



भारत सरकार
Government of India
केन्द्रीय लोक निर्माण विभाग
Central Public Works Department

NOTICE INVITING e-TENDERS

NIT No. : 07/SE/FARIDABAD/NIT/2026-27

Name of Work : Up-gradation of Officer's Messes of various Units at NSG Manesar, Gurugram. SH: Renovation and upgradation of Officer's mess of Training centre, 11 SRG and 51 SAG at NSG Manesar camp. Manesar, Gurgaon - Civil and Electrical works.

Estimated Cost : Rs.8,07,18,670/- (Civil: Rs.4,91,25,873/-+ Electrical Rs.3,15,92,797/-)

Earnest Money : Rs.16,14,373/-in favour of "Executive Engineer, Manesar Division, CPWD, Gurgaon"

Completion Period: 8 (Eight) Months

Last time and date of submission of bids: up to 15:00 Hrs on 05.09.2026

Date & Time of Opening of Bid: At 15:30 Hrs on 05.09.2026



CPWD
Executive Engineer
Manesar Division, CPWD
NSG Camp, Manesar, Gurugram
Email: eemanesarcpwd@gmail.com

INDEX

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Assistant Engineer (P)
Manesar Division, CPWD

Executive Engineer (E)
Faridabad Electal Division, CPWD

Executive Engineer
Manesar Division, CPWD

This NIT containing pages 1 to 183 is approved for **Rs.8,07,18,670/-** (Civil: Rs.4,91,25,873/-+ Electrical Rs.3,15,92,797/-)

Superintending Engineer
Faridabad Circle, CPWD

NOTICE INVITING e-TENDERS

The **Executive Engineer, Manesar Division, CPWD, NSG Camp, Manesar, Gurgaon (Haryana) – 122051** invites on behalf of President of India online percentage rate bids from approved and eligible CPWD enlisted contractors of appropriate class in Building & Roads category for following work: -

NIT No : 07/SE- FARIDABAD/NIT/2026-27

Name of Work: Up-gradation of Officer's Messes of various Units at NSG Manesar, Gurugram. SH: Renovation and upgradation of Officer's mess of Training centre, 11 SRG and 51 SAG at NSG Manesar camp. Manesar, Gurgaon - Civil and Electrical works.

Estimated Cost: Rs.8,07,18,670/- (Civil: Rs.4,91,25,873/-+ Electrical Rs.3,15,92,797/-)

Earnest money: Rs.16,14,373/-

Period of completion: 8 (Eight) Months

Last time and date of submission of bids : up to 15:00 Hrs on **05.09.2026**

Date & Time of Opening of Bid : At 15:30 Hrs on **05.09.2026**

The tender forms and other details can be obtained from the website <https://etender.cpwd.gov.in> or www.cpwd.gov.in

INFORMATION AND INSTRUCTIONS FOR BIDDERS FOR e-TENDERING

The **Executive Engineer, Manesar Division, CPWD, NSG Camp, Manesar, Gurgaon (Haryana) – 122051** on behalf of President of India invites online percentage rate from approved and eligible CPWD enlisted contractors of appropriate class in Building & Roads category for the following work:

NIT No.	07/SE/FARIDABAD/NIT/2026-27
Name of Work & Location	Up-gradation of Officer's Messes of various Units at NSG Manesar, Gurugram. SH: Renovation and upgradation of Officer's mess of Training centre, 11 SRG and 51 SAG at NSG Manesar camp. Manesar, Gurgaon - Civil and Electrical works.
Location	NSG Camp, Manesar, Gurugram
Estimated Cost put to Tender	Rs.8,07,18,670/-
Earnest Money	Rs.16,14,373/-
Stipulated Period of Completion	8 (Eight) Months
Last Date & Time of Online Submission of Bids copy of Receipt of deposition of original EMD & Other Documents as specified in the Bid Document	Up to 15:00 Hrs on 05.09.2026
Date & Time of Opening of Bid	At 15:30 Hrs. on 05.09.2026

1. The intending bidder must read the terms and conditions of CPWD-6 carefully. He should only submit his bid if he considers himself eligible and he is in possession of all the documents required.
2. Information and instructions for bidders posted on website shall form part of bid document.
3. The bid document consisting of plans, specifications, schedule of quantities of various types of items to be executed and the set of terms & 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
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 with in the period of bid submission and uploading the mandatory scanned documents such as Insurance Surety Bonds, Account Payee Demand Draft, Fixed Deposit Receipt or Banker's Cheque or/and Bank Guarantee (for the balance amount as prescribed) from any of Commercial Banks 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 inviting EE/AE), CPWD and other documents as specified.
5. Those Bidders 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 instruction available on download section of **<https://etender.cpwd.gov.in>**.

7. On opening date, the Bidder can login and see the bid opening process. After opening of bids, he will receive the competitor bid sheets.
8. Tenderer can upload documents in the form of **JPG** format and **PDF** format.
9. Tenderer must ensure to quote rate of each item. The column meant for quoting rate in figures appears in yellow colour and the moment rate is entered, it turns sky blue.

In addition to this, while selecting any of the cells a warning appears that if any cell is left blank the same shall be treated as “0”. Therefore, if any cell is left blank and no rate is quoted by the bidder, rate of such item shall be treated as “0” (**Zero**).

However, if a tenderer quotes nil rates against each item in item rate tender or does not quote any percentage above/below on the lowest 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.

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 Contractors
- iii. Bidder's Pan Card
- iv. Receipt for deposition of original EMD to division office of any EE, CPWD in prescribed Proforma along with scanned copy of original EMD
- v. GST registration Certificate, if already obtained by the bidder.

