LED, Input Signal LED, Output Limit LED, Bluetooth LED, Display OLED, 16-bit grayscale, 96 × 96 resolution. Mains Voltage 100 VAC – 240 VAC (±10%, 50/60 Hz) etc. complete as per required.	1.00	Each	80754.00	80754.00
15	Supply , installation , testing and commissioning of Gooseneck mic with mute button Length: 18 inch (45.7 cm) lengths Snap-fit foam windscreen hock mount provides over 20 dB isolation from surface vibration noise etc. complete as per required.	1.00	Each	36465.00	36465.00
16	Supply , installation , testing and commissioning of Wireless lapel mic, SUPERIOR AUDIO With a range of up to 300 feet (100m), 14 hours of power from a single pair of AA batteries, the show can go on and on (and on).Run up to 12 channels per frequency band* etc. complete as per required.	1.00	Each	37835.00	37835.00
17	Supply , installation , testing and commissioning of Wireless hand held mic,Power and battery status LED Adjustable gain control Quick and easy frequency matching AA batteries (included) provide up to 14 hours of continuous use, 100 m (300 ft) operating range (line of sight) Integrated microphone capsule design -10 dB gain attenuationWireless Handheld Mic set etc. complete as per required.	2.00	Each	34648.00	69296.00

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18	Supply , installation , testing and commissioning of 32-Channel Premium Analog Mixing Console 24 Mic Inputs with 48V Phantom Power and HPF per Channel 32 Line Inputs (24 mono and 4 stereo) 6 AUX Sends + 2 FX Sends 4 GROUP Buses + ST Bus 2 Matrix out 1 Mono out On-board processors FX1:REV-X(8 PROGRAM, PARAMETER control)/ FX2:SPX(16 PROGRAM, PARAMETER control) Mic inputs MIC: 24 (INPUTS HPF: 100Hz 12dB/oct) Digital I/O USB Device, iPod / iPhone, Total harmonic distortion 0.02% (20Hz 20kHz@ +14dBu) Frequency response +0.5/-1.0dB 20Hz - 20kHz, refer to the nominal output level @1kHz etc. complete as per required.	1.00	Each	154779.00	154779.00
19	SITC of Main led wall Auditorium : CURVED led video wall 2 to 6 digree:- Configuration SMD 3-in-1 Pixel Pitch COS Human And hemudity Protection/COB/flip chip for human touch Protection based Indoor Direct View True Color LED Wall size 9 M X 4.8 M or higher inclusive Pixel Density 160000 pixels/m2 OR Better Brightness 800 cd/m2 or more IP,PP-2.5MM, tile size 640 X 480 MM Grade IP30 / IP50 Lifetime (Typical) ≥100,000 hrs Viewing AngleHorizontal160° Vertical 160 or better, Dimming Capability0-255 level Contrast Ratio*5000:1 or higher Refresh Rate*1920Hz or higher Color Processing*16 Bit or higher Colors*4.4 Trillion or higher of LED control Processor Contro IRS232 Can be Cascaded for Uniform ControlInputsAUDIO IN 1 x AUDIO INPUT PORTDVI IN 1 x DVI INPUT PORTOutputs OUTPUT (1 TO 4) 4 x LAN OUTPUT PORT/ FIBER OPTICDVI OUT 1 x DVI OUTPUT PORT Resolution SupportInput Resolution Support1920 x 1200,2048 x 1152,2560 x 960,& other user define resolutions (under 2.3 million pixels)Maximum Width Output 2048 pixelsMaximum Height Output 1200 pixels Power Input voltage (AC) AC 100-240 V-50/60 HzRated power consumption 2.9 WOperating temperature -20°C-60°COperating humidity 10%RH-90% RHDimensions video prosseser Inputs1X DVI, 1X HDMI, 2 X VGA, 1 X Composite Video, 1 x SDI/HD-SDI Input Resolution Full HD or better Output 2xDVI,1 XVGA				

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	ControlPanel/Knob RS232 Power 100~240VAC Operating Temperature 5~40 Deg C Switching Seamless Switching, Fade in Fade Out Switching & Blend Switch Power Distribution Unit, Structure to mount in trolley solutions LED & I&C (1 Nos.) ,Power Distribution UnitA Power Distribution Unit to be provided to provide power to the LED walls.Cable pointsCable entry and exit points should be providedSurge protectionClass C MaterialDie-cast Aluminum Power Redundancy (Optional) Support With all video processor,Led controller,LED and installation should be a same OEM. OEM shall be ISO 9001, ISO 14001, OHSAS 45001 & ISO 27001:1 certified NABL with MII – Certificates to be submit.				
	OEM should have their own service center across India for support.Franchised or Authorized service center are not acceptable Service centers should be available in all major metro cities BIS should be a name of same OEM and Factory address. Warranty 2 years at the time of installation. etc. complete as per required.	1.00	Each	6057314.00	6057314.00
20	SITC of 55" Display panel Screen Size (diagonal) 55 inch Brightness (cd/m²) Typical 440 nits or higher, Picture Processor 4K HDR Processor X1, Display resolution (H x V pixels) 4K UHD (3840 * 2160), Backlight type Direct LED, Operation time 24*7 Viewing Angle (Right/Left/Up/Down) 178 degree, Operating System (Built in)Android, HDR Compatibility HDR10, HLG, Dolby Vision, On-board Storage (GB) 16 GB or more, Color gamut (DCI-P3) 92% or higher, Wi-Fi Direct, Wi- Fi Certified & Wireless LAN Yes, Chromecast & Apple AirPlay (built in) Yes, HDCP, HDCP 2.3, Ports and Connectivity, HDMI (4), Digital Audio Out (1), USB (2), Ethernet (1), Power consumption Not more than 205 W, Weight without Stand Not more than 16 Kg etc. complete as per required.	2.00	Each	66300.00	132600.00
21	SITC of 45 degree tilt capable, height adjustable floor cart for confidence monitor display. Shall have integrated VESA mounts for display. EIC Approved etc. complete as per required.	2.00	Each	90124.00	180248.00

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22	Supply , installation , testing and commissioning of wireless presentation system which allows to Present from laptop, tablet or smart phone wirelessly, Should support Native screen mirroring or extended desktop solution; no app, no dongle, Should have Quick Switch Mode to switch between presenters without disconnecting, Should have Optional configurable ,secure, and isolated Wi-Fi hotspot, Integrated HTML 5.0-based digital signage player, Windows native wireless touch and inking, Integrated Whiteboard application with advanced interactive features, Multi-View Mode allows up to four devices shared on-screen, 4K and interactive flat panel ready, Protection: HDCP 2.x etc. complete as per required.	1.00	Each	229936.00	229936.00
23	SITC of HDMI 2.0 HDBaseT Extension Set, Extend HDMI 2.0 signals up to 4K@60Hz / 4:4:4 up to 70m (4K 40m / 1080P 70m), Complete set Includes TX, RX, power supply, and IR flasher/emitter, Extends bi-directional IR. Flexible PoC (Power on either end), Supports HDR10, HDCP 2.2 compliant, Flexible power design (use power supply at TX or RX) etc. complete as per required.	4.00	Each	56614.00	226456.00
24	SITC of four input by four output HDMI 2.0b matrix switcher with HDCP 2.2 support and capable of handling resolutions up 4K@60Hz 4:4:4 / 8 bit color with HDR output support for each channel. The matrix shall feature advanced independent EDID management control for each HDMI. The switcher shall have individual scaler control on each output port. The digital audio outputs can be set to follow the HDMI video route or can be independently routed either by API or web control interface. The 4x4 switcher can be controlled via front panel buttons, front panel IR, external IR, remote IR, RS232, and Ethernet etc. complete as per required..	1.00	Each	78389.00	78389.00
25	SITC of 2 core 14 AWG/2.5 Sq mm, Twisted, unshielded Speaker cable with stranded annealed bare copper conductors, Semi-rigid PVC insulation etc. complete as per required.,	400.00	Meter	165.00	66000.00

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26	SITC of 2 core Twisted, shielded balanced Audio and control cable with 22AWG or better copper conductors, Semi-Rigid PVC insulation, Riser rated PVC jacket. CMR rated etc. complete as per required.	200.00	Meter	105.00	21000.00
27	Supplying, drawing, Testing and commissioning of Cat6A UTP 4 pair, 23 AWG solid copper cable in existing conduit/ on surface, U/FTP, LSZH, Non- Plenum, Horizontal (solid) Cable suitable for high speed data networking application supporting upto 10Gbps over a 100 meter channel. The 4 Unshielded Twisted Pairs (UTP) cable with color coded insulation for easy identification should have FLAME PROPERTIES i.e. Flammability Test - IEC 60332-1, Smoke Density - IEC 61034, LSZH standards compliance: ANSI/TIA-568 C.2, ISO/IEC 11801, IEEE 802.3an, RoHS. Delay Skew should be < 45NS. The outer Cable Diameter should be 7.5 + 2 mm. Cable should have been tested and verified by UL/ ETL etc. complete as required.				
27.1	1 Run of cable	200.00	Meter	62.00	12400.00
28	SITC of 6' High Speed HDMI with Ethernet cable for 3D, 4K, Deep Colour applications and installations, 18.0Gbps Bandwidth to support 4K60 4:4:4, shall Support ARC, and all HDCP levels, HDR Certified by HDMI ATC, RoHS, REACH, and TAA Compliant, etc. complete as per required.	10.00	Each	3056.00	30560.00
29	Supply, Installation, Testing and commissioning of a Digital Podium. The podium is to include essential features such as a 21" Finger- touch Monitor with Motorised Angle Adjustment, a Switcher enabling seamless transitions between PC, Laptop, and Visualizer inputs for screen output. Additionally, the podium should incorporate a USB Port for Pen Drive connectivity, a Power Plug for Laptop compatibility, and an Audio system comprising 1 x Gooseneck Microphone. The tender also encompasses the provision of complete accessories necessary for installation and operation etc. complete as per required..	1.00	Each	274293.00	274293.00

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30	Supplying and fixing 24U Rack with 4 inch Castor wheels and front brake Floor Standing Rack with Main Frame Pillar of 1.25mm Powder Coated CRCA Sheet with removable side panels, L- Shape adjustable Vertical Mounting Rail of 2mm with 'U'Marking completely knocked-down condition (CKD) Shape, fitted with 4 number cooling fans, minimum 5nos two line cable entry/exit provision at top and bottom with rubber protection, Front door 5mm Toughened Glass with MS frame or MS perforated with lock, Rear MS vented or perforated door, Powder coated Color- RAL- 7035 or black, complied with UL & RoHS, 2 x 6 sockets 16A power distribution units, 3 numbers closed cable organizer, Hardware mounting screws packet of 20 x 1 number, etc.complete as required.	6.00	Each	21201.00	127206.00
	Dining Hall				
31	Supply, installation , testing and commissioning of full range ceiling mounted music and PA loudspeaker. The loudspeaker shall meet the following performance criteria: Usable Frequency range (-10 dB) of 85Hz to 19kHz; Power handling of 64 Watt peak; Nominal dispersion of 165° Conical; Sensitivity of 84 dB SPL and Max SPL of 102 dB SPL peak; Nominal impedance of 16 ohms and Integral multi-tap Transformer with selectable tap settings of 2/4/8/16 W @ 70V & 100V. The loudspeaker system shall be comprised of a 2.25-inch woofer; enclosed in engineered-plastics with integrated steel backcan and a powder-coated steel grille. UL-1480 rated and EN54-24 compliant for Life safety/VA applications.Shall be packed in pairs etc. complete as per required.	18.00	Each	18212.00	327816.00
32	SITC of Class D configurable amplifier with a digital signal processing architecture running at 48 kHz / 24 bit .The amplifier shall deliver 4 x 150 W each Load- independent outputs deliver full channel power to either low-impedance (4-8 Ω) or high impedance (70/100V) loads without bridging ; Frequency Response : 20Hz - 20kHz ; THD <0.04% at rated output, Channel Separation (Crosstalk) > 80 dB, Dynamic Range $\geq$ 100 dBA (at rated power).Audio Latency < 1 ms (any analog input to loudspeaker output). The amplifier shall have Dedicated input for 600-ohm telephone or mic	1.00	Each	276896.00	276896.00

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	paging, independent 600-ohm music-on-hold and line-level aux outputs, and a NO/NC mute connection. Phoenix Input and output terminals, shall support remote source selection and Volume controllers (wired) for individual channels. amplifier should have Processing Functions Matrix mixer, loudspeaker EQ, VPeak/VRMS limiters, real-time PEQ, ControlCenter configuration, mute/output polarity inversion, Mains Voltage 100 VAC – 240 VAC (±10%, 50/60 Hz) etc. complete as per required.				
33	SITC of zone controllers provide volume control shall have Connectors Two (2) RJ- 45, allows for daisy-chaining, TIA/EIA 568B wiring standard Maximum Cable Length 609 m (2000 ft) for when used with amplifiers, 152 m (500 ft) for Processors, using shielded cable etc. complete as per required.	1.00	Each	6669.00	6669.00
34	SITC of 2 core 16 AWG/1.5 Sq mm, Twisted, unshielded Speaker cable with stranded annealed bare copper conductors, Semi-rigid PVC insulation etc. complete as per required.	300.00	Meter	105.00	31500.00
	Auditorium				
35	Supply, installation, testing & Commissioning of FOH biamped full-range coaxial point-source loudspeaker. shall have coaxial two-way point source loudspeaker with a single 12" LF driver and HF compression driver 3" or better. Frequency Range (-10dB) of 60Hz - 18kHz or better & long term Peak Power Handling of 2400W (Low frequency) and 720W for High Frequency driver or better. The Loudspeaker module shall have a Max. SPL (Peak) of >= 131 or better. It should have Horizontal dispersion pattern of 110° or better, vertical dispersion of the loudspeaker shall be 60 degrees or better. The loudspeaker shall be enclosed in a Baltic birch plywood enclosure with perforated steel grille. Environmental: IP43-rated or Better, Suspension / Mounting: M10 threaded inserts, M6 threaded inserts, M8 threaded inserts (bottom, for external pole adapter) etc. complete as per required.	2.00	Set	484328.00	968656.00

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36	Supply, installation, testing & Commissioning of OEM array frames/ Hanging/ Mounting arrangement for Suspension of speake offered above, Shall offer multiple rigging points for achieving desired pitch settings. etc. complete as per required.	2.00	Set	34442.00	68884.00
37	Supply, installation, testing & Commissioning of multipurpose subwoofer with a single 15" neodymium LF driver. Frequency Range (-10dB) of 35Hz - 130Hz or better. Power Handling, Peak: 2800 W or better. It should have an axial Sensitivity of $\geq 90\text{dB}$ (1W/1m)(free-field) or more delivering a free field Max. Calculated SPL(peak) of $\geq 124\text{dB}$ (free-field) or better. The loudspeaker should have a nominal impedance of 8 ohm or more. The loudspeaker shall be enclosed in a Baltic birch plywood enclosure with perforated steel grille. Connectors: 2 $\times$ Neutrik® NL4 inputs with wired-parallel through, Suspension/ Mounting/ Transport: 1 $\times$ M20 threaded pole mount, 12 $\times$ M10 threaded inserts (for accessory attachment or mounting), 16 $\times$ M8 caster attachment points, Complete with installation as per the site requirement etc. complete as per required..	2.00	Each	425581.00	851162.00
38	Supply, installation, testing & Commissioning of Subwoofer Hanging arrangement etc. complete as per required.	2.00	Each	25602.00	51204.00
39	Supply, installation, testing and commissioning of Stage Monitors Two-way Small Format high SPL IP55 rated (as per IEC 60529) all weather surface mount loudspeaker. The loudspeaker shall meet the following performance criteria: Frequency Range (-10 dB) of 80 Hz - 18 kHz or better; Nominal Dispersion : 90°H x 60°V (rotatable Horn); Power handling of 1000W peak or more; Sensitivity : 93 dB; Max SPL : 122dB Peak; Nominal impedance of 8 ohms and Integral multi-tap Transformer with selectable tap settings of 10/20/40/80W@70V & 100V. The loudspeaker system shall be comprised of a Powder-coated finish stainless steel grille with Two-part spray polyurea coating Enclosure; Enclosure Material Exterior-grade plywood, Single 8-inch woofer; Single 2-inch voice coil high- frequency compression driver; U bracket shall be included etc. complete as per required..	2.00	Each	182145.00	364290.00

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40	Supply, installation, testing and commissioning of front fill speakersTwo-way Small Format high SPL IP55 rated (as per IEC 60529) all weather surface mount loudspeaker. The loudspeaker shall meet the following performance criteria: Frequency Range (-10 dB) of 90 Hz - 18 kHz or better; Nominal Dispersion : 100°H x 100°V; Power handling of 600W peak or more; Sensitivity : 92 dB and the Max SPL : 119dB Peak or better; Nominal impedance of 8 ohms and Integral multi-tap Transformer with selectable tap settings of 10/20/40/80W@70V & 100V. The loudspeaker system shall be comprised of a Powder-coated finish stainless steel grille with Two-part spray polyurea coating Enclosure; Enclosure Material Exterior-grade plywood, Single 5.25-inch woofer; Single 2-inch voice coil high-frequency compression driver; U bracket shall be included etc. complete as per required..	3.00	Each	120049.00	360147.00
41	Supply , installation , testing and commissioning of class D amplifier with 2 x 1000 W Load- independent outputs deliver full channel power to either low-impedance (4-8 Ω) or high-impedance (70/100V) loads without bridging. Amplifier shall have frequency response of 20 Hz to 20 kHz, THD+N at rated power less than 0.04%. Dynamic Range $\geq$ 100 dBA (at rated power). Audio Latency < 1 ms (any analog or Digital input to loudspeaker output), The amplifier shall meet or exceed the following performance specifications: channel separation (crosstalk) greater than 80 dB. The amplifier shall have 2 line-level inputs with selectable input sensitivity settings (-10 dBV, 4 dBu and 14 dBu) for balanced line-level inputs and possibility of 8 or more no .of digital Audio channels . The amplifier shall offer a master mute connection for use with external dry contacts, normally open or normally closed, to mute all outputs of the amplifier, Indicators & Controls: Power LED, Input Signal LED, Output Limit LED, Mains Voltage 100 VAC – 240 VAC ($\pm$ 10%, 50/60 Hz) etc. complete as per required.	2.00	Each	189802.00	379604.00

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42	Supply, installation, testing and commissioning of class D amplifier with 4x300 W Load-independent outputs deliver full channel power to either low-impedance (4-8 Ω) or high-impedance (70/100V) loads without bridging. Amplifier shall have frequency response of 20 Hz to 20 kHz, THD+N at rated power less than 0.04%. Dynamic Range $\geq$ 100 dBA (at rated power). Audio Latency < 1 ms (any analog or Digital input to loudspeaker output), The amplifier shall meet or exceed the following performance specifications: channel separation (crosstalk) greater than 80 dB. The amplifier shall have 4 line-level inputs with selectable input sensitivity settings (-10 dBV, 4 dBu and 14 dBu) for balanced line-level inputs and possibility of 8 or more no .of digital Audio channels . The amplifier shall offer a master mute connection for use with external dry contacts, normally open or normally closed, to mute all outputs of the amplifier, Indicators & Controls: Power LED, Input Signal LED, Output Limit LED, Mains Voltage 100 VAC – 240 VAC ($\pm$ 10%, 50/60 Hz) etc. complete as per required.	2.00	Each	250761.00	501522.00
43	Supply, installation, testing and commissioning of digital audio DSP with 32-bit fixed/floating-point DSP 456 MHz/ARM Cortex-A8 600 MHz processor or better with following features and specifications are required: The audio DSP shall have 12 analog balanced mic/line level inputs and 8 balanced output channels & 8 additional digital output channels on an RJ-45 jack. Each independently controllable . The DSP shall have Dante 64 $\times$ 64, primary/secondary, an Ethernet connection for control and programming on an RJ-45 jack, USB audio Micro-B type, stereo in/out, Audio Latency 1.05 ms (analog in to analog out) or less, DSP shall have GPIO – 5 x 5 general-purpose control, Phantom Power +48 VDC, software selectable per input, RS-232/485 ports: RS-232 (DTE) and RS-485 for control devices DSP shall have Display 256 x 64 OLED with rotary encoder, LED Status Indicators Power/Status, Audio Signal Indication On Display The audio DSP shall include configurable signal processing, like signal routing and mixing, equalization, filtering, dynamics, delay, room combining, as well as	1.00	Each	462208.00	462208.00