If the bidder has not obtained GST registration, then he shall scan and upload following undertaking along with other 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 a/c of the work executed and/or for any action taken by CPWD or GST department in this regard.”

- vi. Undertaking on structural stability and soundness as per prescribed format form 'F' “Page No. 8”.
- vii. Affidavit on blacklisting/debarment as per Form 'G' “Page No. 9”.
Note: “Affidavit to be furnished on a 'Non-judicial' stamp paper of Rs. 100/- (scanned copy of the notarized affidavit to be uploaded at the time of submission of bid).”
- viii. Deceleration form for Contact detail “Page No. 9”.
- ix. ERP Training Certificate.
- x. Any other document as specified in the Bid document.

RECEIPT OF DEPOSITION OF ORIGINAL EMD

Receipt No.....#..... /date.....#.....	
1. Name of Work: Up-gradation of Officer's Messes of various Units at NSG Manesar, Gurugram. SH: Renovation and upgradation of Officer's mess of Training centre, 11 SRG and 51 SAG at NSG Manesar camp. Manesar, Gurgaon - Civil and Electrical works.	
2. NIT No.	: 07/SE/FARIDABAD/NIT/2026-27
3. Estimated Cost	: Rs.8,07,18,670/-
4. Amount of Earnest Money Deposit	: Rs.16,14,373/-
5. Last date of submission of Bid	: 05.09.2026
1. Name of Contractor :#	
2. Form of EMD#	
3. Amount of Earnest Money Deposited.....#	
4. Date of submission of EMD#	
5. E-mail id of the office where EMD Deposited #.....#	
Signature, Name and Designation of EMD receiving officer (EE/AE(P)/AE/AAO) with Officer stamp	

(# to be filled by EMD receiving EE/AE/AAO as the case may be)

(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/MOBILISATION 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 an irrevocable Bank Guarantee for Rs. (Rupees only) valid up to (date)*..... as **Earnest Money Deposit** from (name and address of the contractor) (herein 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 up to (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 (Rupees only).
4. We, (indicate the name of the Bank), further undertake to pay the Government any money so demanded notwithstanding any dispute or disputes raised by the contractor in any suit or proceeding pending before any Court or Tribunal, our liability under this Bank Guarantee being absolute and unequivocal. The payment so made by us under this Bank Guarantee shall be a valid discharge of our liability for payment there under and the Contractor shall have no claim against us for making such payment
5. We, (indicate the name of the Bank), further agree that the Government shall have the fullest liberty without our consent and without affecting in any manner our obligation here under to vary any of the terms and conditions of the said agreement or to extend time of performance by the said Contractor from time to time or to postpone for any time or from time to time any of the powers exercisable by the Government against the said contractor and to forbear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such variation or extension being granted to the said Contractor or for any forbearance, act of omission on the part of the Government or any indulgence by the Government to the said Contractor or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

6. We, (indicate the name of the Bank), further agree that the Government at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor at the first instance without proceeding against the Contractor and notwithstanding any security or other guarantee the Government may have in relation to the Contractor's liabilities.
7. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor
8. We, (indicate the name of the Bank), undertake not to revoke this guarantee except with the consent of the Government in writing.
9. This Bank Guarantee shall be valid up tounless 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

1. Signature

Staff code no.

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 / Performance Guarantee / Security Deposit / Mobilization Advance, as the case may be.

FORM – “F”

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).

FORM "G"

PROFORMA OF AFFIDAVIT FOR NON - BLACK LISTING

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

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

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

Signature of Notary with seal

Contact Details

S. No.	Description	:	Details
1.	NAME OF THE AGENCY	:	
2.	CORRESPONDENCE ADDRESS	:	
3.	NAME OF THE AUTHORIZED PERSON OF THE AGENCY	:	
4.	OFFICIAL CONTACT NUMBER ON WHICH CONTRACTOR IS AVAILABLE FOR THE DEPARTMENT	:	
5.	OFFICIAL E-MAIL FOR CORRESPONDENCE		

PART - A

GENERAL

CPWD-6 FOR e-TENDERING

1. **Percentage Rate Bids** are invited on behalf of President of India from approved and eligible CPWD Enlisted Contractors of appropriate class in Building & Roads category for the work of “**Up-gradation of Officer’s Messes of various Units at NSG Manesar, Gurugram. SH: Renovation and upgradation of Officer’s mess of Training centre, 11 SRG and 51 SAG at NSG Manesar camp. Manesar, Gurgaon - Civil and Electrical works**”.

The enlistment of the CPWD Contractors should be valid on the last date of submission of bids. In case the last date of submission of bids is extended, the enlistment of contractor ***should be valid on the original date of submission of bids.***

The work is estimated to cost **Rs.8,07,18,670/-** (Civil: Rs.4,91,25,873/- + Electrical Rs.3,15,92,797/-)

This estimate, however, is given merely as a rough guide.

2. Agreement shall be drawn with the successful bidder on prescribed Form No. **CPWD-7** (or other Standard Form as mentioned) which is available as a Govt. of India Publication and also available on website www.cpwd.gov.in. Bidder 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 **8 (Eight) 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. However, site may be made available in parts as per approved work program and progress of work thereof and no claim of damages for handing over site in parts shall be admissible.*
(ii) *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 and progress of work thereof and no claim of damages for issue of drawings in phased manner shall be admissible.*
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 from 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 (for the balance amount as prescribed) from any of Commercial Banks (drawn in favour of **Executive Engineer, Manesar, CPWD, Gurgaon**) shall be scanned and uploaded to the e-tendering website within the period of bid submission. The original EMD

should be deposited either in the office of Executive Engineer inviting bids or division office of any Executive Engineer, 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 lacs, whichever is less, shall have to be deposited in shape prescribed above, and balance may be deposited in shape of Bank Guarantee of any Commercial Bank having validity for **6 (six) months** or more from 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 bid of the successful bidder, whichever is earlier. However, in case of two/three bid system, earnest money deposit of bidders unsuccessful during technical/eligibility bid evaluation etc. shall be returned within 30 days of declaration of result of technical/eligibility bid evaluation.

Copy of Enlistment Order and other documents as specified in the bid document shall be scanned and uploaded to the e-tendering website within the period of bid submission. However, certified copy of all the scanned and uploaded documents as specified in the bid document shall have to be submitted by **the lowest bidder** only along with physical EMD of the scanned copy of EMD uploaded within a week physically in the office of tender inviting 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 05.09.2026**

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 copy 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-on-item rate tender or does not quote any percentage above/below on the total amount of the tender or any section/sub-head in percentage rate tender, the tender shall be treated as invalid and will not be considered as lowest tenderer.
11. The contractor whose bid is accepted will be required to furnish performance guarantee at specified percentage of the tendered amount as mentioned in Schedule E and within the period specified in Schedule F. This guarantee shall be in the form of Insurance Surety Bonds, Account Payee Demand Draft, Fixed Deposit Receipt or Bank Guarantee from any of 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 sub-contractors, 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: -

Up-gradation of Officer's Messes of various Units at NSG Manesar, Gurugram. SH: Up-gradation of NSG Officer's institute (NOI) - Civil & Electrical Work.

Intending Bidders are advised to inspect and examine the site and its surroundings and satisfy themselves before submitting their bids as to the nature of the ground and sub-soil (so far as is practicable), the form and nature of the site, the means of access to the site, the accommodation they may require and in general shall themselves obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their bid. A bidder shall be deemed to have full knowledge of the site whether he inspects it or not and no extra charge consequent on any misunderstanding or otherwise shall be allowed. The bidder shall be responsible for arranging and maintaining at his own cost all materials, tools & plants, water, electricity access, facilities for workers and all other Services required for executing the work unless otherwise specifically provided for in the contract documents. Submission of a bid by a bidder implies that he has read this notice and all other contract documents and has made himself aware of the scope and specifications of the work to be done and of conditions and rates at which stores, tools and plant, etc. will be issued to him by the Government and local conditions and other factors having a bearing on the execution of the work.

13. The competent authority on behalf of the President of India does not bind itself to accept the lowest or any other bid and reserves to itself the authority to reject any or all the bids received without the assignment of any reason. All bids in which any of the prescribed condition is not fulfilled or any condition including that of conditional rebate is put forth by the 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 to rejection.
15. The competent authority on behalf of President of India reserves to himself the right of accepting the whole or any part of the bid and the bidder shall be bound to perform the same at the rate quoted.
16. The contractor shall not be permitted to bid for works in the 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 Urban Development. Any breach of this condition by the contractor would render him liable to be removed from the approved list of contractors of this Department.
17. No Engineer of Gazetted Rank or other Gazetted Officer employed in Engineering or Administrative duties in an Engineering Department of the Government of India is allowed to work as a contractor for a period of one year after his retirement from Government service, without the previous permission of the Government of India in writing. This contract is liable to be cancelled if either the contractor or any of his employees is found any time to be such a person who had not obtained the permission of the Government of India as aforesaid before submission of the bid or engagement in the contractor's service.
18. The bid for the work shall remain open for acceptance for a period of **30 (Thirty) days** from the date of opening of Eligibility Bids.
- a) If any tenderer withdraws his tender or makes any modification in the terms & conditions of the tender which is not acceptable to the department **within 7 days** after last date of submission of bids, then

the Government shall without prejudice to any other right or remedy, be at liberty to forfeit 50% of the earnest money absolutely irrespective of letter of acceptance for the work is issued or not.

- b) If any tenderer withdraws his tender or makes any modification in the terms & conditions of the tender which is not acceptable to the department **after expiry of 7 days** after last date of submission of bids, then the Government shall without prejudice to any other right or remedy, be at liberty to forfeit 100% of the earnest money absolutely irrespective of letter of acceptance for the work is issued or not.
 - c) In case of forfeiture of earnest money as prescribed in para (i) and (ii) above, the bidders shall not be allowed to participate in the rebidding process of the same work.
19. This notice inviting Bid shall form a part of the contract document. The successful 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:
- (i) The Notice Inviting Bid, all the documents including Additional Conditions, Specifications and Drawings, if any, forming part of the bid as uploaded at the time of invitation of bid and the Rates quoted online at the time of submission of Bid and Acceptance thereof together with any correspondence leading thereto.
 - (ii) Standard **CPWD Form-7** or other Standard CPWD Form as applicable.