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	control, monitoring, and diagnostic tools				
	The audio DSP shall control and proxy all expansion devices and other Dante® endpoints. It shall have following specs : Frequency Response: 18 Hz to 20 kHz, THD+N < 0.003%, Channel Separation (Crosstalk) < -105 dB, Dynamic Range > 115 dB, A- weighted 20 Hz – 20 kHz, analog input to analog output etc. complete as per required.				
44	Supply, installation, testing and commissioning of Full range IP55 rated indoor/outdoor surface mounted music loudspeaker. The loudspeaker shall meet the following performance criteria: Usable Frequency range (-10dB) of 70Hz to 17kHz; Power handling of 200Watt peak; Nominal Coverage Angle (1 – 4 kHz) 130° × 125°; Sensitivity of 89 dB SPL and Max SPL of 112 dB SPL peak; Nominal impedance of 8 ohms and Integral multi-tap Transformer with selectable tap settings of 5/10/20/40W@70V & 100V. The loudspeaker system shall be comprised of a 4.5-inch woofer; enclosed in engineered-plastics and a powder-coated tamper-resistant steel grille. UL-1480 rated and EN54-24 compliant for Life safety/VA applications. Environmental: IP55 Rated for direct-exposure outdoor installations etc. complete as per required.	2.00	Each	61284.00	122568.00
45	Supply, installation, testing and commissioning of integrated low impedance Class D Amplifier with output of 2 x 50 W @ 4 Ω, Frequency Response - 40 Hz - 20 kHz ; THD+N ≤0.3 % (at full rated power) ; Channel Separation (Crosstalk) ≤-60 dBV; A/D and D/A Converters - 24-bit / 48 kHz; Audio Latency - 10.4 ms - (any input to speaker output or aux output) ; Maximum Input Level : +10 dBV or better. 1 balanced page input, 1 balanced mic/line input, 2 unbalanced line; 1 unbalanced line auxiliary input, built in loudspeaker EQs. Shall include output for expansion amplifier and remote controller (Wired) for source as well as volume control etc. complete as per required..	1.00	Each	95383.00	95383.00

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46	Supply, installation, testing and commissioning of Gooseneck mic with mute button Length: 18 inch (45.7 cm) lengths Snap-fit foam windscreen hock mount provides over 20 dB isolation from surface vibration noise etc. complete as per required.	1.00	Each	36465.00	36465.00
47	Supply, installation, testing and commissioning of Wireless lapel mic, SUPERIOR AUDIO With a range of up to 300 feet (100m), 14 hours of power from a single pair of AA batteries, the show can go on and on (and on). Run up to 12 channels per frequency band etc. complete as per required.	1.00	Each	37835.00	37835.00
48	Supply , installation , testing and commissioning of Wireless hand held mic Power and battery status LED Adjustable gain control Quick and easy frequency matching AA batteries (included) provide up to 14 hours of continuous use, 100 m (300 ft) operating range (line of sight) Integrated microphone capsule design -10 dB gain attenuation Wireless Handheld Mic set etc. complete as per required.	2.00	Each	34648.00	69296.00
49	Supply , installation , testing and commissioning of 32-Channel Premium Analog Mixing Console 24 Mic Inputs with 48V Phantom Power and HPF per Channel 32 Line Inputs (24 mono and 4 stereo) 6 AUX Sends + 2 FX Sends 4 GROUP Buses + ST Bus 2 Matrix out 1 Mono out On-board processors FX1:REV-X(8 PROGRAM, PARAMETER control)/ FX2:SPX(16 PROGRAM, PARAMETER control) Mic inputs MIC: 24 (INPUTS HPF: 100Hz 12dB/oct) Digital I/O USB Device, iPod / iPhone, Total harmonic distortion 0.02% (20Hz-20kHz@ +14dBu) Frequency response +0.5/-1.0dB 20Hz - 20kHz, refer to the nominal output level @1kHz etc. complete as per required.	1.00	Each	154779.00	154779.00
50	SITC of bezel less active LED AIO (All in one) of size 165" Diagonal or better having Pixel Pitch 1.9 mm or better ,Resolution-1920 x 1080 ,Brightness-800 nits,contrast ratio: 10000:1, Technology-COB/COS/ Flipchip/ Micro, Refresh Rate-3840Hz,color processing- up to 16 bit,viewing angle-160 X160,Lifetime = 100000 hrs ,Average Power consumption-- 1	1.00	Each	2787156.00	2787156.00

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	Kw, service access-front , Inbuilt Controller having -OS- Andriod 13, RAM-8 GB , Storage -64 GB,CPU--Octacore(4 cortex x A76 + 4 cortex X A55), wifi, Bluetooth, Inbuilt min. 100 watt speaker, Input port - HDMI x 4, USB 2.0 x1, USB 3.0 x2, Audio In x 1, USB type C x1, USB type B Out X1, HDMI out x 1, Audio out x 2, RS232x1,RJ45 x2, POE port, OPS slot x1, OPS -optional (optional- having CPU-window based intel core I5-1240 P, RAM -16 GB, SSD-256 GB, HDMI In x 2, USB x2, PC interface 40 Pin)) , Touch Feature Optional having laser radar touch type ,Accessories-Remote , wall mounted bracket, Operational Hour-24 x7 Inbilt Capability to Process 4 HDMI Input signal on single screen ,support simultaneous display of upto eight connected devices and auto-brightness adjustment ,dust protection ,mositure protection,scratch protection , easy to clean and maintain ,better heat disipation , MII, BIS , OEM should have own manufacturing facility in India and same factory address mentioned in BIS, should have ISO 9001,14001,27001,45001,E waste CPCB, Warranty-2 Years. etc. complete as per required.				
51	Supply, Installation, Testing and commissioning of a Digital Podium. The podium is to include essential features such as a 21" Finger-touch Monitor with Motorised Angle Adjustment, and a Switcher enabling seamless transitions between PC, Laptop, and Visualizer inputs for screen output. Additionally, the podium should incorporate a USB Port for Pen Drive connectivity, a Power Plug for Laptop compatibility, and an Audio system comprising 1 x Gooseneck Microphone. The tender also encompasses the provision of complete accessories necessary for installation and operation.etc. complete as per required.	1.00	Each	274293.00	274293.00
52	Supply , installation , testing and commissioning of wireless presentation system which allows to Present from laptop, tablet or smartphonewirelessly, Should support Native screen mirroring or extended desktop solution; no app, no dongle, Should have Quick Switch Mode to switch between presenters without disconnecting, Should have Optional configurable,secure, and isolated Wi-Fi hotspot, Integrated HTML 5.0-based digital signage	1.00	Each	229936.00	229936.00

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	player, Windows native wireless touch and inking, Integrated Whiteboard application with advanced interactive features, Multi-View Mode allows up to four devices shared on-screen, 4K and interactive flat panel ready, Protection: HDCP 2.x etc. complete as per required.				
53	Supply , installation , testing and commissioning of 4K 10.2G 70M HDMI Wall Plate extender set with audio pass-through and RS232, Complete set includes Wall plate TX, RX, Power supply, cover plate, Extend HDMI up to 4K & Analog Audio signals up to 70 meters. HDCP2.2 Compliant, Extends RS232 & 1 way PoC from RX to wall plate TX, Supports video up to 4K2K@30Hz (4:4:4), 4K2K@60Hz (4:2:0) 10.2G, Supports all HDMI audio formats, Single cable 40m for 4K / 70m for 1080P RS232 & CEC pass-through, Dedicated 3.5mm audio independent from the HDMI signal, Remote power from receiver to wall plate transmitter, TX is standard US 1-gang decorator format, HDCP 2.2 compliant etc. complete as per required.	1.00	Each	55018.00	55018.00
54	Supply , installation , testing and commissioning of 4x1 HDMI 2.0 Auto-switcher, 4K60 4:4:4 / HDR 18G Matrix switcher with audio de-embed, ARC, IR, & RS232 control, Auto-switch or manual switch between four HDMI inputs, 1x HDMI and 1x 3.5mm TRS audio (ARC & audio de-embedding) output Front panel, Supports resolutions up to 4k@60Hz, 4:4:4. 8 bit deep color, Supports HDR formats, HDCP 2.2 compliant, Supports EDID management, Supports CEC pass through control of source / display etc. complete as per required.	1.00	Each	50900.00	50900.00
55	Supply , installation , testing and commissioning of HDMI 2.0 HDBaseT Extension Set, Extend HDMI 2.0 signals up to 4K@60Hz / 4:4:4 up to 70m (4K 40m / 1080P 70m), Complete set Includes TX, RX, power supply, and IR flasher/emitter, Extends bi-directional IR. Flexible PoC (Power on either end), Supports HDR10, HDCP 2.2 compliant, Flexible power design (use power supply at TX or RX) etc. complete as per required.	2.00	Each	274293.00	548586.00

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56	SITC of 1:4 HDMI splitter with 18G 4K60 4:4:4 support. The splitter should be 1 in 4 out HDMI distribution amplifier/splitter, it should support HDMI 2.0 4K@60Hz 4:4:4 HDCP 2.2 Compliant. Each output should independently support automatic- down scaling from 4K to 1080P. tSwitcher should support multiple HDR formats including HDR10 and Dolby Vision, it should also supports PCM 2.0/5.1/7.1, Dolby TrueHD, Dolby Atmos, DTS HD Master Audio and DTS:X audio formats etc. complete as per required. .	1.00	Each	26704.00	26704.00
57	Supply, Installation, Testing & Commissioning of PC with dual HDMI output, 2nos. Of USB3.0 port, 2 no. of USB2.0 port, i7 processor, 16GB RAM, 256GB Sata hard disk, with power supply, etc. complete as per required. .	1.00	Each	110735.00	110735.00
58	SITC of 2 core 12 AWG/4 Sq mm, Twisted, unshielded Speaker cable with stranded annealed bare copper conductors, Semi-rigid PVC insulation, compliant etc. complete as per required.	100.00	Meter	368.00	36800.00
59	SITC of 2 core Twisted, shielded balanced Audio and control cable with 22AWG or better copper conductors, Semi-Rigid PVC insulation, Riser rated PVC jacket. CMR rated etc. complete as per required.	100.00	Meter	105.00	10500.00
60	SITC of 4 pair shielded Category 6A cable with 23AWG or better Solid annealed bare copper conductors, High- density polyethylene insulation, Flame rated PVC jacket, Overall aluminum/poly foil shield with drain, RoHS compliant etc. complete as per required. .	200.00	Meter	192.00	38400.00
61	SITC of 6' High Speed HDMI with Ethernet cable for 3D, 4K, Deep Colour applications and installations, 18.0Gbps Bandwidth to support 4K60 4:4:4, shall Support ARC, and all HDCP levels, HDR Certified by HDMI ATC, RoHS, REACH, and TAA Compliant etc. complete as per required. ,	6.00	Each	2787.00	16722.00
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62	SITC of 98" 4K HDR professional display with Cognitive Processor XR™ Brightness (cd/m²) 440 Contrast Ratio 5000:1 Dynamic Contrast Ratio 700,000:1 Response Time (Gray to gray, Typical, ms) 6.5 Display Resolution (H x V, pixels) 3840 x 2160 HDR (High Dynamic Range) Compatibility Yes (HDR10,HLG,Dolby Vision) Aspect Ratio 16:9 Portrait/Tilt Compatibility -Yes Dimming Type Local Dimming Display Device LCD Panel Type VA Backlight Type Direct (Full Array LED) TRILUMINOS Display XR Triluminos Pro Colour Gamut (DCI-P3) 95% Picture Processor Cognitive Processor XR Operation Time 24/7 Deep Black Non-Glare No Haze (%) 2% Viewing Angle (Right/Left), 178 (89 / 89) degree (CR >10) Viewing Angle (Up/Down)- Audio Power Output 10W + 10W + 10W + 10W 178 (89 / 89) degree (CR >10) Operating System Android TV On-board Storage (GB) 32GB Wi-Fi Direct Yes Wireless LAN HDCP HDCP2.3 (for HDMI1/2/3/4) Composite Video Input (s) Hybrid w/S-Center Speaker Input x1 (Side, Mini jack) HDMI Inputs Total 4 (4Side) Analog Audio Input (s) (Total) 1 (Side Analog Conversion) Digital Audio Output (s) 1 (Side) USB Ports 2 (Side) Ethernet Inputs 1 (Side)Integrated etc. complete as per required.	1.00	Each	691290.00	691290.00
63	SITC of 75" Display panel Screen Size (diagonal) 75 inch, Brightness (cd/m²) Typical 440 nits or higher, Picture Processor 4K HDR Processor X1, Display resolution (H x V pixels), 4K UHD (3840 * 2160), Backlight type Direct LED, Operation time 24*7, Viewing Angle (Right/Left/Up/Down) 178 degree Operating System (Built in)Android, HDR Compatibility, HDR10,HLG,Dolby Vision, On-board Storage (GB) 16 GB or more, Color gamut (DCI-P3) 92% or higher, Wi-Fi Direct, Wi-Fi Certified & Wireless LAN Yes, Chromecast & Apple AirPlay built in Yes, HDCP, HDCP 2.3, Ports and Connectivity HDMI (4), Digital Audio Out (1), USB (2), Ethernet (1), Power consumption Not more than 310 W Weight without Stand Not more than 32 Kg etc. complete as per required.	2.00	Each	156413.00	312826.00
64	SITC of motorized retractable conference display system shall feature a 17.3-inch Full HD IPS display with 1920×1080 resolution,	3.00	Each	286292.00	858876.00

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customizable up to 4K UHD, ultra-wide viewing angle, tempered anti-glare glass protection, and ultra-slim all-aluminum alloy construction with CNC precision carving and anodized surface treatment for superior corrosion resistance and premium aesthetics. The system shall adopt a fully decentralized architecture eliminating the need for a central server, ensuring higher stability, faster response, and independent operation of each unit. It shall support chairman, secretary, and delegate identity modes with configurable authority management, synchronized screen sharing, local and external signal switching, and seamless real-time display transmission without latency. The system shall support RJ45 hand-in-hand CAT6 network topology with hot-swappable connectivity, allowing one chairman unit to manage up to 42 delegate units simultaneously with further expandable architecture through cascading chairman units. etc. complete as per required. The display mechanism shall utilize intelligent digital synchronous positioning technology, dual silent linear slide rails, precision gear transmission, and multi-point balanced lifting control for noiseless, vibration-free, accurate, and uniform movement. The screen shall support automatic power ON/OFF during lifting operation, adjustable viewing angle up to 120°, independent rise/pause/fall control keys, and one-touch group control for all units. The unit shall include dual HDMI high-definition inputs, built-in industrial-grade mini PC compatibility, low-power intelligent circuitry, and fast boot operation. Control methods shall include panel control, RS-232 hand-in-hand communication, software control, wireless remote control, central control integration, and group management. The system shall incorporate military-grade metal control buttons with high sensitivity and long operational life, detachable safety protection mechanism, built-in overload, leakage, overcurrent, anti-collision, current-limiting, and voltage stabilization protections supporting AC100V–240V universal power input for safe, reliable, and uninterrupted operation in mission-critical conference environments. etc. complete as per required.				
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65	SITC of PTZ Camera : 20X Optical Zoom : 4K AI Tracking PTZ Camera 20X optical zoom and wide viewing angle , high performance Sony Sensors and true 4K Imaging, Image Sensor : Sony 1/ 2.8" CMOS, Effective Pixels : 8.29MP, , Iptical Zoom :20 X optical Zoom, Lens : F: 4.95mm -99mm, Digital Zoom : 8X. etc. complete as per required.	1.00	Each	198309.00	198309.00
66	SITC of Ceiling mount for Camera etc. complete as per required.	1.00	Each	4014.00	4014.00
67	SITC of Chairman Unit : The chairman unit shall include all delegate features with enhanced authority via Multi-Layer Leadership Protocol. It shall support priority override, instant mute of active delegate units, and full control of speaking order. The unit shall provide web-based approval/rejection of speech requests, support up to 40 chairman units and 150 VIP units, and enable unrestricted VIP speaking with centralized conference management and real-time system control, Microphone Type : Digital Intelligent Disc Type (Beam forming 14mm gold plated capsules with 150 degree wide pickup angle), Frequency Response : 30Hz ~ 20KHz, Signal-to-Noise Ratio : >90dB, Dynamic Range : 96dB, Total Harmonic Distortion (THD) : <0.05%, Microphone Sensitivity : -37dB ±2dB, Working Power Supply : 24V DC ±5% (via PoE / Central Control Unit). Should be strong anti-interference shielding against mobile, Wi-Fi, and Bluetooth signals , Aluminium Alow body with glass touch control, The length of Gooseneck Microphone should not be more than 23 cm. etc. complete as per required.	3.00	Each	58655.00	175965.00
68	SITC of Delegate Unit : The delegate unit shall be a digital wired conference microphone with IRIN DSP/DDOV processing, 48kHz audio, and 30Hz-20kHz frequency response. It shall feature a 14mm gold-plated condenser capsule with AGC, AEC, EQ, and 50-60cm pickup range. The unit shall support Adaptive Conference Logic Engine, Dynamic Speaker Matrix, and Secure Digital Identity Framework, enabling 1-20 active units or unlimited discussion mode, with CAT5/8-pin daisy-chain connectivity and high EMI immunity,	61.00	Each	51532.00	3143452.00

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	Microphone Type : Digital Intelligent Disk Type (Beam forming 14mm gold plated capsules), Frequency Response : 30Hz ~ 20KHz, Signal-to-Noise Ratio : >90dB, Dynamic Range : 96dB, Total Harmonic Distortion (THD) : <0.05%, Microphone Sensitivity : -37dB $\pm$ 2dB, Working Power Supply : 24V DC $\pm$ 5% (via PoE / Central Control Unit).Should be strong anti-interference shielding against mobile, Wi-Fi, and Bluetooth signals , Aluminium Alow body with glass touch control, The length of Gooseneck Microphone should not be more than 23 cm. etc. complete as per required.				
69	SITC of CENTRAL UNIT (CONTROLLER) :Support eight meeting modes: limited number, FIOFI, LIFO, Last in First out, Chairman's permission (request for speech), voice control start, limited time speech, queuing speech, free discussion,The number of speakers can be set to 1-9, the chairman and VIP are not limited by the number, free discussion mode is not limited to open all, With high-definition camera, automatic speaker tracking (look at me feature), Support the connection of 150 chairman units, With super anti-interference ability, it can effectively isolate the signal interference of mobile phone, radio wave, Bluetooth, WiFi and so on, and never produce noise when calling. It has a 3.5mm headphone interface, which can be used as a meeting monitoring for participants, and can adjust the volume of the listening. etc. complete as per required.	1.00	Each	251378.00	251378.00
70	SITC of Wall mount Speaker: Two way Speaker : Compact full range speaker system,Frequency Range (-10dB)-80 Hz – 20 kHz, Drivers- One (6.5 in) Full-Range, Impedance-8 ohms, Power Rating-100W (100W peak), 2 hrs,Coverage Angle- Vertical 80° (1.5 kHz - 16 kHz, $\pm$ 10°)Horizontal 80° (ave, 1 kHz – 4 kHz, $\pm$ 20°),Sensitivity-93 dB (speech mode, 2 kHz - 14 kHz)89 dB (music mode, 300 Hz - 18 kHz). etc. complete as per required.	8.00	Each	22763.00	182104.00
71	SITC of Mixer Amplifier with built in Bluetooth and USB/SD Card : Output power is 500W, Frequency Response: Mic: (200Hz - 18KHz) Line : 100Hz - 19KHz), TDH @ 1KHz less than 1%, Input Sensitivity : Mic Input: -	1.00	Each	68430.00	68430.00