20. For Composite Bids

- 20.1. 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.
- 20.2. The Bid document includes following Components:
- Part-A: General** - CPWD-6 for e-Tendering, Tender Form (CPWD-7) including Schedule A to F, Standard General Conditions of Contract, Conditions for Associate Agency for Specialized/E&M Works
- Part-B: Major Component (Civil & Horticulture)** – Additional/Special Conditions, Specifications, List of Preferred Makes, Schedule of Quantities for Major Component (Civil & Horticulture) of the work
- Part-C: Minor Component (E&M)** - Additional/Special Conditions, Specifications, List of Preferred Makes, Schedule of Quantities for Minor Component (E&M) of the work.
- Part D: Financial Bid** – Proforma for Financial Bid
- 20.3. The bidders must associate himself, with agencies as per NIT conditions
- 20.4. The eligible bidders shall quote rates for all items of major component as well as for all items of minor components of work.
- 20.5. After acceptance of the bid by Competent Authority, the Engineer-in-charge of Major Component of the work shall issue letter of award on behalf of the President of India. After the work is awarded, the Main Contractor will have to enter into one Agreement with Engineer-in-charge of Major Component and has also to sign two or more copies of Agreement depending upon number of EE/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). The Engineer-in-Charge of Major Component will operate **Part - B the Agreement along with Part - A & D** and whole agreement in general. The EE/DDH in charge of Minor Component(s) shall operate **Part - C along with Part - A & D** of the Agreement.

- 20.6. Entire work under the scope of composite bid including major and all minor components shall be executed under one agreement.
- 20.7. Security Deposit will be worked out separately for each component corresponding to the estimated cost of the respective component of works.
- 20.8. 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).
- 20.9. 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.
- 20.10. 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.
- 20.11. 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
- 20.12. (A) 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.
- (B) 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 to uploading tender can be resolved through the concerned Executive Engineer or ERP help line 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.

**GOVERNMENT OF INDIA
CENTRAL PUBLIC WORKS DEPARTMENT**

PERCENTAGE RATE TENDER & CONTRACT FOR WORKS

Tender for the work of “**Up-gradation of Officer’s Messes of various Units at NSG Manesar, Gurugram. SH: Renovation and upgradation of Officer’s mess of Training centre, 11 SRG and 51 SAG at NSG Manesar camp. Manesar, Gurgaon - Civil and Electrical works**”.

To be submitted/uploaded up to **15:00 Hrs. on 05.09.2026** on website: <https://etender.cpwd.gov.in>

- (i) To be opened in the presence of bidders who may be present at **15:30 Hrs. on 05.09.2026** in the office of the **Executive Engineer, Manesar Division, CPWD, NSG Camp, Manesar, Gurgaon, (Haryana) - 122051**.

(ii) **TENDER**

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

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

I/We agree to keep the tender open for **30 (Thirty) 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 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 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 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 agency 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 Deposited/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

Postal Address:

Witness:

Address:

Occupation:

ACCEPTANCE

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

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

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

(For & on behalf of President of India)

Dated:

Signature.....

Designation.....

SCHEDULES A TO F

SCHEDULE 'A'

Schedule of quantities for the Work : **As enclosed**

SCHEDULE 'D'

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

SCHEDULE 'E'

Reference to General Conditions of Contract: General Conditions of Contract-2023 (Maintenance Works) as amended / modified up to the last date of submission of Tenders.

Name of Work: Up-gradation of Officer's Messes of various Units at NSG Manesar, Gurugram. **SH:** Renovation and upgradation of Officer's mess of Training centre, 11 SRG and 51 SAG at NSG Manesar camp. Manesar, Gurgaon - Civil and Electrical works.

Estimated cost of work: Rs.8,07,18,670/-

(i)	Earnest Money	Rs.16,14,373/- (to be returned after receiving Performance Guarantee)
(ii)	Performance Guarantee	5% of the accepted tendered value OR Estimated Cost put to tender (ECPT) whichever is higher and Additional Performance Guarantee as per OM No. DG/CON/Maintenance 2023/18 dated 27.02.2026 (Copy enclosed at P- 83-84)
(iii)	Security Deposit	2.5% of the accepted tendered value of the work

SCHEDULE 'F'

General Rules & Directions:

Officer inviting Tender: **Executive Engineer, Manesar Division**, CPWD, NSG Camp, Manesar, Gurgaon (Haryana) – 122051.

Definitions:

2(vi)	Engineer-in-Charge	Major Component (Civil): Executive Engineer, Manesar Division, CPWD, or successor thereof Minor Component (E&M Works): Executive Engineer (E), Faridabad Electrical Division, CPWD, or successor thereof
2(viii)	Accepting Authority	Superintending Engineer, Faridabad Circle, CPWD or Successor thereof
2(x)	Percentage on cost of materials and Labour to cover all overheads and profits	15%
2(x)(b)	Standard Schedule of Rates	Civil Works: Delhi Schedule of Rates 2023 (Vol. 1 & 2) with up-to-date correction slips modified as per cost index of Delhi NCR E&M Works: Delhi Schedule of Rates 2025 (E&M) with up-to-date correction slips modified as per cost index of Delhi NCR
2(xi)	Department	Central Public Works Department (CPWD)

9(ii)	Standard CPWD Contract Form:	General Conditions of Contract-2023 (Maintenance Works) and CPWD Form-7 (Percentage Rate Tender & Contract for Works) as amended / modified up to the last date of submission of Tenders
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Clause-1:

(i)	Time allowed for submission of Performance Guarantee, programme chart (Time and Progress) and applicable labour licenses, registration with EPFO, ESIC and BOCW Welfare Board or proof of applying thereof from the date of issue of letter of acceptance.	07 (Seven) days
(ii)	Maximum allowable extension with late fee @ 0.1% per day of Performance Guarantee amount beyond the period provided in (i) above	03 (Three) days

Clause-2:

(i)	Authority for fixing compensation under clause 2	Superintending Engineer (Civil), Faridabad Circle, CPWD or Successor thereof
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Clause-5:

(i)	Number of days from the date of issue of letter of acceptance for reckoning date of start	10 (Ten) days
(ii)	Time allowed for completion of work	8 (Eight) Months

TABLE OF MILE STONES

S. No.	Description of Milestone (Physical)	Time allowed (From Stipulated Date of Start)	Amount to be With-held in Case of Non-Achievement of Milestone
1.	Financial Progress of 1/8 th of Tendered Amount	25% of Completion Period	1.25% of Tendered Value for failure of each Milestone
2.	Financial Progress of 3/8 th of Tendered Amount	50% of Completion Period	
3.	Financial Progress of 3/4 th of Tendered Amount	75% of Completion Period	
4.	Financial Progress of Full Tendered Amount	Completion Period	

1. Withheld amount shall be released if and when subsequent milestone is achieved within respective time specified. However, in case milestones are not achieved by the Bidder for the work, the amount shown against milestone shall be withheld.
2. Intending bidder may submit phasing of activities/milestones based on their resources and methodology at the time of bidding corresponding to physical milestones/stages indicated in the above table. These

shall be formed part of the agreement after approval of the accepting authority, otherwise it would be assumed that agency agrees with the above-mentioned physical milestones.

Authority to decide:

(i)	Extension of time	Executive Engineer, Manesar Division, CPWD, NSG Camp, Manesar, Gurgaon or his successor thereof
(ii)	Rescheduling of mile stones	Superintending Engineer, Faridabad Circle, CPWD or Successor thereof
(iii)	Shifting of date of start in case of delay in handing over of site	

Clause-5.4:

Schedule of rate of recovery for delay in submission of the modified programme in terms of delay days: **Rs. 500/- per day**

Clause- 6 : Applicable

Mode of measurement: Computerised Measurement Book (EMB/CMB): CMB

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.61.41 Lakh (Civil) Rs.34.49 Lakh (Electrical)
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Clause-7A:

Whether Clause 7A shall be Applicable	Yes, No Running Account Bill shall be paid for the work till the applicable labour licenses, registration with EPFO, ESIC and BOCW Welfare Board, whatever applicable as submitted by the Bidder to the Engineer-in-Charge.
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Clause-10A: List of Testing equipment's to be provided by the agency at Site Lab:

Equipment for conducting necessary Site Tests as per requirements of Specifications and quality assurance plan shall be provided and installed at site in the well-furnished Site Laboratory by the contractor at his own cost.

Clause-10B(ii)

Whether Clause 10B(ii) shall be Applicable	Not applicable
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Clause-10C:(Applicable in only those contracts where clause 10CC is not applicable)

Component of Labour Expressed as percent of value of work	15%
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Clause-10CC: Not Applicable

Clause-11:

Specifications to be followed for execution of work:
CPWD Specifications 2019 Vol. 1 and Vol. 2 or latest version of above specifications as issued / amended up to last date of tender submission

Clause-12:

12.3 & 12.4	Deviation Limit beyond which clauses 12.3 shall apply	No Limit
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Clause-16:

Competent Authority for deciding reduced rates:
Superintending Engineer (Civil), Faridabad Circle, CPWD or Successor thereof

Clause-19:

Clause 19C : Authority to decide penalty for each default	Executive Engineer, Manesar Division, CPWD, NSG Camp, Manesar, Gurgaon
Clause 19D : Authority to decide penalty for each default	
Clause 19G : Authority to decide penalty for each default	
Clause 19K : Authority to decide penalty for each default	

Clause-25:

(i)	Conciliator	Special Director General (Chandigarh), CPWD or Successor thereof
(ii)	Arbitrator Appointing Authority	Superintending Engineer (Civil), Faridabad Circle, CPWD or Successor thereof
(iii)	Place of Arbitration	New Delhi or NCR

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

Tendered Cost of work (Rs. in Crore)	Requirement of Technical Staff		Minimum experience (Years)	Designation of Technical Staff	Rate at which recovery shall be made from the contractor in the event of not fulfilling provision of clause 36(i)
	Qualification	Number (of Major + Minor Component)			
Tendered Cost (5 to 10 crore)	Graduate Engineer	1	5 (and having experience of one similar nature of work)	Project Manager	Rs.25,000/- per month per person
	Graduate Engineer or Diploma Engineer	1+1	2 or 5 respectively	Project Planning/ Quality/ Billing Engineer	Rs.15,000/- per month per person

Note:

1. 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 company can be treated at par with Graduate Engineers for the purpose of such deployment subject to 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 based on Delhi Schedule of Rates	Delhi Schedule of Rates 2023 with Amendments up to the date of submission of bid.
ii)	Variations permissible on theoretical quantities:	
(a)	Cement : - For works with estimated cost put to tender not more than Rs.25 Lakh. - For works with estimated cost put to tender more than Rs.25 Lakh.	3% Plus/Minus 2% Plus/Minus
(b)	Bitumen for all works.	2.5% Plus only and nil on minus side.
(c)	Steel reinforcement and structural steel sections for each diameter, section and category.	2% Plus/minus
(d)	All other materials	Nil

STANDARD GENERAL CONDITIONS OF CONTRACT

1. Latest edition of “**General Conditions of Contract - 2023 (Maintenance Works)**” as amended / modified up to the last date of submission of Tenders, which is available in market as CPWD publication and also available on CPWD official website at https://cpwd.gov.in/Documents/cpwd_publication.aspx shall be deemed to be part of the Tender document and Agreement.
2. The General Conditions of Contract (GCC) are amended from time to time through issue of OMs under series DG/CON which are available on CPWD official website at [http://www.cpwd.gov.in/Documents/Official Circulars/ DG CON](http://www.cpwd.gov.in/Documents/Official%20Circulars/DG%20CON). These amendments/modifications issued up to last date of submission of Tenders shall be deemed to be part of the Tender document and Agreement.
3. The General Conditions of Contract (GCC) and its amendments as mentioned above, though not attached with this tender document, shall be deemed to be part of the Tender document and Agreement to be signed with the successful bidder.