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	40dB (10mV) Line: -8dB(400mV), Input Interface : Mic 1:6 35mm, Mic 2/Line 3: XLR/6.35mm.Line 1& 2 RCA, Output Interface : 4-16Ohms, 70V, 100V, 6-Zones 100V, 6 zone output and 150/500W total power, Signal to Noise Ratio : Mic: >80dB, Line: > 85dB etc. complete as per required.				
72	SITC of 8 in 8 out Digital Signal Processor : DSP with 08AEC Mic/Line Inputs, 8 Line outputs, Bidirectional USB for Software based VC as well as for Playing Digital audio, Other features includes Automatic Mixing Console, Adaptive feedback cancellation, Noise suppression, PEQs, GEQs, Compressor, Limiter etc. 8 Port Freely configurable GPIO, Configurable thru software etc. complete as per required.	1.00	Each	168982.00	168982.00
73	SITC of HDMI 2.0 HDBaseT Extension Set, Extend HDMI 2.0 signals up to 4K@60Hz / 4:4:4 up to 70m (4K 40m / 1080P 70m), Complete set Includes TX, RX, power supply, and IR flasher/emitter, Extends bi-directional IR. Flexible PoC (Power on either end), Supports HDR10, HDCP 2.2 compliant, Flexible power design (use power supply at TX or RX) etc. complete as per required.	5.00	Each	47904.00	239520.00
74	SITC of four input by four output HDMI 2.0b matrix switcher with HDCP 2.2 support and capable of handling resolutions up 4K@60Hz 4:4:4 / 8 bit color with HDR output support for each channel. The matrix shall feature advanced independent EDID management control for each HDMI.The switcher shall have individual scaler control on each output port. The digital audio outputs can be set to follow the HDMI video route or can be independently routed either by API or web control interface. The 4x4 switcher can be controlled via front panel buttons, front panel IR, external IR, remote IR, RS232, and Ethernet. etc. complete as per required.	1.00	Each	52259.00	52259.00
75	Supply, Installation, Testing & Commissioning of PC with dual HDMI output, 2nos. Of USB3.0 port, 2 no. of USB2.0 port, i7 processor, 16GB RAM, 256GB Sata hard disk, with power supply, etc. complete as per required.	1.00	Each	110735.00	110735.00

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	Class Room				
76	Supply , installation , testing and commissioning of full range ceiling mounted music and PA loudspeaker. The loudspeaker shall meet the following performance criteria: Usable Frequency range (-10 dB) of 83Hz to 19kHz; Power handling of 80 Watt peak; Nominal Coverage Angle (1 – 4 kHz) 150°; Sensitivity of 86 dB SPL and Max SPL of 105 dB SPL peak; Nominal impedance of 16 ohms and Integral multi-tap Transformer with selectable tap settings of 2/4/8/16W@70V & 100V. The loudspeaker system shall be comprised of a 2.25-inch woofer; enclosed in engineered-plastics with integrated steel backcan and a powder-coated steel grille. UL-1480 rated and EN54-24 compliant for Life safety/VA applications etc. complete as per required. .	16.00	Each	18212.00	291392.00
77	SITC of smart mixer amplifier high impedance Class D, with Amplifier Power as 2 x 160 W @ 4Ω ; Frequency Response - 20 Hz - 20 kHz ; THD+N ≤0.5 % (at full rated power); Channel Separation (Crosstalk) ≤ -58 dBu, Dynamic Range 88 dB or better; A/D and D/A Converters - 24-bit / 48 kHz; Audio Latency - 10.4 ms - (any input to speaker output or aux output) ; Audio Inputs : Line Inputs (2) balanced, (2) unbalanced; Page Inputs (1) balanced mic/line, Embedded quick-start QR code in the OLED screen simplifies installation Up to 30 selectable EQ presets ensure sound performance and long-term reliability, mixer amplifier must have Bluetooth 5.0 connectivity and RCA connectivity—no wire splicing required, Indicators & Controls: Power LED, Input Signal LED, Output Limit LED, Bluetooth LED, Display OLED, 16-bit grayscale, 96 × 96 resolution. Mains Voltage 100 VAC – 240 VAC (±10%, 50/60 Hz) etc. complete as per required.	2.00	Each	144782.00	289564.00
78	Supply , installation , testing and commissioning of Conferencing digital audio DSP with 32-bit fixed/floating-point DSP 456 MHz/ARM Cortex-A8 600 MHz processor or better with following features and specifications are required: The audio DSP shall have 12 analog balanced mic/line level inputs and 8 balanced output channels & 8 additional digital output channels on an RJ-45 jack. Each	2.00	Each	462208.00	924416.00

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	independently controllable. The DSP shall contain 12 channels of acoustic echo cancellation (AEC), with multiple references, routable to analog and/or Dante® inputs. The DSP shall have Dante 64 × 64, primary/secondary, an Ethernet connection for control and programming on an RJ-45 jack, USB audio Micro-B type, stereo in/out, Audio Latency 1.05 ms (analog in to analog out, without AEC) or less, DSP shall have GPIO – 5 x 5 general-purpose control, Phantom Power +48 VDC, software selectable per input, RS-232/485 ports: RS-232 (DTE) and RS-485 for control devices, DSP shall have Display 256 x 64 OLED with rotary encoder, LED Status Indicators Power/Status, Audio Signal Indication On Display, The audio DSP shall include configurable signal processing, like signal routing and mixing, equalization, filtering, dynamics, delay, room combining, as well as control, monitoring, and diagnostic tools. The audio DSP shall control and proxy all expansion devices and other Dante® endpoints. DSP shall have 2-line VoIP supports all popular codecs and PSTN connection (RJ-11) for worldwide POTS/analog telephone systems. It shall have following specs : Frequency Response: 18 Hz to 20 kHz, THD+N < 0.003%, Channel Separation (Crosstalk) < -105 dB, Dynamic Range > 115 dB, A-weighted, analog input to analog output etc. complete as per required.				
79	SITC of Wireless Headset System With a range of up to 300 feet (100m) 14 hours of power from a single pair of AA batteries, SYSTEMS EXPANSIONS – Run up to 12 channels per frequency band etc. complete as per required.	2.00	Each	37835.00	75670.00
80	Supply , installation , testing and commissioning of Wireless hand held mic,Power and battery status LED Adjustable gain control Quick and easy frequency matching AA batteries (included) provide up to 14 hours of continuous use, 100 m (300 ft) operating range (line of sight) Integrated microphone capsule design -10 dB gain attenuationW ireless Handheld Mic set etc. complete as per required.	2.00	Each	34648.00	69296.00
81	SITC of bezel less active LED AIO (All in one)of size 216" Diagonal or better having	2.00	Each	3095960.00	6191920.00

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Pixel Pitch 1.25 mm or better ,Resolution-3840 x 2160 (4K) , Brightness-800 nits, contrast ratio: 20000:1, Technology-COB/Flipchip/Micro, Refresh Rate-3840Hz, color processing-up to 16 bit,viewing angle-170 X170,Lifetime = 100000 hrs ,Average Power consumption-- 1.3Kw, service access-front , Inbuilt Controller having -OS- Andriod 13, RAM-8 GB , Storage -64 GB,CPU--Octacore(4 cortex x A76 + 4 cortex X A55), wifi, Bluetooth,Inbuilt min. 100 watt speaker, Input port - HDMI x 4, USB 2.0 x1, USB 3.0 x2, Audio In x 1, USB type C x1, USB type B Out X1, HDMI out x 1, Audio out x 2, RS232x1,RJ45 x2, POE port , OPS slot x1, OPS -optional (optional- having CPU-window based intel core I5-1240 P, RAM -16 GB, SSD-256 GB, HDMI In x 2, USB x2, PC interface 40 Pin)) , ,Accessories- Remote , wall mounted bracket, Operational Hour-24 x7 ,Inbilt Capability to Process 4 HDMI Input signal on single screen ,support simultaneous display of upto eight connected devices and auto-brightness adjustment, dust protection, moisture protection, scratch protection, easy to clean and maintain, better heat disipation, MII,BIS, OEM should have own manufacturing facility in India and same factory address mentioned in BIS, should have ISO 9001,14001,27001,45001,E waste CPCB , Brightness measurement tool minimum a luminance meter (which can provide direct brightness reading in cd/m²) testing instrument for brightness measurement of offered LED screen. They should provide details (Model No. & Date of Purchase) of the luminance meter available with them in India along with its latest calibration certificate. (Please note- Illuminance meters like LUX meter are not acceptable as they are not for measuring emitted light), OEM Should have registered office in India from last 15 years, factory certificate attached with Bid, OEM should have 800 Cr turnover from last 3 years, OEM should have experience of installation min. 10 indoor LED installation in consignee state in any Govt / PSU dept. and having installation experience min. 100 indoor LED wall in India in any Govt / PSU dept., Warranty-3 Years. etc. complete as per required.				
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82	Supply, Installation, Testing and commissioning of a Digital Podium. The podium is to include essential features such as a 21" Finger-touch Monitor with Motorised Angle Adjustment, and a Switcher enabling seamless transitions between PC, Laptop, and Visualizer inputs for screen output. Additionally, the podium should incorporate a USB Port for Pen Drive connectivity, a Power Plug for Laptop compatibility, and an Audio system comprising 1 x Gooseneck Microphone. The tender also encompasses the provision of complete accessories necessary for installation and operation. etc. complete as per required.	2.00	Each	274293.00	548586.00
83	Supply, installation, testing and commissioning of camera that should support minimum resolution: Full HD Resolution providing resolution up to 1920x 1080P with a frame rate up to 60fps, Lens: Panasonic 1/2.8" high-quality CMOS sensor (2.07MP), Optical Zoom: 20x providing a horizontal field of view range between 6.3° (tele) to 72.5° (wide), Multiple AV Outputs: Ability to Send Simultaneous Audio and Video outputs at the same time - HDMI, SDI, USB3.0 and LAN ports etc. complete as per required.	2.00	Each	223061.00	446122.00
84	SITC of 4x2 collaboration matrix switcher TX-RX Kit .The kit shall support 3 USB host and 8 USB peripheral. The Transmitter shall have 2 USB HOST- 1 USB-C (with 60w charging) and 1 on USB-B 3.0. and 1 USB - B 3.0 host shall be on the reciver. There shall be 1 HDMI input on transmitter and 2 HDMI in on the receiver. There shall be 1 HDMI loop out on the transmitter and 2 HDMI out on the receiver. The comunication between the transmitter and receiver shall be on HDBT 3.0. There shall be audio out on both transmitter and receiver. there shall be push butons on txmister and receiver for controlling. The system shall be controllabel over the LAN(webpage) and RS-232 port for 3rd party control system. The system shall support resolution upto 4K60 and USB 2.0 High speed with Isochronous support for max camera compatibility. The system shall also support USB3.0 Hub and switching auto switches for BYOM environments.etc. complete as per required.	2.00	Each	190447.00	380894.00

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85	Analog Stereo Audio Balun-2 RCA female to RJ45 connector etc. complete as per required.	2.00	Each	11688.00	23376.00
86	SITC OF 2 core 16 AWG/1.5 Sq mm, Twisted, unshielded Speaker cable with stranded annealed bare copper conductors, Semi-rigid PVC insulation etc. complete as per required.	2.00	Each	148.00	296.00
87	SITC of 2 core Twisted, shielded balanced Audio and control cable with 22AW G or better 7 strand annealed bare copper conductors, Semi-Rigid PVC insulation, Riser rated PVC jacket. UL 444, UL 13 CMR rated etc. complete as per required.	200.00	Meter	97.00	19400.00
88	SITC of 3m 18G HDMI Active Cable/ Gold Plated & LGrip-Connector/ Oxygen Free Copper. Supports 21:9 true Cinema etc. complete as per required.	2.00	Each	2922.00	5844.00
89	Supply , installation , testing and commissioning of 2m 18G HDMI Cable with Ethernet, Gold Plated & L Grip Connector/ Oxygen Free Copper.Supports 21:9 True Cinema, eARC Support etc. complete as per required.	12.00	Each	2399.00	28788.00
90	SITC of 4 pair shielded/foiled TIA/EIA-568-C Category 6A cable with 23AW G or better Solid annealed bare copper conductors,High-density polyethylene insulation, Flame rated PVC jacket, Overall aluminum/poly foil shield with drain, NEC CMR, CEC CMR FT4, RoHS compliant etc. complete as per required. .	100.00	Meter	245.00	24500.00
91	SITC of 2m USB 3.1 C to C (Male) Molded Cable With Charging(100W) etc. complete as per required.	2.00	Each	5363.00	10726.00
92	SITC of USB 3.0 A to A (Male) Molded Cable - 6ft etc. complete as per required.	4.00	Each	997.00	3988.00
93	SITC of USB 3.0 A to B (Male) Molded Cable - 6ft etc. complete as per required.	2.00	Each	810.00	1620.00
94	SITC of USB 3.0 A to B (Male) Molded Cable - 15ft etc. complete as per required.	2.00	Each	1802.00	3604.00
95	SITC of USB 2.0 A(M) to Micro-B(M) etc. complete as per required.	2.00	Each	3944.00	7888.00
	Sub Head-8 (VRV/VRF System)				
1	Outdoor Unit:-				
	Supply, Installation, Testing & Commissioning of Modular type Variable Refrigerant Flow/Variable Refrigerant Volume air cooled				

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	Outdoor units suitable for cooling/heating having 100%hermetically sealed inverter type twin Rotary/Scroll Compressor(s),minimum two compressors (with individual separate PCB) for above 14HP modules, microprocessor based Controller, top discharge type condensing unit(s), withR-410-A Refrigerant or equivalent, vibration Isolators with suitable foundation etc. complete as required. To have better efficiency condenser fan shall be capable to operate at different speed with respect to load. The unit shall deliver therated capacity and in confirmation as per IS 18728:2024 and CPWD Specifications and work even at 50°C ambient temperature without tripping. The system shall be able to deliver 100% of the rated capacity upto 39 Degree Celcius. The unit shall be suitable to work on 400V +/- 10%, 3Phase, 50Hz AC power supply and BMS compatible. The units hall be filled with first charge of the refrigerant and ready for use as required. The condenser should be coated with a hydrophilic film to prevent water accumulation on the surface of the heat exchanger, enhance water dispersion, and reduce the risk of degradation, thereby improving overall performance and durability. The Indian Seasonal Energy Efficiency Ratio(ISEER) of the unit shall be as per Energy Conservation and Sustainable Building Code (ECSBC) 2024 as below and complete as per CPWD specification, connections, interconnections etc. as required. (For capacity <40 kWr ISEER6.4, Capacity > 40 and <70 ISEER 6.5, Capacity > 70 ISEER6.6 for ECSBC+ Building) For Cooling or Heating or Both				
	For Cooling or Heating or Both				
	(a) 14 HP to 22 HP	570.00	Per HP	20385.00	11619450.00
	(b) 10 HP to 12 HP	32.00	Per HP	21422.00	685504.00
2	Horizontal Floor Mounted AHUs				
	Supply, installation testing and commissioning of factory fabricated double skinned Dx Cooling Coil Air handling unit horizontal type fabricated out of extruded aluminium section with 0.6 mm Pre. coated GI sheet at outside & 0.6 mm Aluzinc/ plain Galvanised steel sheet inside, 48+/- 2 mm panels with polyurethane foam having zero Ozone Depletion Potential				

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	substance insulation factory injected between them by injection molding machine with framework for each section should bolted together with soft rubber gasket in between to make the joint airtight , with Single/ Multiple DIDW Fans with AMCA certified for air and sound with EC Motors suitable for operation on 415 volts + 10%, 50 Hz + 5% AC supply, 6 Row cooling coil coated with premium high performance chemical coating for corrosion resistance made of aluminium finned copper tube with coil section, pre - filter section with prefilters , fine filter section with MERV 13 filters as per specifications in extruded aluminium frame in supply after fan, stainless steel drain pan made out of 18 G sheet duly insulated with 19mm nitrile rubber and density of insulating material with diamond cut drain slope . The AHU panels shall be insulated with 48±2 mm thick & 40 Kg/m3 density PU foam.The motor & blower assembly shall be mounted on aluminium extruded section only. The complete AHU shall conform to specification and shall be complete with mixing box . The face velocity across cooling coil shall be limited to 152 MPM maxm. Units shall be with thermal break profile and Eurovent/ AHRI certified . The capacity of Air- handlers shall be as follows and other details as per specifications :				
(a)	11000 CFM Static Pressure 65mmwg (vertical)	4.00	Nos.	803323.00	3213292.00
(b)	15000 CFM Static Pressure 65mmwg	2.00	Nos.	994436.00	1988872.00
(c)	12000 CFM Static Pressure 65mmwg	1.00	Nos.	820599.00	820599.00
(d)	10000 CFM Static Pressure 65mmwg (vertical)	2.00	Nos.	719104.00	1438208.00
3	Supply, Installation, Testing and Commissioning of following minimum capacity 4 way Cassette Type Indoor ceiling mounted unit equipped with synthetic washable media pre filter, fan section with low noise fan/dynamically balanced blower, multispeed motor, coil section with DX Copper coil, electronic expansion valve, outer cabinet, drain pump, grill, necessary supports, vibration Isolation, Corded remote control etc., suitable for operation on single phase 230 V ± 10%, 50HzAC supply, complete, as required. The Indoor units must shutdown upon receiving a signal from the BMS System/Fire Signals. The system shall be capable to adjust air flow as per				

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	room requirement in auto mode. The cooling capacity of indoor unit will be at air inlet conditions of 27 Degree C DB and 19Degree C WB temperature.				
(a)	1.0 TR	6.00	Nos.	27880.00	167280.00
(b)	1.6 TR	2.00	Nos.	39464.00	78928.00
(d)	2.6 TR	6.00	Nos.	40814.00	244884.00
(e)	3.6 TR	30.00	Nos.	44269.00	1328070.00
(f)	4.1 TR	4.00	Nos.	45781.00	183124.00
(g)	4.6 TR	4.00	Nos.	52799.00	211196.00
4	Supply, Installation, Testing and Commissioning of following minimum capacity and external static pressure VRF/VRV ceiling mounted mid high static ductable type 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, drain pump, other necessary supports etc., suitable for operation on single phase AC supply 230 V $\pm$ 10%, 50 as required. The Indoor units must shut down upon receiving a signal from the BMS System/Fire Signals. The system shall be capable to adjust air flow as per room requirement automatically. The cooling capacity of indoor unit will be at air inlet conditions of 27 Degree C DB and 19 WB temperature. High Static Ductable units (minimum 49 to 77 Pascal external static pressure)				
(a)	4.0 TR	3.00	Nos.	45997.00	137991.00
5	Supply, Installation, Testing and Commissioning of following minimum capacity and external static pressure VRF/VRV ceiling mounted high ductable type 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, drain pump, other necessary supports etc., suitable for operation on single phase AC supply 230 V $\pm$ 10%, 50 as required. The Indoor units must shut down upon receiving a signal from the BMS System/Fire Signals. The cooling capacity of indoor unit will be at air				