CONDITIONS FOR ASSOCIATE AGENCY FOR SPECIALISED / E&M WORKS

1.0 PROCEDURE FOR EXECUTION OF SPECIALIZED CIVIL/HORTICULTURE ITEMS:

- 1.1 Specialized Items have been provided **in Annexure-6 of SOP** for CPWD Works Manual (amendments to the Annexure-6 of SOP up to last date of tender submission shall be applicable).
- 1.2 These items should be got executed only through associated specialized agencies **currently actively engaged** in execution of the said specialized item and fulfil eligibility criteria prescribed in the agreement.
- 1.3 The Contractor(s) shall submit his proposal for the approval of the Engineer-in-Charge, the names of specialized agencies of repute along with their technical capability /experience proposed to be engaged by him. The proposal shall be submitted as early as possible but not later than one month before proposed date of start of execution of such items as per approved work programme.
- 1.4 It shall be the responsibility of main contractor to sort out any dispute / litigation with the Specialized Agencies without any time & cost overrun to the Department. The main contractor shall be solely responsible for settling any dispute / litigation arising out of his agreement with the Specialized Agencies. The contractor shall ensure that the work shall not suffer on account of litigation/ dispute between him and the specialized agencies / sub-contractor(s). No claim of hindrance in the work shall be entertained from the Contractor on this account. No extension of time shall be granted and no claim what so ever, of any kind, shall be entertained from the Contractor on account of delay attributable to the selection/rejection of the Specialized Agencies.

2.0 ELIGIBILITY CONDITIONS FOR SPECIALIZED CIVIL/HORTICULTURE WORKS:

- 2.1 The tenderer(s) must associate eligible agencies to execute the specialized works, who fulfil the prescribed eligibility criteria. However, the contractor himself shall also be eligible to carry out any or all of such specialized works without associating any specialized agency provided he fulfils the prescribed eligibility criteria
- 2.2 Eligibility requirement for associate specialized agencies for execution of the specialized civil items shall be as below:

The agency must be **currently actively engaged** in execution of the said specialized item and must have satisfactorily executed **similar works** during last 5 (five) years from date of submission of proposals for approval of associate specialized agency as below:

- (i) Three works each of value not less than 40% of corresponding estimated cost of the specialized items of the work in the NIT.

or

- (ii) Two works each of value not less than 60% of corresponding estimated cost of the specialized items of the work in the NIT.

or

- (iii) One work of value not less than 80% of corresponding estimated cost of the specialized items of the work in the NIT.

3.0 CONDITIONS FOR ASSOCIATE AGENCY FOR E&M WORKS:

- 3.1 Specialized E&M items have been provided in Annexure-6 of SOP for CPWD Works Manual (amendments to the Annexure-6 of SOP up to last date of tender submission shall be applicable).

- 3.2 Specialized items of E&M work shall be got executed only through eligible associated specialized agencies currently actively engaged in execution of the said specialized items and fulfil eligibility criteria prescribed in the agreement.
- 3.3 Also, unless the main contractor himself meets the eligibility conditions for execution of E&M works (Normal items), he will have to associate with agencies, fulfilling the eligibility requirements prescribed in the tender document.
- 3.4 In the event of the associated E&M agency not performing satisfactorily or failure of associate agency to complete the E&M work, the main contractor on written directions of the department, shall remove the Associate agency deployed on the work and shall submit proposal for approval of new associate agency without any loss of time or variation in cost to the department. Such new associate agency shall also give an undertaking along with the main tenderer that both of them shall guarantee for the equipment already supplied for which payment has been released by the department in part. If any equipment supplied for the work, during the currency of the earlier associate agency and paid partly by the department, becomes redundant /not in a position to be installed and commissioned and put to beneficial use due to change in agency for execution of E&M work, the main contractor shall be liable for replacement of the equipment(s) at no cost to the department. No change of associate agency will be allowed without prior approval of the Engineer-in-charge of the work.
- 3.5 The main contractor shall be responsible and liable for proper and complete execution of the E&M works despite having engaged associated agencies and ensure coordination and completion of all E&M works.
- 3.6 The Composite Contractor and the associated specialized agencies shall give required affidavit to confirm their association.
- 3.7 The associate contractor shall attend the inspection of the work by the Engineer-in-charge of E&M works as and when required.

4.0 ELIGIBILITY CRITERIA FOR ASSOCIATED AGENCY FOR E&M WORKS:

- 4.1 The tenderer(s) must associate eligible agencies to execute components of E&M Works who fulfil the prescribed eligibility criteria. However, the contractor shall also be eligible to carry out himself any or all the components of E&M Works 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 get it installed from authorized agency/service provider of the manufacturer or specialized agency as per the eligibility criteria mentioned below:

- 4.2 **ELIGIBILITY CRITERIA:** Eligibility criteria for various components E&M Works (Normal and Specialized) shall be as below:

- (a) **For Normal E&M Works e.g. Internal Electrical Installations, External Lighting/Cabling/ Earthing & Service Connection etc.:**

The associate agency shall be registered/enlisted in CPWD in Building & Roads category in appropriate class and should have a valid electrical license.