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	inlet conditions of 27 Degree C DB and 19 Degree C WB temperature.				
	High Static Ductable units (minimum 78 Pascal external static pressure)				
	(a) 8.0 TR	1.00	Nos.	85191.00	85191.00
6	Supply, installation and commissioning of VRV/VRF central controller featuring an array of simple, useful system management functions for added value and shall be touch type and complete in all respect including control wiring, interface module.	2.00	Nos.	26400.00	52800.00
7	Supply, Installation, Testing and Commissioning of Y/T/Multi Joints. Joints shall be of same Original Equipment Manufacturer (OEM) make as of ODUs and IDUs				
(a)	Indoor Units	48.00	Nos.	4535.00	217680.00
(b)	Outdoor Multi Joints	18.00	Nos.	8098.00	145764.00
8	Supply, installation, testing & commissioning of BHF Kit for Outdoor Units etc. complete as reqd.	31.00	Nos.	19975.00	619225.00
9	Supply and installation of Expansion Kit for connecting AHU With Out door Units etc. complete as reqd.	9.00	Set	53123.00	478107.00
10	Supply, Installation, testing and commissioning including vacuumization and Nitrogen testing of following nominal sizes of soft/hard drawn copper refrigerant piping for VRV/VRF system, complete with fittings, with suitable adjustable ring type hanger supports, jointing/brazing including accessories, insulated with XPLE Class-O tubular insulation/with Class-O closed cell elastometric nitrile rubber tubular sleeves sections of 19 mm thick insulation as given below for Suction and Liquid lines, all accessories as per specifications etc. as required :				
(a)	6.4 mm dia (OD) (Soft drawn) with tube thickness 1.2 mm with tube thickness 1.2 mm	350.00	mtrs	256.00	89600.00
(b)	9.5 mm dia (OD) (Soft drawn) with tube thickness 1.2 mm with tube thickness 1.2 mm	300.00	mtrs	346.00	103800.00
(c)	12.7 mm dia (OD) (Soft drawn) with tube thickness 1.2 mm with tube thickness 1.2 mm	180.00	mtrs	487.00	87660.00
(d)	15.86 mm dia (OD) (Soft drawn) with tube thickness 1.2 mm with tube thickness 1.2 mm	300.00	mtrs	615.00	184500.00
(e)	19 mm dia (OD) (Hard drawn) with tube thickness 1.2 mm with tube thickness 1.2 mm	200.00	mtrs	739.00	147800.00

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(f)	22.2 mm dia (OD) (Hard drawn) with tube thickness 1.2 mm with tube thickness 1.2 mm	750.00	mtrs	904.00	678000.00
(g)	28.58 mm dia (OD) (Hard drawn) with tube thickness 1.2 mm with tube thickness 1.2 mm	750.00	mtrs	1157.00	867750.00
(h)	34.9 mm dia (OD) (Hard drawn) with tube thickness 1.62 mm with tube thickness 1.62 mm	200.00	mtrs	1286.00	257200.00
(i)	41.27 mm dia (OD) (Hard drawn) with tube thickness 1.62 mm with tube thickness 1.62 mm	300.00	mtrs	1368.00	410400.00
11	Supply, installation, testing and commissioning of UPVC pipes having thermal stability for condensate water including wrapping of 6mm thick class 0 nitrile rubber insulation with suitable adhesive with all UPVC plain and brass threaded fittings including the pipes with clamps 1metre spacing. This including jointing of pipes with one step UPVC solvent cement and testing of joints complete etc. as required.				
	(a) 65 mm dia	50.00	Mtrs.	1561.00	78050.00
	(b) 50 mm dia	100.00	Mtrs.	929.00	92900.00
	(c) 40 mm dia	200.00	Mtrs.	731.00	146200.00
12	Supplying, installation, balancing and commissioning of factory fabricated GSS sheet metal rectangular/ round ducting complete with neoprene rubber gaskets, elbows, splitter dampers, vanes, hangers, supports, bends, transitions, reducers, end caps, collars etc as required complete in all respect in confirmation to IS : 655 and approved drawings and specifications of following sheet thickness complete as required.				
(a)	Thickness 0.63 mm sheet	550.00	Sqmt.	1191.00	655050.00
(b)	Thickness 0.80 mm sheet	1100.00	Sqmt.	1382.00	1520200.00
(c)	Thickness 1.00 mm sheet	450.00	Sqmt.	1488.00	669600.00
(d)	Thickness 1.25 mm sheet	150.00	Sqmt.	2013.00	301950.00
13	Supplying, installation, testing and commissioning of GI volume control duct damper complete with neoprene rubber gaskets, nuts, bolts, screws linkages, flanges etc in confirmation to SMACNA/IS and as per specifications complete etc. as required	10.00	Sqmt.	7580.00	75800.00
14	Supplying, Fixing, installation, testing and commissioning of powder coated extruded aluminium Supply Air Grills with aluminium volume control dampers in confirmation to SMACNA/IS and as per specifications complete etc. as required	50.00	Sqmt	9623.00	481150.00

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15	Supplying & fixing of powder coated extruded aluminium Return Air Grills with louvers but without volume control dampers complete in confirmation to SMACNA/IS and as per specifications complete etc. as required.	50.00	Sqmt	6285.00	314250.00
16	Supplying, Fixing, installation, testing and commissioning of supply air diffusers of powder coated aluminium with aluminium volume control dampers with anti smudge ring & removable core in confirmation to SMACNA/IS and as per specifications complete etc. as required	30.00	Sqmt	12841.00	385230.00
17	Supplying, Fixing, installation, testing and commissioning of Return air diffusers of powder coated aluminium without volume control dampers with anti smudge ring & removable core in confirmation to SMACNA/IS and as per specifications complete etc. as required	30.00	Sqmt	8595.00	257850.00
18	Supplying, Fixing, installation, testing and commissioning of thermal insulated flexible duct of following sizes duly supported at regular interval as per site requirement etc. in confirmation to SMACNA/IS and as per specifications complete etc. as required.				
(a)	200 mm dia	40.00	Mtr.	633.00	25320.00
19	Supplying, Fixing, testing and commissioning of fire dampers of minimum 90 minutes fire rated in supply air duct/main branch and return air path as and where required of required sizes i/c control wiring, the damper shall be motorized and spring return so as to close the damper in the event of power failure automatically and open the same in case of power being restored. The spring return action shall be inbuilt mechanism and not externally mounted. The damper shall also be closed in the event of fire signal and, in confirmation to IS and as per specifications complete etc. as required				
(a)	Fire Damper	15.00	Sqmt	11355.00	170325.00
(b)	Actuator	25.00	Each	10645.00	266125.00
20	Supplying 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 ³ , with 25 mm X 25 mm GI section of 1.25 mm thick, at 600 mm centre to centre covered	100.00	Sqmt	890.00	89000.00

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	with Reinforced Plastic tissue paper and 0.5 mm thick perforated aluminium sheet fixed to inside surface of ducts with cadmium plated nuts, bolts, stick pins, CPRX compound in confirmation to SMACNA/IS and as per specifications complete etc. as required.				
21	Supplying, fixing acoustic lining on wall and ceiling of AHU rooms with 50mm thick, density 32 kg/cu.m resin bonded glass fiber insulation friction fixed in 610mm x 610 mm frame work made of 25X50X50X50X25 mm made out of 0.6mm thick GI sheet U shaped channel and covered with reinforced fiber glass tissue and finished with 0.80 mm perforated aluminium sheet etc. complete as required and as per specifications	50.00	Sqmt	1057.00	52850.00
22	Supply and drawing of following sizes of Heavy duty Industrial Flexible cables, PVC insulated, and FRLS round sheathed with multi core bright annealed bare copper conductor suitable for rated voltage of 1.1 KV grade, ISI marked conforming to IS:694:2010 with latest amendments in existing steel/PVC conduit/trunking/pipe etc. as required.				
(a)	3C x 1.5 sq. mm	500.00	Mtr	251.00	125500.00
(b)	3C x 6 sq. mm	500.00	Mtr	821.00	410500.00
	AHU starting Panels with VFD				
23	Supply, Installation, testing and commissioning of indoor (IP42) cubical type panel wall mounted totally enclosed, with following accessories for 3 phase, 415 V + 10 %, 50 Hz AC System for Ambient temperature -5°C to +40°C, fabricated in compartmentalized designed made of CRCA sheet steel of 2.0mm thick for framework & covers, 3 mm thick for gland plate i/c cleaning & finishing complete with 9 tank process for powder coated of approved shade (RAL 7032-Siemens gray or as approved by Engineer-in-Charge), having front access, having suitable current carrying capacity, extensible TPN Aluminum alloy bus bar of high conductivity, DMC/SMC bus bar supports, fabrication shall be done in transportable section, panel shall have 2 nos. earth studs of minimum size of 25mm x 5mm & connections/ interconnections, earthing, etc. complete with control wiring, proper earthing, testing, commissioning and all accessories required for satisfactory operation, suitable for				

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	operation etc as required at site. (Note all the MCCB should be Ics=100% Icu & shall be provided with standard spreader terminals) (depth not less than 300 mm)				
	Bus Bar - 400 Amp 4Pole AL.				
	1 No. 250A 25 kA FP thermal magnetic release type MCCB (Ics= 100% Icu, Adjustable O/I & Adjustable S/C) as Incomer				
	1 set of suitable size current transformer,				
	1 set of digital ammeter, digital Voltmeter & RYB phase indication lamps,				
	2 no. 22.0 KW VFD suitable for 415 V, 3-phase, 50 Hz supply with all in-built protections,				
	2 No. Star delta starter with suitable rating contactors, Timer, SPP & start and stop push buttons,				
	VFD and Star Delta starter bypass arrangement with electrically and mechanically interlocked contactors,				
	2 No. VFD & Star Delta starter Bypass selector switch,				
	2 No. Auto/Manual selector switch,				
	2 set of fault and run indication lamps,	3.00	Set	176515.00	529545.00
24	Supply, Installation, testing and commissioning of indoor (IP42) cubical type panel wall mounted totally enclosed, with following accessories for 3 phase, 415 V + 10 %, 50 Hz AC System for Ambient temperature -5°C to +40°C, fabricated in compartmentalized designed made of CRCA sheet steel of 2.0mm thick for framework & covers, 3 mm thick for gland plate i/c cleaning & finishing complete with 9 tank process for powder coated of approved shade (RAL 7032-Siemens gray or as approved by Engineer-in-Charge), having front access, having suitable current carrying capacity, extensible TPN Aluminum alloy bus bar of high conductivity, DMC/SMC bus bar supports, fabrication shall be done in transportable section, panel shall have 2 nos. earth studs of minimum size of 25mm x 5mm & connections/ interconnections, earthing, etc. complete with control wiring, proper earthing, testing, commissioning and all accessories required for satisfactory operation, suitable for operation etc as required at site. (Note all the				

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	MCCB should be Ics=100% Icu & shall be provided with standard spreader terminals) (depth not less than 300 mm)				
	Bus Bar - 400 Amp 4 Pole AL.				
	1 No. 250A 25 kA FP thermal magnetic release type MCCB (Ics= 100% Icu, Adjustable O/I & Adjustable S/C) as Incomer				
	1 set of suitable size current transformer,				
	1 set of digital ammeter, digital Voltmeter & RYB phase indication lamps,				
	3 no. 15.0 KW VFD suitable for 415 V, 3-phase, 50 Hz supply with all in-built protections,				
	3 No. Star delta starter with suitable rating contactors, Timer, SPP & start and stop push buttons,				
	VFD and Star Delta starter bypass arrangement with electrically and mechanically interlocked contactors,				
	3 No. VFD & Star Delta starter Bypass selector switch,				
	3 No. Auto/Manual selector switch,				
	3 set of fault and run indication lamps,	1.00	Set	142064.00	142064.00
	MECHANICAL VENTILATION WORK				
25	Supply , installation , testing and commissioning , of duct mounted circular / rectangular direct inline fans complete with TEFC squirrel cage induction motor with protection class -IP 44, efficiency class STD with B class insulation, suitable for operating temperature for normal ventilation -20 to + 55 degree centigrade, direct drive arrangement , heavy gauge sheet metal casing manufactured from corrosion resistant pressed galvanised sheet steel, rubber isolator mounts and other accessories. Thickness of the casing shall not be less than: For Dia (300 to 650) mm – 2mm, Dia (700 to 1140) mm – 3 mm, Dia (1200 to 1400) mm – 4mm & Dia 1600 – 5 mm. The fan shall be complete in all respect and should match the specification ,Drawings and Schedule. Inline fans shall be of following capacities				
(a)	<u>Toilet Exhaust Inline Ventilation fan</u>				
	Air Qty. = 400 CFM				
	Static Pressure = 10 mm Wg				
	Fan Speed = not exceeding 2500 rpm				

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	Motor = 0.14 KW, 2 Pole, 1 Phase				
	Noise level = not exceed 57 db at 3 meter distance	1.00	Nos.	17377.00	17377.00
(b)	<u>Toilet Exhaust Inline Ventilation fan</u>				
	Air Qty. = 800 CFM				
	Static Pressure = 10 mm Wg				
	Fan Speed = not exceeding 2600 rpm				
	Motor = 0.30 KW, 2 Pole, 1 Phase				
	Noise level = not exceed 90 db at 1 meter distance	13.00	Nos.	27166.00	353158.00
26	Supply, installation, testing and commissioning of direct driven Vane Axial flow fan with smoke spill motor (Motor should completely be accommodated inside the fan casing, suitable for operating temperature for normal ventilation at -20 to + 55 degree centigrade & for a minimum of 250 Deg C for a minimum of 2 Hrs. in case of fire i.e. high temp. application, with protection class -IP 55) as per the specifications enclosed. The fans should be AMCA certified for air performance and fan Efficiency Grade (Min FEG 71, lesser is not acceptable). Thickness of the casing shall not be less than: For Dia (300 to 650) mm – 2mm, Dia (700 to 1140) mm – 3 mm, Dia (1200 to 1400) mm – 4mm & Dia 1600 – 5 mm. Fan should be selected for maximum efficiency. The fan Motor shall be of efficiency class IE3 with "H" class insulation motor shall be CE labeled. Fan Efficiency shall not be less than 65%. All fans after assembly shall be dynamically trim-balanced to ISO1940 and AMCA 204/3 - G2.5 quality grade. Outlet velocity of the fans should not exceed 12-13 m/s for normal application.				
(a)	<u>Ventilation (In Case of Fire)</u>				
	Air Qty. = 4000 CFM				
	Static Pressure = 20 mm Wg				
	Fan Speed = not exceeding 1450 rpm				
	Motor = 1.1 KW, 4 Pole, 3 Phase				
	Noise level = not exceed 66 db at 3 meter distance	20.00	Nos.	112825.00	2256500.00
27	Supply, installation, testing and commissioning of direct driven Vane Axial flow fans (Motor should completely be accommodated inside the fan casing manufactured from corrosion resistant pressed galvanised sheet steel, suitable				

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	for operating temperature for normal ventilation at -20 to + 55 degree centigrade & with protection class -IP 55) as per the specifications enclosed. The fans should be AMCA certified for air performance and fan Efficiency Grade (Min FEG 71, lesser is not acceptable). Thickness of the casing shall not be less than: For Dia (300 to 650) mm – 2mm, Dia (700 to 1140) mm – 3 mm, Dia (1200 to 1400) mm – 4mm & Dia 1600 – 5 mm. Fan should be selected for maximum efficiency. The fan Motor shall be of efficiency class IE3 with "F" class insulation. Fan Efficiency shall not be less than 65%. All fans after assembly shall be dynamically trim-balanced to ISO1940 and AMCA 204/3 - G2.5 quality grade. Outlet velocity of the fans should not exceed 12-13 m/s for normal application.				
(a)	<u>Passenger Lift well Pressurization</u>				
	Air Qty. = 7500 CFM				
	Static Pressure = 20 mm Wg				
	Fan Speed = not exceeding 1450 rpm				
	Motor = 2.2 KW, 4 Pole, 3 Phase				
	Noise level = not exceed 73 db at 3 meter distance	3.00	Nos.	128611.00	385833.00
(b)	<u>Goods Lift well Pressurization</u>				
	Air Qty. = 10000 CFM				
	Static Pressure = 20 mm Wg				
	Fan Speed = not exceeding 1450 rpm				
	Motor = 3.7 KW, 4 Pole, 3 Phase				
	Noise level = not exceed 74 db at 3 meter distance	1.00	Nos.	190285.00	190285.00
28	Fabrication, Installation, Testing and Commissioning of Wall Mounted with locking arrangement, totally enclosed, dust, vermin proof and outdoor type Feeder Pillar (IP54) of suitable size fabricated out of 2 mm thick cold rolled close annealed, sheet steel, powder coated paint of approved shade after 7 tank treatment process and 2 nos 20x3mm GI strips throughout the width of feeder pillar consisting two earth studs on each strip complete with following incoming and outgoing switchgears including making connections/ inter connections with lugs/ thimble for switch gears and control wiring with 2.5 sq.mm PVC insulated FRLS copper conductor cable. (Drawing shall be got approved from Engineer				

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	in charge before fabrication, (MCCB's Ics=100 %Icu)				
	<u>Incoming:-</u>				
(a)	63 Amp, 10 KA 'C' curve DP MCB, Digital voltmeter with selector switch, Ammeter with selector switch & CT's etc LED type RYB Indicating lamps, ON, OFF, trip, LED indicating lamps.				
	<u>Outgoing:-</u>				
	40 Amp, 10 KA 'C' curve TP MCB, DOL starter with single phase preventer suitable for 5 HP motor with all protection but without thermal overload protection including relay, contactor, push button etc and internal wiring required for automatic operation, selector switch for local / remote, auto/ manual / OFF operation etc	24.00	Nos.	21055.00	505320.00
29	Supplying, installation, testing & commissioning of LPCB/ BRE approved fire survival armoured cables, as per B5 7846, fire test as per B5 6387, copper conductor mica tapped, flame barrier, XLPE insulation, halogen free inner & outer sheathed (1000 V), LPCB certified power cable must survive upto 950 C for min. 3 hrs etc. as required.				
	(a) 3C x 4 Sq mm	500.00	Mtr.	481.00	240500.00
	(b) 3C x 6 Sq mm	500.00	Mtr.	636.00	318000.00
	Sub Head- 9 (Water Coolers)				
1	SITC of 60 Liters/Hr cooling capacity with inbuilt 50 Liters Per Hour RO Purification System with auto sanitization with min.7 stage purifications & storage capacity of 120 LTR:				
	(a) Cooling Water Storage Capacity. : 120 Ltr				
	(b) Normal water storage capacity: 8 Ltr Online				
	(c) Water Cooling Rate 60 LPH				
	(d) Water Inlet Colling Adjustment Temperature: 13.5 °C Adjustable				
	(e) No. Of Faucets : 3				
	(f) Water Recovery: More than 60%				
	(g) Outer Body Material- Tank/Cooler: SS204 cu/SS304 or better				
	(h) Storage Tank/Cooler Material : SS304 or better				
	(i) Refrigerant : R-134 A or equivalent				
	(j) Operating Voltage :230+-10% V AC,50 Hz				

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	(k) Power Consumption: Max. 700W				
	(l) Type of water purification technology: RO + UV				
	(m) Purification Capacity. : Min.50 Liters/Hour				
	(n) Purification Stages : Min Seven stage filtration process				
	(o) Sediment Filter: Dedicated 10 micron 20" filter				
	(p) Carbon Filter: Activated Carbon Block- 10 micron 10" filter				
	(q) Water Saver Cartridge: 10" Nova Cartridge				
	(r) Taste Enhancer Cartridges: PH Correction Cartridge				
	(s) RO Membrane: 300X 1 + 100X 1 GPD				
	(t) Purification Stages : Min 7 stage filtration process with required Technology	3.00		122200.00	366600.00
	Sub Head-10 (Addressable Emergency Lighting System & Exit Signages)				
1	Supply, installation, testing and commissioning of Addressable TCP/IP enabled Emergency Lighting control Panel (Approved as per BS EN 60598) with 2 lines 160/400 luminaire circuit self-test system using self contained luminaires, each circuit with maximum 80/200 luminaires, Circuit length 1000 meters & locally. LCD screen display of 320*480 with keypad to operate & test all addressable luminaires. Automatic function test and duration test of luminaires with search function which require no manual addressing. Automatic e-mail dispatch if faults occur. Panel should monitor lamp, communication, battery & test failure. Electronic log book storage for a period of 4 years. Degree protection IP20. The Panel shall comply as per technical specifications. Certification - EN62368 certified.	1.00	Each	270678.00	270678.00
2	Supply, installation, Testing & Commissioning of Addressable LED self-contained luminaire - suitable for open area / escape route illumination as per NBC2016 standards. Automatic test for reduced inspection effort, Simple fault analysis and status display via bicolor LED. Housing material Polycarbonate (850 °C glow wire resistant), Ingress protection IP44, Built in lithium battery with 3 hours battery back-up. Certification - EN 60598 & BIS certified.	20.00	Each	11776.00	235520.00

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3	Supply, Installation, testing and commissioning of EN54/BIS approved Addressable Wall mounted Single Sided / Double Signage with 20 mtr. viewing distance with built in High efficiency L80 LED with 50,000 hour life, Built in Ni-Cd battery with back-up of 2 hours, Housing of Polycarbonate, Glow wire test : 850°C, RAL9003, with set of 3 exit legends (L, R, D), Degree of protection IP42, Operation Mode Non -Maintained or Maintained mode selectable, Connection voltage 230V +/- 5% [220V-240V] 50-60Hz SL2MNM, Dimensions in mm: 270 x 119 x 49 with IEC CB test certificate LED including necessary accessories as per specification.	20.00	Each	10457.00	209140.00
4	Supply, Installation, testing and commissioning of EN54/BIS approved Addressable Escape sign luminaire with LED Lightguide technology having Additional function: Displaying a red 'X' to signify an area as closed or blocked, Minimum service requirement due to high service life of the LEDs (50 000 hours) with complete necessary accessories as per specification complete all as specified and directed.	8.00	Each	71364.00	570912.00
5	Supplying & laying of 2x1.5 sqmm fire survival armoured cable, 600/1000V rated with annealed copper conductor having glass mica fire barrier tape covered by an extruded layer of Cross Linkable Ethylene Propylene Rubber (EPR) insulation and LSZH inner bedding, steel wire armouring & LSZH outer sheath complete as required.				
	(a) 2 x 1.5 sq.mm	1000.00	Mtr.	386.00	386000.00
	Sub Head-11 (Wet Riser & Sprinkler System)				
1	Supplying and fixing of fire brigade connection of cast iron body with gun metal male instantaneous inlet couplings complete with cap and chain as reqd. for suitable dia MS pipe connection conforming to IS 904 as required:				
	(a) 2 way-100 mm dia M.S. Pipe	2.00	Each	7262.00	14524.00
	(b) 4 way - 150 mm dia M.S. Pipe (for sump)	1.00	Each	14820.00	14820.00
2	Providing and fixing fire brigade suction hose coupling (draw out connection) with nut for female coupling as per IS-902 complete with 150mm dia. Suction pipe and foot valve (to be connected to static tank) complete as required	1.00	Each	14331.00	14331.00

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	and as per enclosed specification.				
3	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 :				
	Single headed Stainless steel	12.00	Each	6632.00	79584.00
4	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 :				
	Single headed Stainless steel	5.00	Each	6632.00	33160.00
5	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 :				
	Stainless Steel (Grade 304)	29.00	Each	1756.00	50924.00
6	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 ² complete as required.	17.00	Each	1424.00	24208.00
7	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 :				
	Stainless Steel (Grade 304)	29.00	Each	4667.00	135343.00
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.				

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	Drum and brackets for fixing the equipments on wall.				
	Connections from riser with 25 mm dia stop gun metal valve & M.S. Pipe and socket.				
	30 m	12.00	Each	9440.00	113280.00
9	Providing and fixing angle iron (40mmx40mmx5mm) door frame and MS sheet (6mm thick) cum glass shutter of size 2.1mtrx 0.9mtr(N.S.) with 25mmx25mmx3mm angle frame all around and stiffened in between i/c hinges, handle, locking arrangement, Powder coated with approved synthetic enamel paint i/c sign writing on glass at internal hydrant including providing & fixing S.S. sheet 2mm thick on remaining portion above door to close opening i/c Powder coating etc. as required. Glass shall be 6 mm thick.	12.00	Each	17791.00	213492.00
10	Providing and Fixing of Weather proof hose cabinet made of 2 mm thick MS sheet having lockable double doors made out of 2 mm thick sheet steel along with glazed glass front and downside openable of suitable size but not less than 700 mm x 600 mm x 250 mm suitable to accommodate internal/ external hydrant, butterfly valve, 2 Nos. 15 mtr. long Hose pipe and 1 No. branch pipe duly painted with two coats of anticorrosive primer and two coats of approved Post office red synthetic enamel paint complete in all respect, for external hydrant, as required.	5.00	Each	7371.00	36855.00
11	Providing and fixing stainless steel standard fireman's axe with heavy insulated rubber handle tested to 20000 volts as per IS : 926 complete.	12.00	Each	1828.00	21936.00
12	Providing laying, testing & commissioning of 'C' class heavy duty MS Pipe conforming to IS 1239/Class -II of IS: 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 coaltar/asphalt tape as per IS 10221, refilling the trench etc. of following sizes complete as required.				
	(a) 150 mm. Dia	200.00	Mtr	5104.00	1020800.00
	(b) 100 mm. Dia	35.00	Mtr	3784.00	132440.00

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13	Providing, laying, testing & commissioning of 'C' class heavy duty MS pipe conforming to IS 1239/Class -II of IS: 3589 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) 200 mm dia. (wall thickness 6.3 mm)	12.00	Mtr	6620.00	79440.00
	(b) 150 mm dia.	100.00	Mtr	4299.00	429900.00
	(c) 100 mm dia.	100.00	Mtr	3077.00	307700.00
	(d) 80 mm dia.	150.00	Mtr	2277.00	341550.00
	(e) 65 mm dia.	150.00	Mtr	1955.00	293250.00
	(f) 50 mm dia.	100.00	Mtr	1557.00	155700.00
	(g) 40 mm dia.	100.00	Mtr	1259.00	125900.00
	(h) 32 mm dia.	130.00	Mtr	1039.00	135070.00
	(i) 25 mm dia.	800.00	Mtr	920.00	736000.00
14	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) 150mm dia.	3.00	Each	9737.00	29211.00
	(b) 100mm dia.	10.00	Each	7271.00	72710.00
	(c) 80mm dia.	14.00	Each	5406.00	75684.00
	(d) 65mm dia.	2.00	Each	4712.00	9424.00
	(e) 50mm dia.	2.00	Each	4114.00	8228.00
15	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :				
	(a) 25 mm nominal bore	14.00	Each	622.40	8714.00
16	Providing & fixing of 25mm dia. gunmetal air release valve with all fittings and forged ball valve on header complete as required and as per enclosed specification.	2.00	Each	1327.00	2654.00
17	Providing and fixing in position industrial type pressure gauges with gun metal / brass valves complete etc as required	12.00	Each	1491.00	17892.00
18	Providing & fixing of pressure switch in M.S. pipe line including connection etc. as required	1.00	Each	1670.00	1670.00
19	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	2.00	Set	19402.00	38804.00

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	wheel valve with required accessories, pressure gauge and painting with synthetic enamel paint of approved shade as required.				
20	Providing & fixing flow switch in following sizes M.S. pipe including connection etc as required.				
	(a) 150 mm dia	6.00	Each	9644.00	57864.00
21	Providing, installation, testing and commissioning of non-return valve of following sizes conforming to IS: 5312 complete with rubber gasket, GI bolts, nuts, washers etc. as required :				
	(a) 150mm	5.00	Each	18884.00	94420.00
	(b) 100mm	2.00	Each	11853.00	23706.00
	(c) 80 mm	5.00	Each	8255.00	41275.00
22	Providing, installation, testing and commissioning of stainless steel Y-strainer fabricated out of 1.6 mm thick stainless steel, Grade 304, sheet with 3 mm dia holes with stainless steel flange.				
	(a) 80mm dia	1.00	Each	5117.00	5117.00
	(b) 200mm dia	2.00	Each	23571.00	47142.00
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 following sizes as required				
	(a) 150 mm dia	1.00	Each	50805.00	50805.00
24	Supplying and fixing, testing and 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, conforming to IS 14846, of following sizes as required.				
	(a) 80 mm	4.00	Each	11386.00	45544.00
	(b) 150mm dia	7.00	Each	24088.00	168616.00
	(c) 200mm dia	4.00	Each	41386.00	165544.00

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25	Supplying and laying control wiring with multi core copper stranded conductor of following sizes PVC insulated, PVC sheathed armoured underground cable between various sensors and system controller/starter etc.in pump house & outside on surface/Existing RCC/GI pipe complete with connections at both end with glands etc., as required				
	(a) 12 C x 2.5 sq.mm.	50.00	Mtr.	501.00	25050.00
	(b) 2 C x 2.5 sq.mm	200.00	Mtr.	130.00	26000.00
26	Supply of following size cross -linke polyethylene (XPLE)insulated, PVC outer sheatedarmoured cable with galvanizedround steel wire or steel strip, with Al. conductor suitable for rated voltage of 1100 volts grade & conforming to IS:7098 (Part-I) 1988 amended up to date. (Compulsory ISI marked)				
	(a) 3.5 C X 120 Sqmm	25.00	Mtr.	1252.00	31300.00
	(b) 3 C X 50 Sqmm	55.00	Mtr.	493.00	27115.00
	(c) 3.5 C X 25 Sqmm	200.00	Mtr.	341.00	68200.00
27	Supplying and installing following size of perforated Hot Dipped Galvanised Iron cable tray (Galvanisation thickness not less than 50 microns) with perforation not more than 17.5%, in convenient sections, joined with connectors, suspended from the ceiling with two numbers GI Suspenders i/c base of suitable size GI angle, GI bolts & nuts, fastneretc as required.				
	(a) 150 mm width X 50 mm depth X 1.6 mm thickness	25.00	Mtr.	803.00	20075.00
	(b) 300 mm width X 50 mm depth X 1.6 mm thickness	40.00	Mtr.	1062.00	42480.00
28	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)	15.00	Mtr.	64.00	960.00
	(b) Above 35 sq. mm and upto 95 sq. mm (clamped with 25x3mm MS flat clamp)	50.00	Mtr.	151.00	7550.00
	(c) Above 95 sq. mm and upto 185 sq. mm (clamped with 25/40x3mm MS flat clamp)	15.00	Mtr.	180.00	2700.00

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29	Supply and making of LT cable terminations with double brass compression gland crimped Aluminium cable lugs for the following size of cable.				
	(a) 3 X 50 sq. mm (32mm)	8.00	Each	442.00	3536.00
	(b) 3½ X 120 sq. mm (45mm)	2.00	Each	710.00	1420.00
	(c) 3.5 X 25 sq. mm (25mm)	4.00	Each	371.00	1484.00
30	(a) Supplying, installation, testing and commissioning of Electric driven Main Fire Pump conforming to IS 12469: 2019 suitable for automatic operation and consisting of following, complete in all respects, as required : (b) Horizontal type, multistage, centrifugal, split casing pump of cast iron body & bronze impeller with stainless steel shaft, mechanical seal as required. (c) 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-12615: 2018. (d) M.S. fabricated Common base plate, coupling, coupling guard, foundation bolts etc. as required. (e) Suitable cement concrete foundation duly plastered with anti vibration pads.				
	(a) 2280 lpm at 88 m Head	1.00	Each	424172.00	424172.00
31	(a) Supplying, installation, testing and commissioning of diesel engine driven main fire pump conforming to IS 12469: 2019 suitable for automatic operation and consisting of following, complete in all respects, as required : (Diesel Driven Pump) (b) Horizontal type, multistage, centrifugal pump of cast of iron body and bronze impeller with stainless steel shaft, mechanical seal as required. (c) 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				

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	with post office red colour etc. as required. (d) M.S fabricated, common base plate, coupling, coupling guard, foundation bolts etc. as required. (e) Suitable cement concrete foundation duly plastered and with anti vibration pads.				
	(a) 2280 lpm at 88 m Head	1.00	Each	667029.00	667029.00
32	(a) Supplying, installation, testing and commissioning of electric driven pressurisation pump conforming to IS 12469: 2019 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 as required.(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-12615: 2018. (d) M.S. fabricated Common base plate, coupling, coupling guard, foundation bolts etc. as required.(e) Suitable cement concrete foundation duly plastered and with anti vibration pads				
	(a) 180 lpm at 88 m Head	1.00	Each	134171.00	134171.00
33	(a) Supplying, installation, testing and commissioning of electric driven terrace pump conforming to IS 12469: 2019 suitable for automatic operation and consisting of following, complete in all respects, as required: (Terrace Pump) (b) Horizontal type, multistage, centrifugal, split casing pump of cast iron body & bronze impeller with stainless steel shaft, mechanical seal as required. (c) Suitable HP squirell cage induction motor TEFC type suitable for operation on 415 volts, 3 phase, 50 Hz, AC supply with IP55 class of protection for enclosure, horizontal foot mounted type with Class- 'F' insulation, conforming to IS-12615: 2018. (d) M.S.fabricated common base plate, coupling, coupling guard, foundation bolts etc.as required. (e) Suitable cement concrete foundation duly plastered and with anti vibration pads				

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	(a) 450 lpm at 35 m Head	2.00	Each	91384.00	182768.00
34	Fabrication, supplying, Installation testing & commissioning of Electrical control panel of cubical construction, floor mounted type, fabricated out of 2mm thick CRCA sheet, compartmentalised with hinged lockable doors, dust and vermin proof, powder coated of approved shade after 7 tank treatment process, cable alley, inter-connection 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				
	Incomings 630A, 50kA 4 Pole MCCB, Ics=100% Icu rating Digital Voltmeter 0-500V with selector switch Ammeter (0-630 A) with selector switch & CTs etc. LED type RYB phase indicating lamps, ON, OFF, trip indicating lamps Set of Copper Bus Bar 800Amps Outgoings (Note : All outgoing feeders for pumps should have digital Ammeter with selector switches, and LED type ON, OFF, trip indicating lamps) Main Fire Pump 250 A, 50kA TPN MCCB, Ics=100% Icu, with fully automatic Star/Delta starter suitable for 100 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. Jockey Pump 125 A, 50kA TPN MCCB, Ics=100% Icu, with Suitable HP fully automatic Star/Delta starter with overload protection, current sensing type single phase preventor complete with all accessories and internal wiring required for automatic operation, selector switch for local/remote, auto/ manual/OFF operation. Diesel Engine ControlControl for diesel engine comprising - Automatic/Manual selctor switch & 3 attemptsstarting device, timers and relays as required, push buttons, start/stop in manual modeIndicating lamp for high/ Low Lub. Oil pressure, High Water Temp and Engine on	1.00	Set	337486.00	337486.00

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	indication Battery charger suitable for 12V/24 V DC with boost and trickle selector switch, 0-30 V DC volt meter, and 0-20 A DC Ammeter All standard relays and accessories for automatic operation of diesel engine System Controller Designing, Supply, Installation, Testing and commissioning of system controller to control operation of main electric fire pump, diesel pump, Pressurization pump, Terrace pump in sequence as per specification consisting of relays, timers. Sensors, annunciation window for fault indication, complete as per specification.				
35	Fabrication, Installation, Testing and Commissioning of Wall/Floor Mounted with locking arrangement, totally enclosed, compartmentalized, dust, vermin proof and outdoor type Feeder Pillar (IP 54) fabricated out of 2 mm thick cold rolled close annealed, sheet steel, with 100 Amp 4 strip AL. bus bar, cable alley, powder coated paint of approved shade after 7 tank treatment process and 2 nos 20x3mm GI strips throughout the width of feeder pillar consisting two earth studs on each strip complete with following incoming and outgoing switchgears including making connections/ inter connections with lugs/ thimble for switch gears and control wiring with 2.5 sq.mm PVC insulated FRLS copper conductor cable. (Drawing shall be got approved from Engineer in charge before fabrication, (MCCB's Ics=100 %Icu) Minimum size should not be less than 0.8 sqmtr face area and 300mm depth.				
	Incoming:- 63 Amp TPN MCCB- 1 No., Digital Voltmeter - 1 No., RYB Indication Lamp- 1 No., 6A SP MCB for control-3 No.				
	Busbar:-4 strip Aluminium bus bars of min. 100 Amps capacity with heat shrinkable coloured sleeves and including DMC/SMC bars supports at required intervals-1 set				
	Outgoing:- 1 No. 32A TPN MCB , DOL Starter suitable for the above pump set with suitable rating contactor, Thermal overload relay, Single phase preventor , 0 to 30 Amps Ammeter including wiring for automatic operation, selector switch for Local / remote & Auto / Manual / OFF Operation etc as required - 2 sets	1.00	Set	74651.00	74651.00

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36	Providing, fixing, testing & commissioning of 15mm dia quartzoid bulb type sprinklers of rating 68 degree centigrade with required accessories :				
	(a) Pendent Sprinkler	590.00	Each	599.00	353410.00
	(b) Upright Sprinkler	74.00	Each	599.00	44326.00
37	Supplying, installation, testing & commissioning of sprinkler flexible pipe (UL Listed) of stainless steel complete with 15NPT on reducer thread with maximum working pressure of 175 PSI test pressure of 875 PSI (Burst) with branch line (Inlet) 25mm NPT male thread to sprinkler head (Outlet) 15mm NPT female thread with reducer, nipple, 2 side brackets, center bracket, stockbar of following sizes complete as required.				
	(a) 1000 mm	590.00	Each	1703.00	1004770.00
38	Providing, installation, testing & commissioning of adjustable rosette plate for 15mm dia in white finish UL Listed or FM approved complete as required.	590.00	Each	264.00	155760.00
	FIRE EXTINGUISHER				
39	Supply, installation, testing and commissioning ISI marked (IS:15683) Fire Extinguisher, Carbon-di-oxide type capacity 4.5 Kg. Flat base including valve, discharge hose of not less than 10 mm dia, 1M long and complete in all respects including initial fill with CO2 gas conforming to IS:307-1966 and wall suspension bracket as required as per specifications.	14.00	Each	4942.00	69188.00
40	Supply, installation, testing and commissioning of 6kg ABC (Powder Type) Fire Extinguisher. Mild Steel Cylinders ISI marked fitted with pressure indicating gauge, internal tube, squeeze lever type valve fully charged with ABC 90 powder (Mono Ammonium Phosphate-90) pressured by Nitrogen complete in all respects including wall suspension bracket and conforming to IS:15683 as required as per specifications.	14.00	Each	2817.00	39438.00
41	Providing and fixing CO2 type fire extinguishers consisting of welded M.S. cylindrical body CO2 type extinguisher PESO approved with certificate. The extinguisher body finished externally with red enamel with	1.00	Each	18631.00	18631.00