- (b) **For items of E&M work except Sub-stations, DG sets, HVAC & STP:**

The contractor shall Associate and sign MoU with Authorised Channel Partner of OEM or Associate specialized agency having valid electrical license and experience of having successfully completed “Similar Works” during last 5 (five) years from date of submission of proposals for approval of Associate Specialized Agency as under:

- (i) Three Similar completed works each of value not less than 40% of Estimated cost of relevant specialized E&M Work.
or
- (ii) Two Similar completed works each of value not less than 60% of Estimated cost of relevant specialized E&M Work.
or
- (iii) One Similar completed work each of value not less than 80% of Estimated cost of relevant specialized E&M Work. Similar work shall mean “SITC of relevant specialized E&M Work”.

(c) For works of DG Sets, HVAC, Sub-Station works:

The Associate agency must have valid electrical license and should have successfully completed “Similar Works” during last 5 years ending previous day of last date of submission of tender as under:

- (i) Three Similar completed works each of value not less than 40% of Estimated cost of relevant component of work of DG Sets / HVAC / Sub-Station with capacity of individual DG Set/Chiller plant/Transformer not less than 80% of individual capacity (rounded off to next available higher capacity) of the transformer proposed in the work.
or
- (ii) Two Similar completed works each of value not less than 60% of Estimated cost of relevant component of work of DG Sets / HVAC / Sub-Station with capacity of individual DG Set / Chiller plant / Transformer not less than 80% of individual capacity (rounded off to next available higher capacity) of the transformer proposed in the work.
or
- (iii) One Similar completed work each of value not less than 80% of Estimated cost of relevant component of work of DG Sets / HVAC / Sub-Station with capacity of individual DG Set/Chiller plant/Transformer not less than 80% of individual capacity (rounded off to next available higher capacity) of the transformer proposed in the work. Similar work shall mean “SITC of relevant specialized E&M Work e.g. DG Sets / HVAC / Sub-Station”.

(d) SITC of E&M Works of STP/WTP/ETP :

The Associate agency must have valid electrical license and should have successfully completed “Similar Works” during last 5 years ending previous day of last date of submission of tender as under:

- (i) Three Similar completed works each (i) of value not less than 40% of cost of E&M component of STP/WTP work or (ii) with design capacity of the STP/WTP/ETP plant not less than 40% of the capacity of proposed plant to be installed.
or
- (ii) Two Similar completed works each (i) of value not less than 60% of cost of E&M component of STP/WTP work or (ii) with design capacity of the STP/WTP/ETP plant not less than 60% of the capacity of proposed plant to be installed.
or
- (iii) One Similar completed work (i) of value not less than 80% of cost of E&M component of STP/WTP work or (ii) with design capacity of the STP/WTP/ETP plant not less than 80% of the capacity of proposed plant to be installed. Similar work shall mean “SITC of E&M Works of STP/WTP/ETP Plants”.

5.0 SUBMISSION OF PROPOSAL FOR APPROVAL OF ASSOCIATED AGENCY:

- 5.1 The Contractor(s) shall submit his proposal for the approval of the Engineer-in-Charge, the names of associate agencies of repute along with verifiable completion certificates of similar work experience, valid Electrical Contractor's license, self-attested GST registration and other documents in respect of the associated agencies, duly attested by both associated agency and the main contractor.
- 5.2 The proposal shall be submitted as early as possible but not later than one month before proposed date of start of execution of such components of E&M work as per approved work programme.
- 5.3 In case the main contractor is himself eligible (as per eligibility criteria) for executing all or some components of E&M work and intends doing job himself, the main contractor must submit the documents as per eligibility criteria mentioned for associated agency of individual E&M component(s) for approval of Engineer-in-charge.
- 5.4 Proposal for associating agency for components of E&M work shall be submitted, as per proforma given in this tender document, from each of proposed associate independently for all E&M component in prescribed Proforma given herein.

PROPOSAL FOR ASSOCIATING AGENCY FOR E&M WORKS

I/we hereby propose the following agency for execution of E&M work component mentioned herein. Consent Letter from the proposed associated agency is enclosed.

- (i) Name of work :
- (ii) Component of E&M Work :
- (iii) Name of Associated Agency :
- (iv) Details of Enlistment :
- (v) Category and Class of Enlistment :
- (vi) Monetary limit of work in Enlistment :
- (vii) Validity of Enlistment :
- (viii) Copy of Enlistment Order attached : (Yes /No)
- (ix) Copy of electrical contractor license attached : (Yes /No)
- (x) Copy GST Registration attached : (Yes/No)
- (xi) Copy PAN Card Attached : (Yes/No)
- (xii) Consent Letter of agency attached : (Yes/No)
- (xiii) Copy of completion certificates of similar work experience attached: (Yes /No)

Encls: Self Attested photocopies of as stated above

Seal & Signature of the Main Contractor

CONSENT LETTER FROM ASSOCIATE AGENCY FOR E&M WORKS

Name of Work:

I / We hereby give my consent to associate with M/s, for executing the (Mention category) component of E&M work of the above-mentioned work.

I / We will execute the work as per specifications and conditions of the agreement for the work and as per directions of the Engineer-in-Charge for the said component of E&M work till the completion of the work.

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

I / We will employ full time technically qualified Engineer / supervisor for the said component of E&M work as required for the work.

I / We will attend inspection of work by officers of the department as and when required.

Dated:

Seal & Signature of Associate E&M Contractor

MEMORANDUM OF UNDERSTANDING (MOU)

Between

M/shaving his registered office at
..... [Henceforth called the **Main Contractor**] which expression shall unless repugnant to the subject or context include its administrators, successors and assigns.

And

M/shaving his registered office at
..... [Henceforth called **Associate E&M Contractor**] which expression shall unless repugnant to the subject or context include its administrators, successors and assigns.