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	trolley mounted complete with internal charge. (Capacity 22.5 Kg.)				
42	Providing and fixing clean agent type automatic modular fire extinguishers consisting of welded M.S. cylindrical body with sprinkler head 68 degree centigrade type extinguisher, PESO approved with certificate. The extinguisher body finished externally with red enamel with trolley mounted complete with internal charge (Capacity 10 KG)	1.00	Each	28267.00	28267.00
43	Supply, installation, testing and commissioning of 6L Kitchen type fire extinguisher (Stored Pressure) in SS (304) body with special wet chemical based Fire Extinguishers especially for Kitchen Fire (Class F Fire) with controlling discharge Mechanism Discharge nozzle. Complete in all respects including wall suspension bracket and conforming to IS : 15683 as required as per specification.	1.00	Each	14826.00	14826.00
	Total Rs.				155235302.00

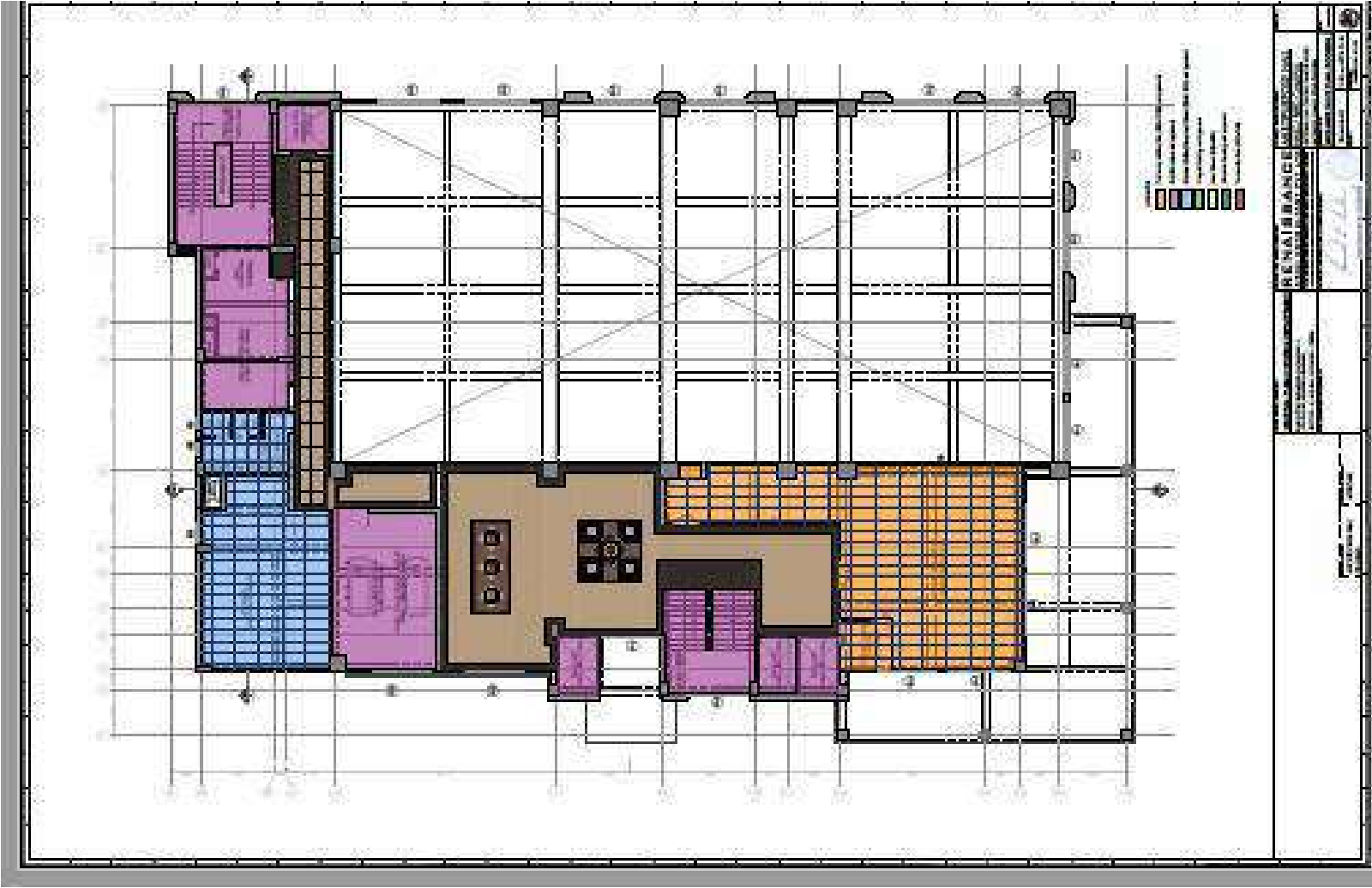
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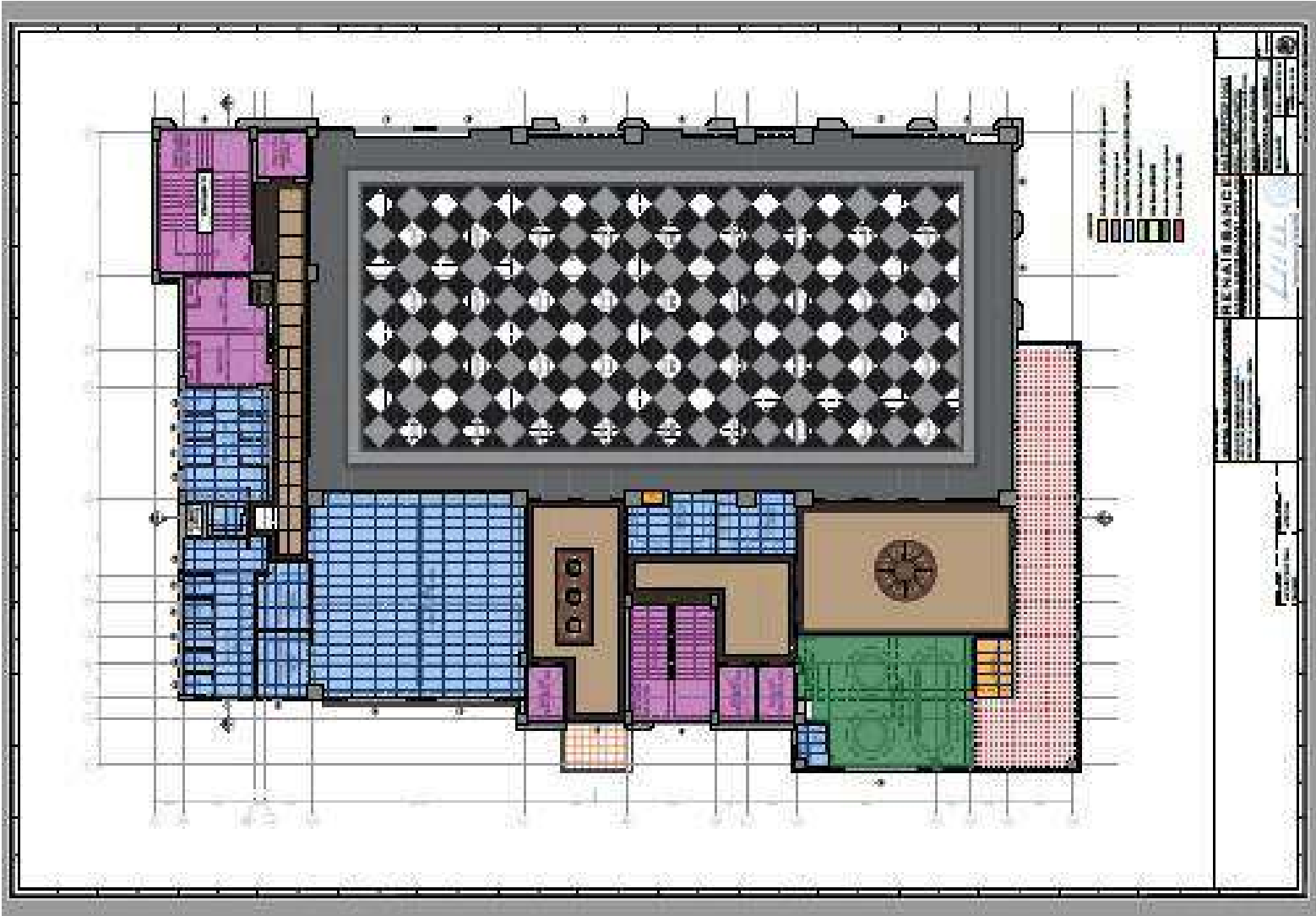
PART-D
(Basic Reference Drawings)

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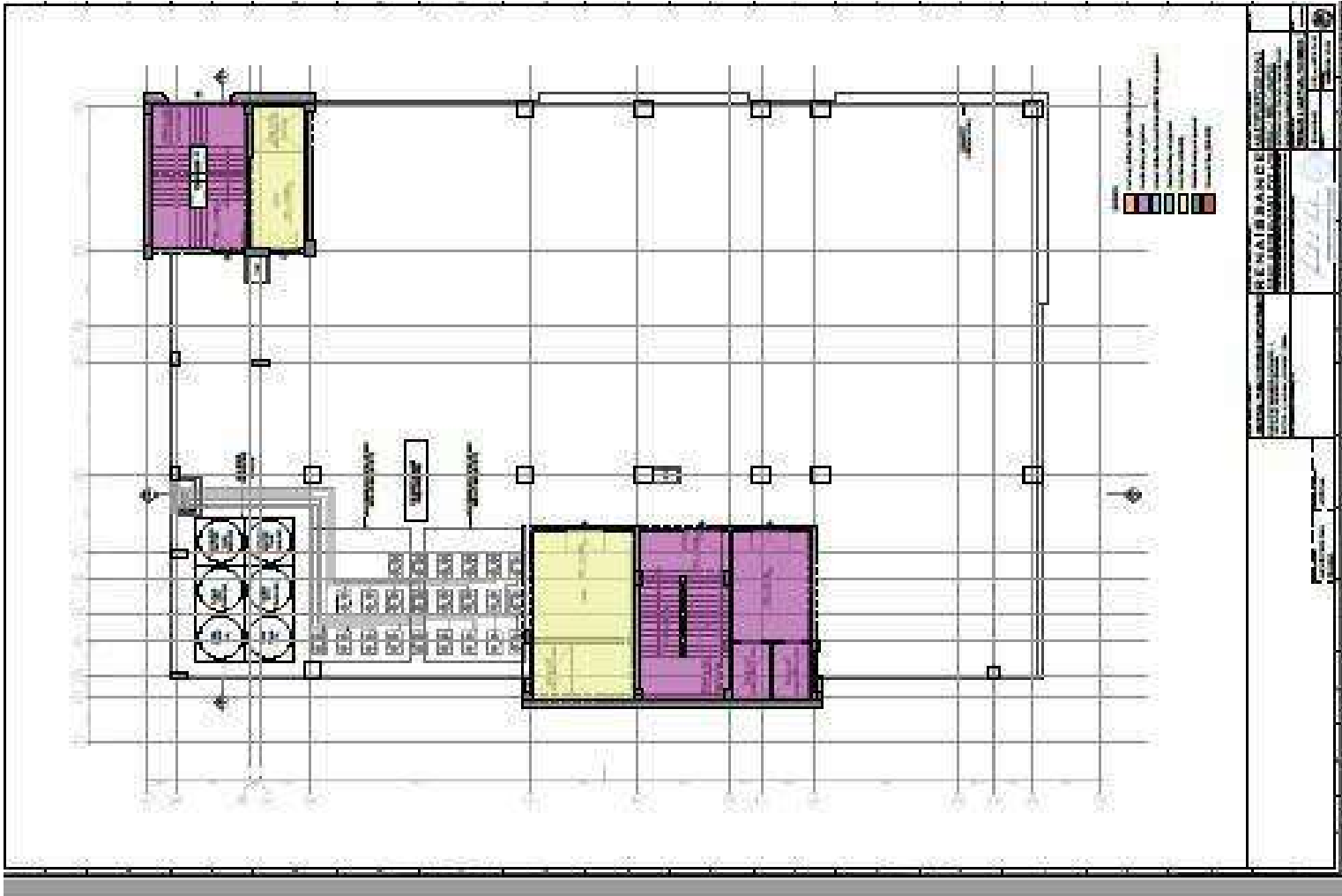
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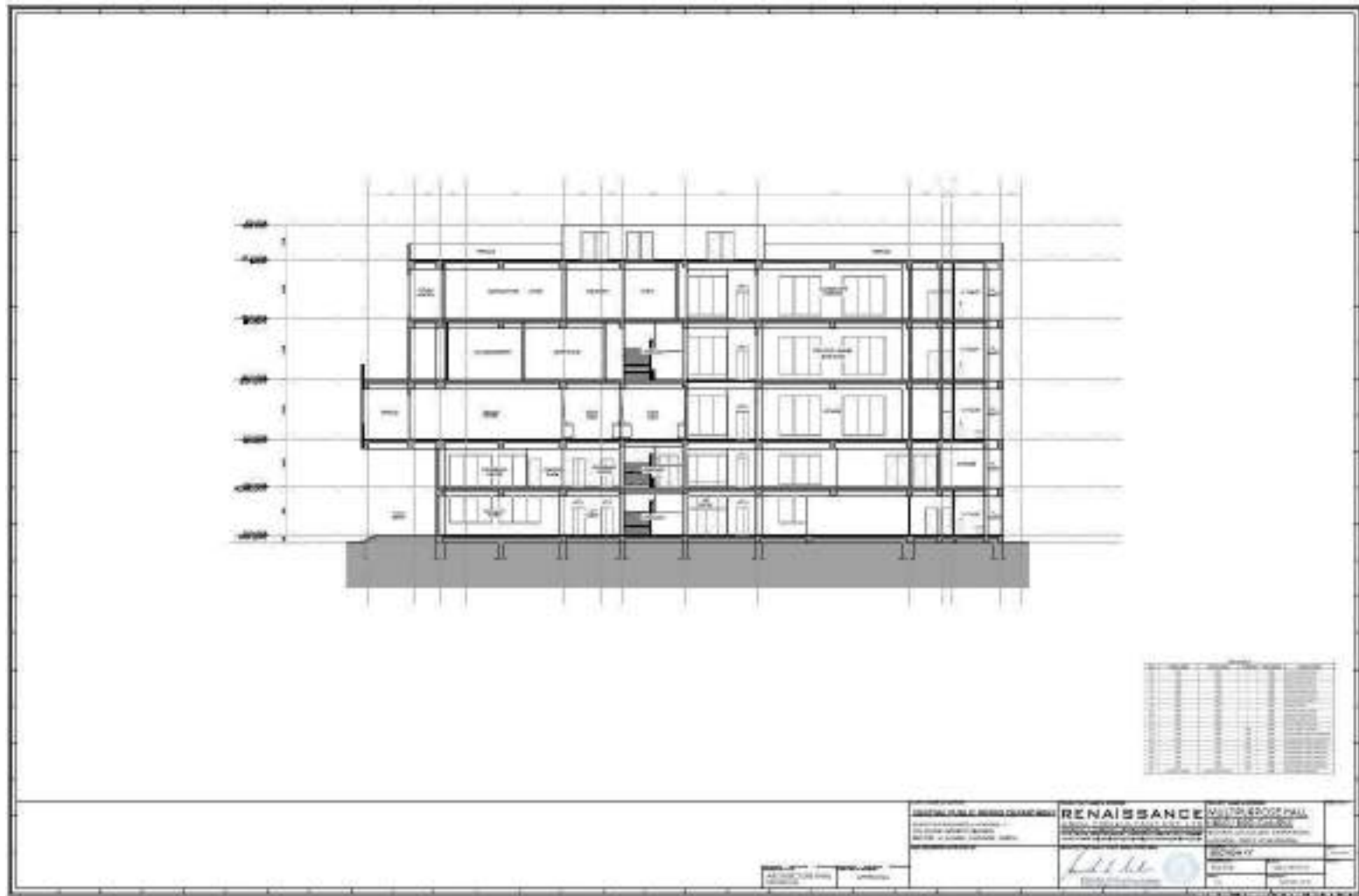


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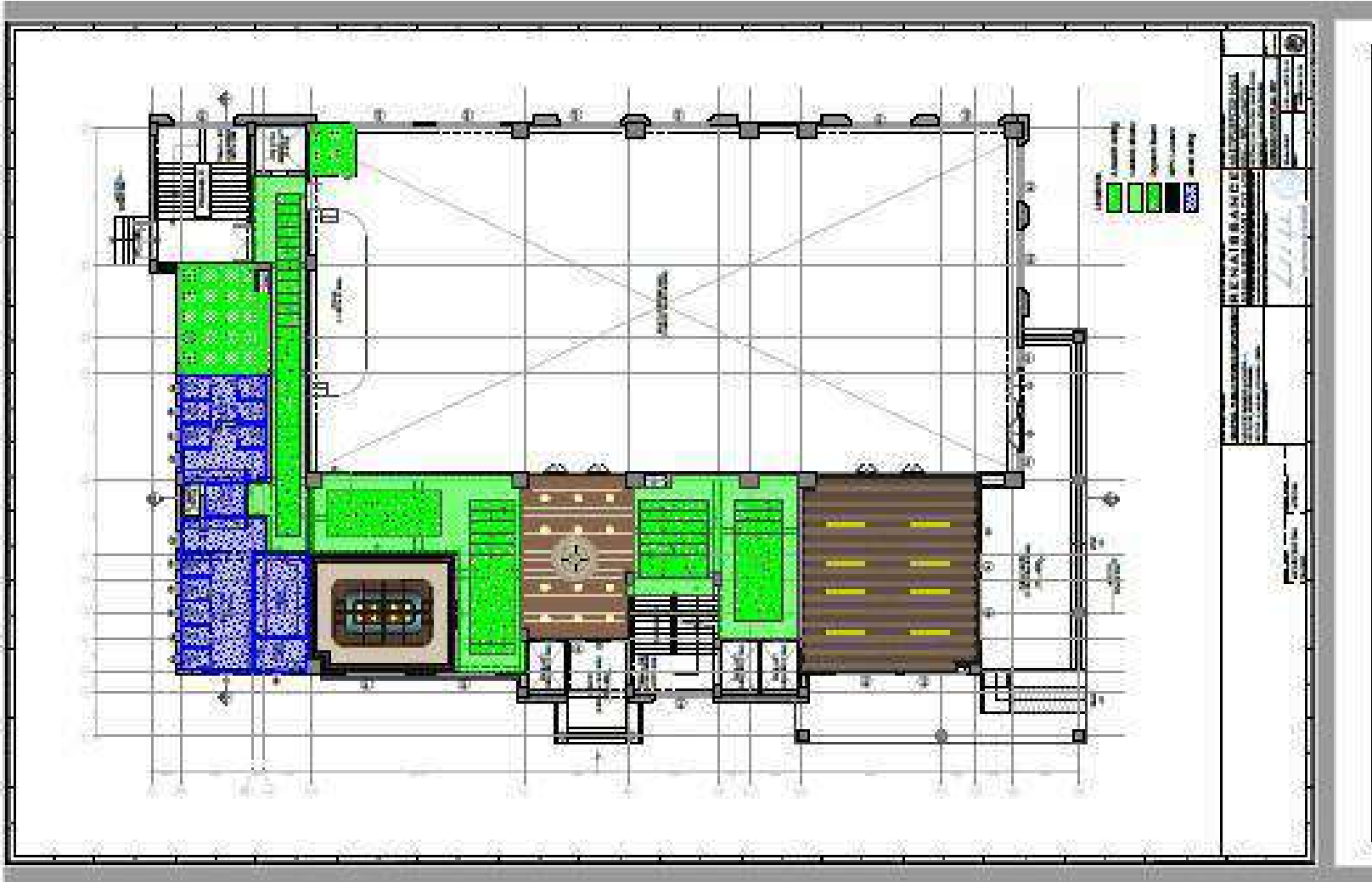


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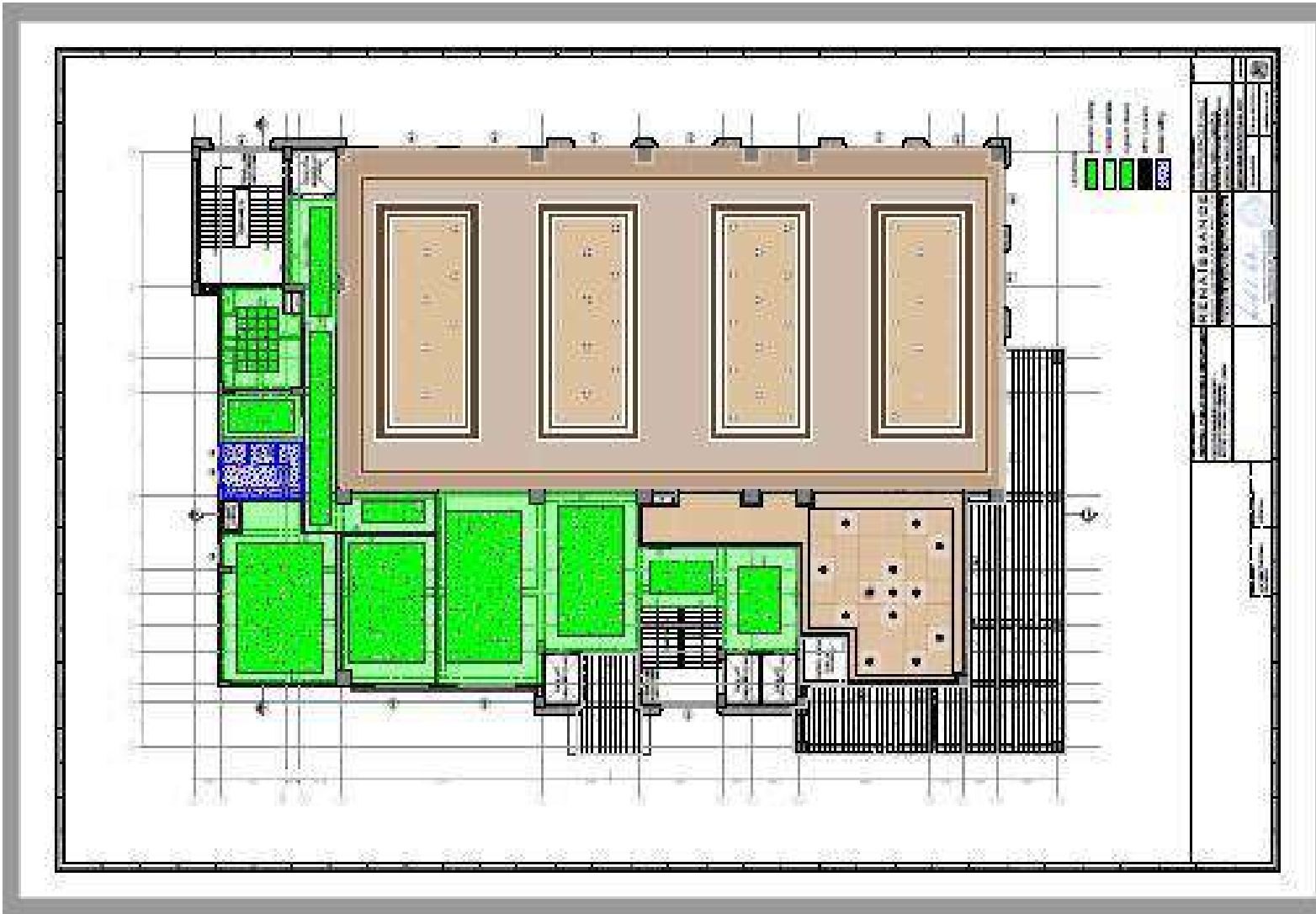




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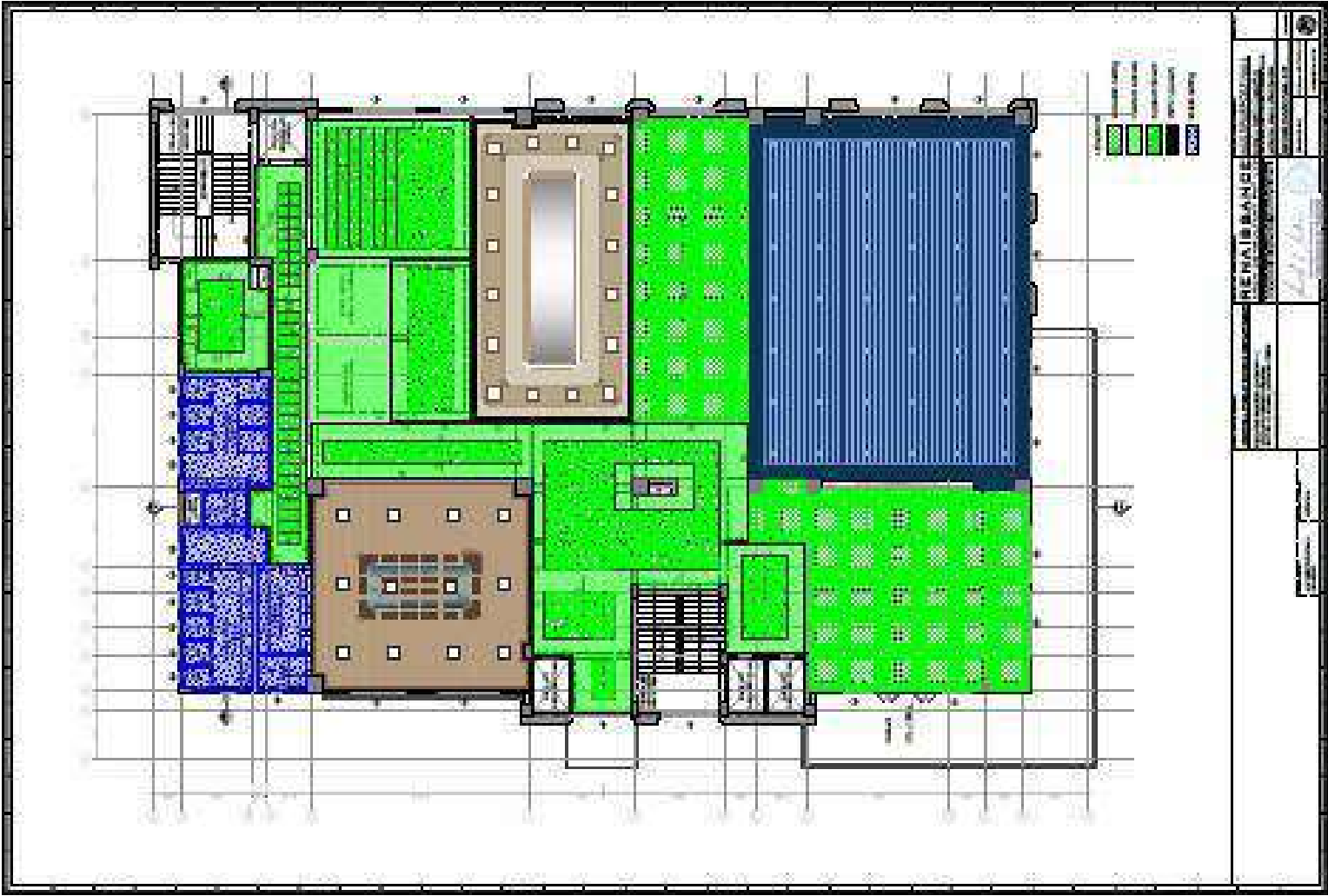
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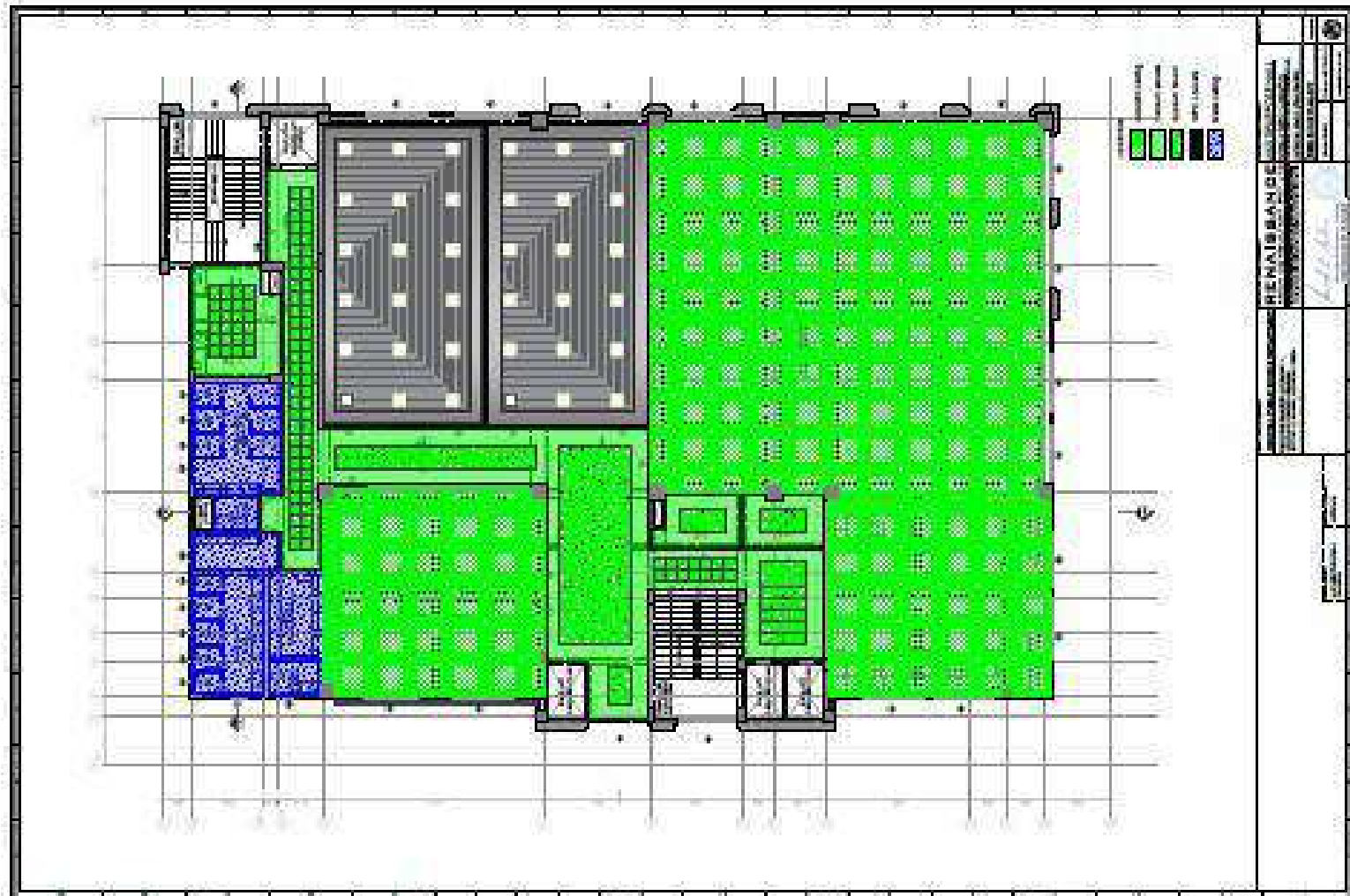
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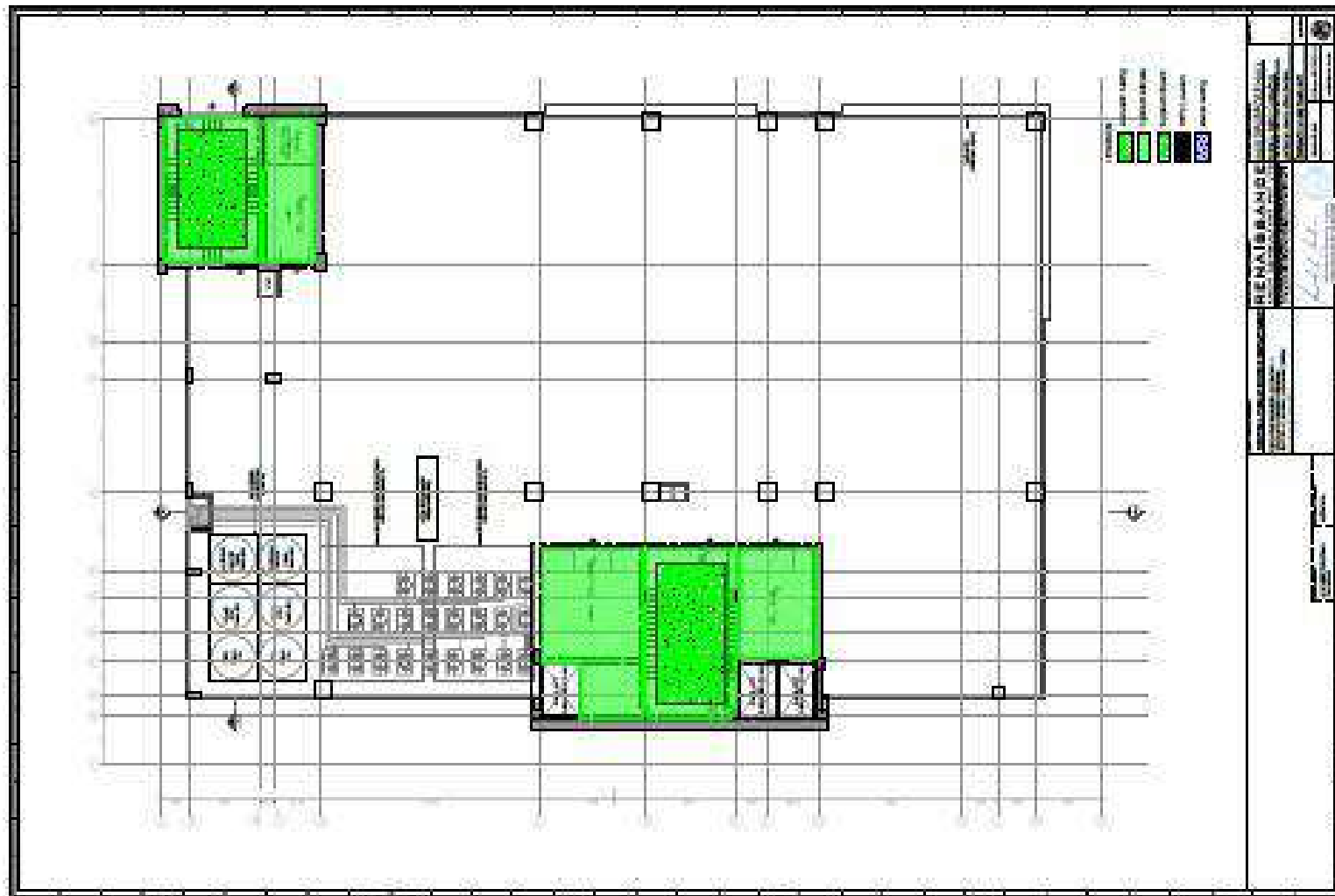
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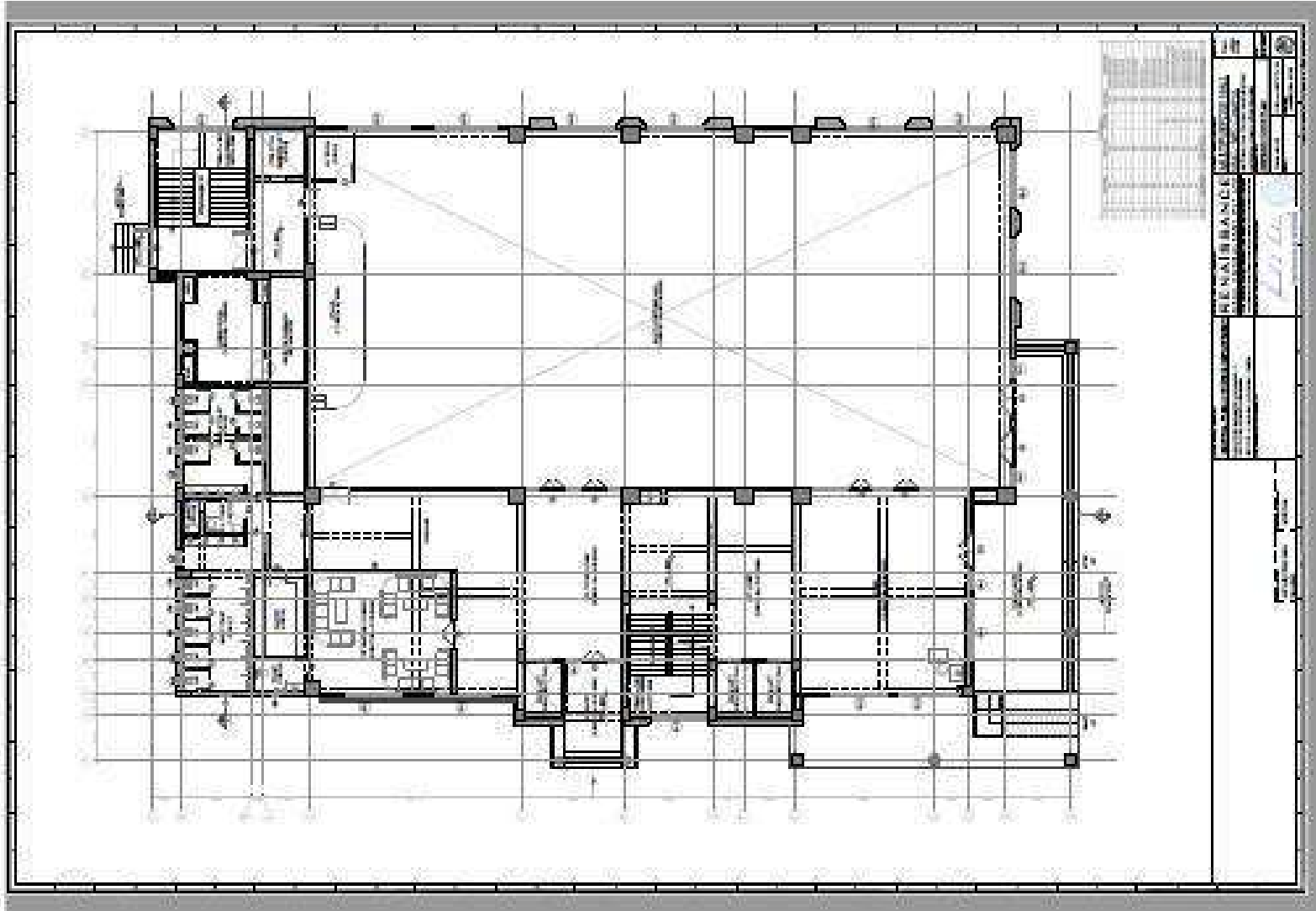
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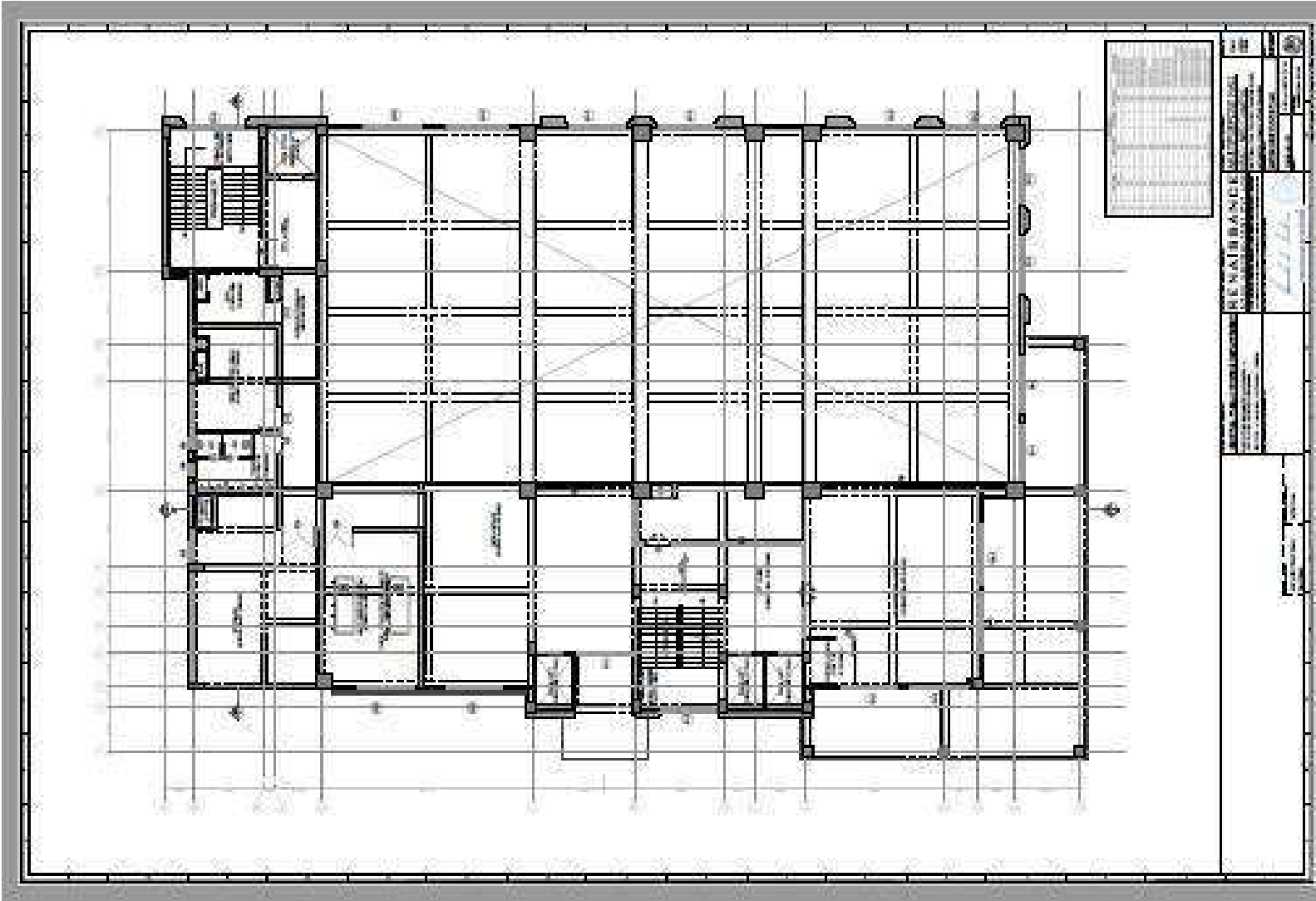
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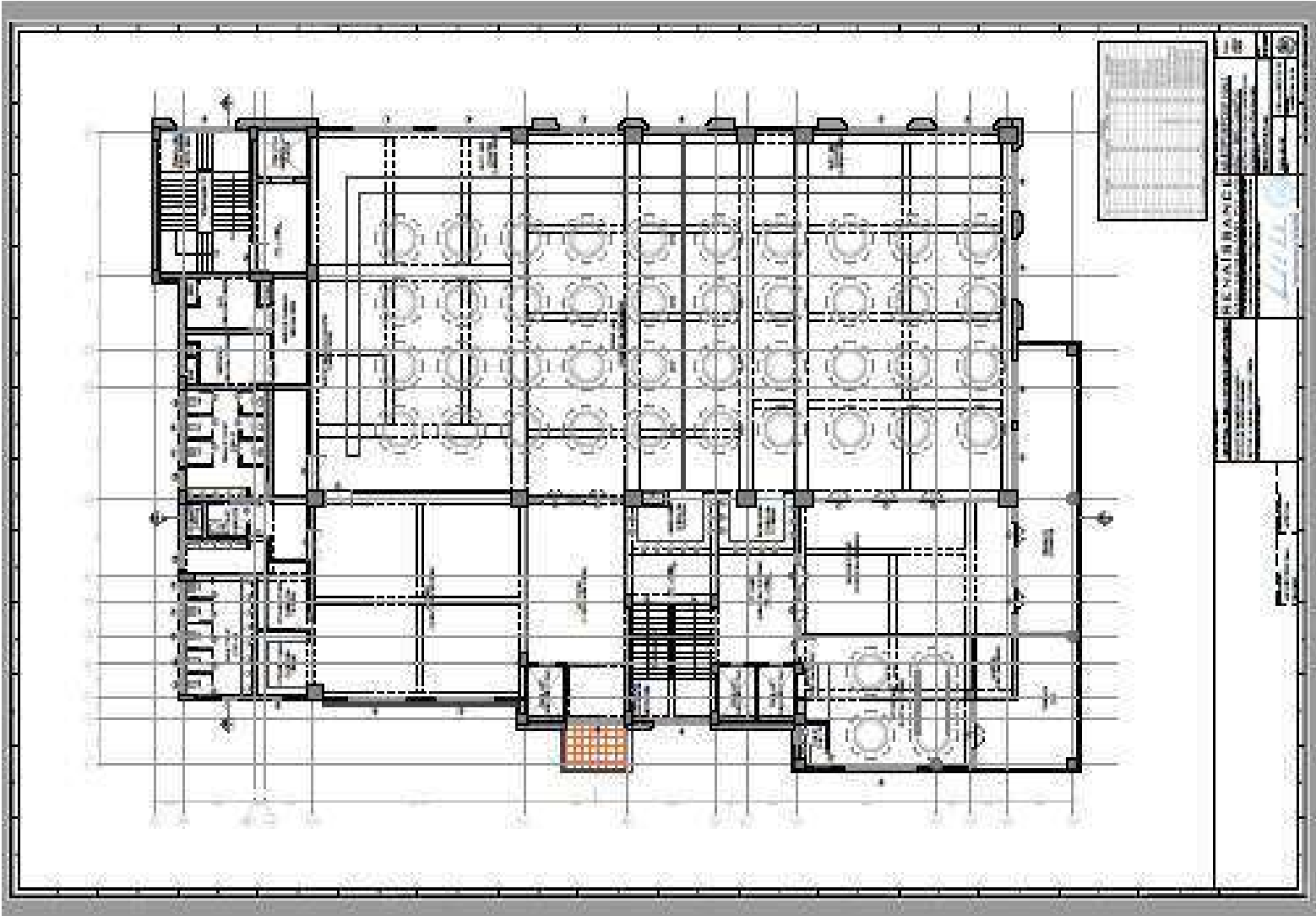
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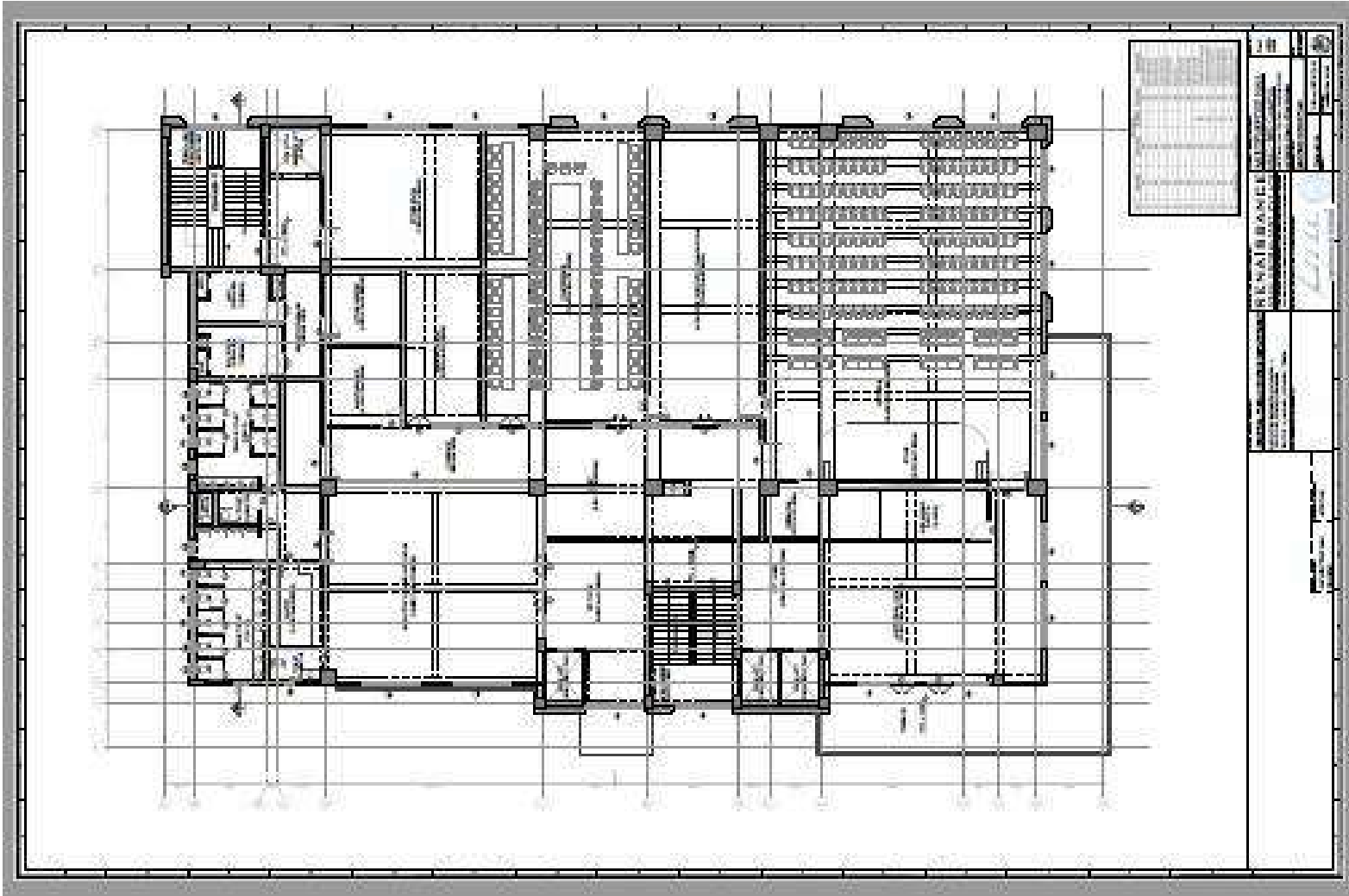
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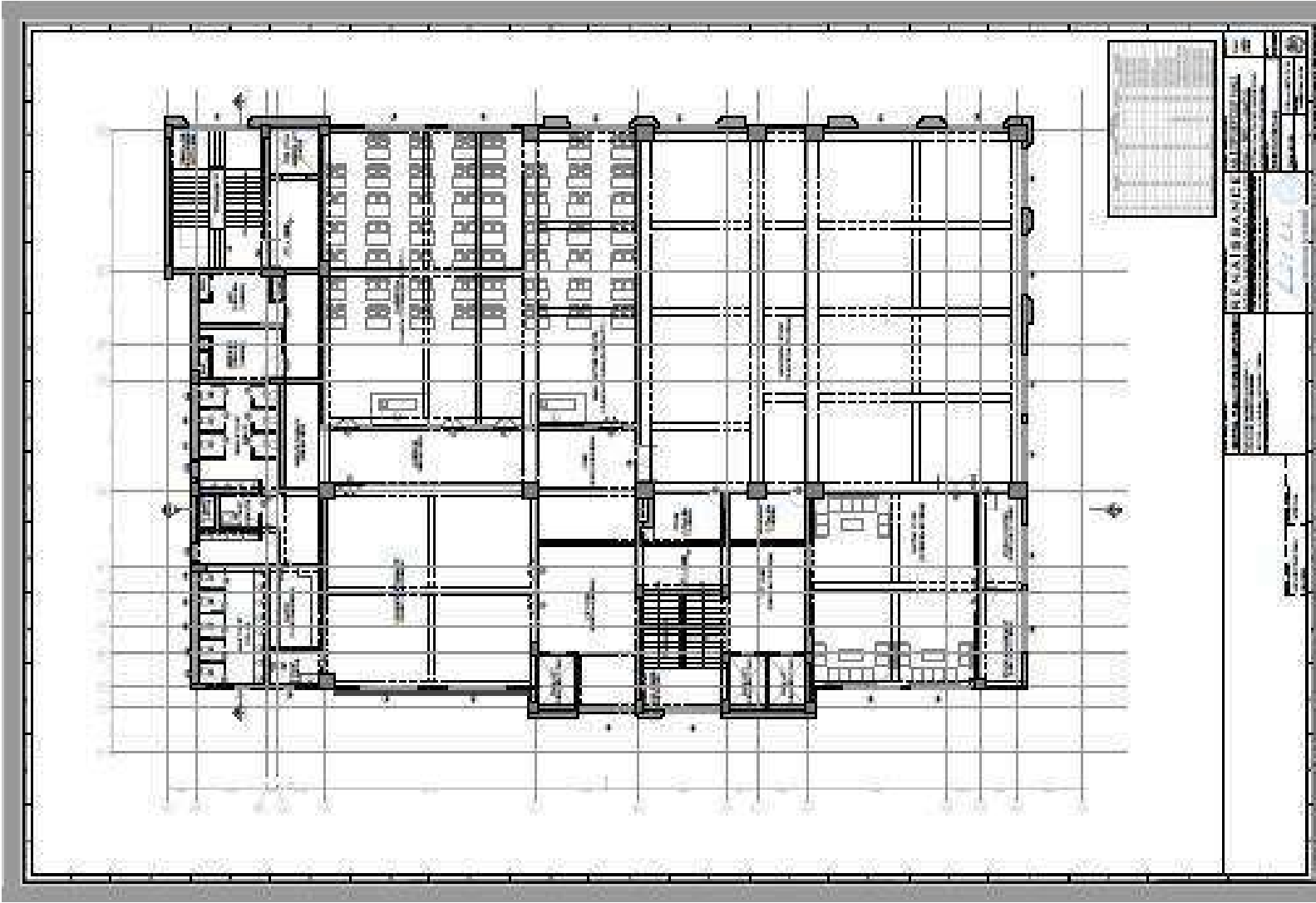
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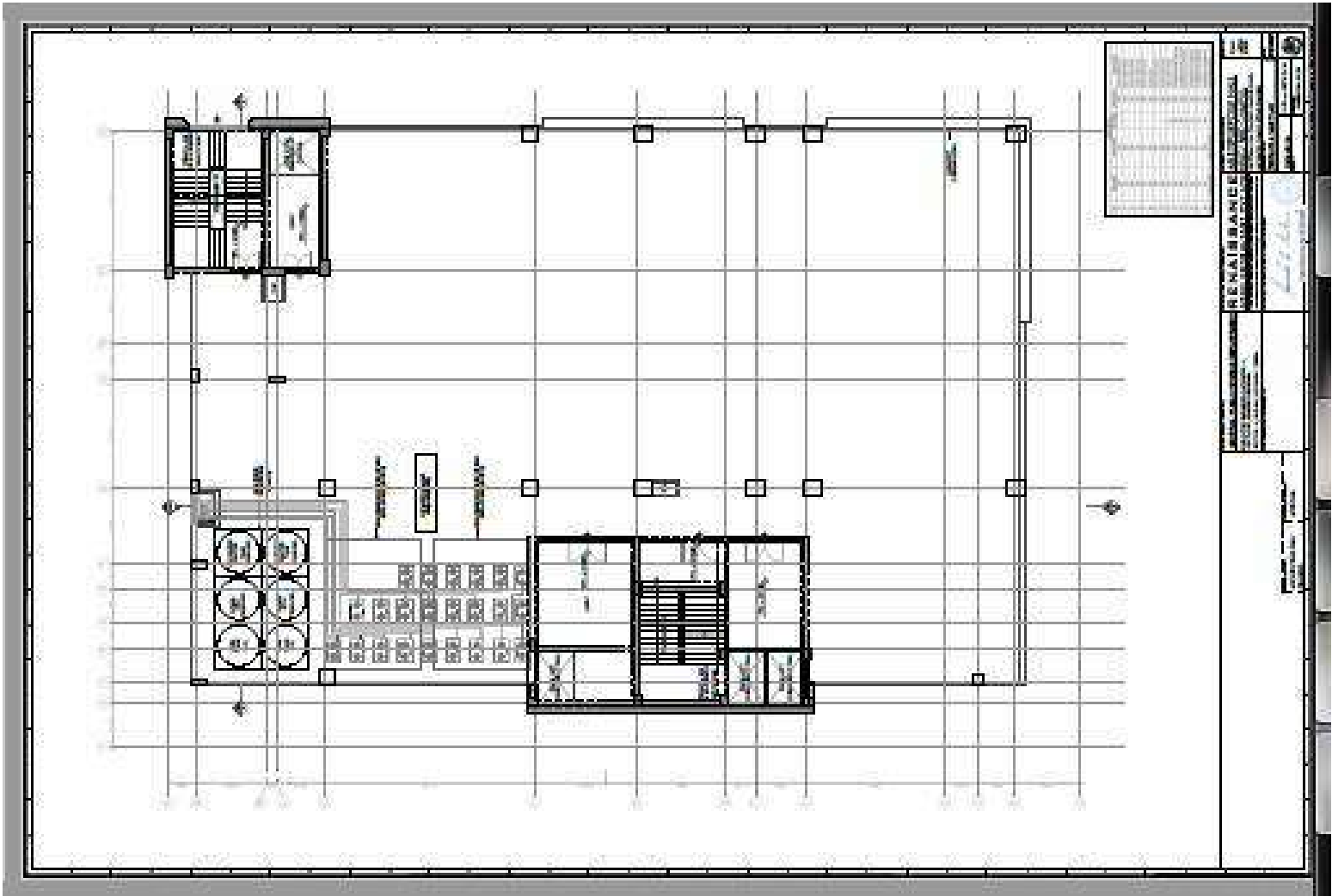
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