Whereas, the Central Public Work Department (CPWD), have awarded EPC Contract to the Main Contractor for the work of :” as per Schedule of Quantities, Specifications, Terms and Conditions contained in the Agreement.

Whereas, This Memorandum of Understanding has been entered into for assigning responsibility of execution of (mention category) **component of E&M Work** forming part of the above work to the Associate E&M Contractor by the Main Contractor.

Now therefore, it is agreed between the Parties here to as follows :

1. Both the parties have gone through and understood the various Terms & Conditions and Clauses of the Contract for the work awarded to the Main Contractor and willingly agree to abide by them.
2. The 'Associate E&M Contractor' will execute (mention category) Component of E&M Work in the wholesome manner as per Terms & Conditions of the Contract. However, both Parties shall be **jointly and severally responsible** for the execution of said Component of work as per the Contract.
3. It is understood that payment for (mention category) component of E&M Work even though executed by the Associate E&M Contractor shall be done by the Department (CPWD) to the Main Contractor as per Terms & Condition of the Contract. The Parties have entered into separate agreement on Terms & Conditions for payment to be made by the Main contractor to the Associate E&M Contractor for the work done by them. The main Contractor shall promptly make payment to the Associate E&M Contractor as per agreed Terms & Condition between them. In the event of failure to make due payments to the Associate E&M Contractor by Main Contractor, the Department (CPWD) may make such payments directly to the Associated E&M Contractor after deducting the same from Bills payable to the Main Contractor.
4. In case of any dispute between Parties, either of them may go for mediation by the Engineer-in-charge. In the event of disagreement with decision of Engineer-in-Charge, either of the Parties may appeal against the mediation to the SE/SE-cum-PD/CE/CE-cum-ED in whose jurisdiction the work falls. His decision shall be final and binding on both Parties.
5. The 'Associate E&M Contractor' shall be liable for disciplinary and penal action(s) as per Contract if he fails to discharge his contractual commitments related to said component of E&M works
6. All the machinery and equipment, tools and tackles required for execution of (mention category) component of E&M Work, as per the Contract, shall be the responsibility of the 'Associate E&M Contractor'.

7. The Technical and other site staff required for the said (mention category) component of E&M Work shall be arranged by the 'Associate Data Centre Contractor' as per terms and conditions of the Contract.
8. Site Order Book & other Registers maintained for the said work shall be signed by the Representatives of Main Contractor as well as 'Associate E&M Centre Contractor' or themselves.
9. All the correspondence regarding execution of the (mention category) component of E&M Work shall be done by the department with the Associate E&M Contractor with a copy to the Main contractor. In case of non-compliance of the provisions of the Contract, the Main Contractor, as well as the Associated E&M Contractor shall be responsible and action under Clauses 2 and 3 may be initiated and taken against the Main Contractor.
10. This MoU between Parties 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 Contract for execution of the above work.
11. This MOU shall be valid till the duration of completion of above work and shall be extended if so required by the CPWD.

Date:

Place:

Signature of Main Contractor

Signature of Associate E&M Contractor

1. Witness with address

2. Witness with address

(From Main Contractor side)

(From Associate E&M Contractor side)

PART - B

MAJOR COMPONENT (CIVIL WORK)

ADDITIONAL CONDITIONS FOR CIVIL WORKS

1. Except for the items, for which Particular Specifications are given herein or where it is specifically mentioned otherwise in this bid document, the work shall generally be carried out in accordance with the “**CPWD Specifications - 2019 (Vol. I & II)**” for Civil works or their latest version with up to date correction slips and CPWD Specification for Horticulture works with up to date correction slips (hereinafter to be collectively referred to as ‘CPWD Specifications’). Wherever CPWD Specifications are silent, the latest BIS Codes/Specifications, National Building Code-2016, MoRTH Specification, Manufacturers Specifications, Sound Engineering practices or well-established local construction practices as decided by the Engineer-in-charge shall be followed.
2. The order of preference in case of any discrepancy as indicated in condition No. 8.1 under “Conditions of Contract” given in standard CPWD Contract form may be read as the following:
 - i) Nomenclature of items as per Schedule of Quantities
 - ii) General/ Special Conditions and Particular Specifications as provided forming part of tender document.
 - iii) CPWD Specifications with up-to-date Correction slips
 - iv) Architectural/Structural drawings
 - v) Indian Standard Specifications of BIS
 - vi) National Building Code - 2016
 - vii) Manufacturers specifications.
 - viii) Sound Engineering practices or well-established local construction practices as decided by the Engineer-in-charge.

A reference made to any Indian Standard Specifications in these documents, shall imply to the latest version of that standard, including such revisions / amendments as issued by the Bureau of Indian Standards up to 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.

3. The proposed work is a prestigious project and quality of work is of paramount importance. Contractor shall have to engage well experienced skilled labour and deploy modern T&P and other equipment to execute the work. ***Many items & specialized works will require engagement of specialised agencies & skilled workers having experience in execution of such items.***
4. The tenderer shall acquaint himself with the proposed site of work, its approach roads, working space available etc. before quoting his rates and no claim on this account shall be entertained by the department.
5. The specifications given herein this bid document are general but not exhaustive and does not mention all the incidental works required to be carried out for complete execution of the item of work. The work shall be carried out, all in accordance with true intent and meaning of the specifications and the drawings taken together, regardless of whether the same may or may not be particularly shown on the drawings and/ or described in the specifications, provided that the same can be reasonably inferred there from. There may be several incidental works, which are not mentioned in the contract document/ specifications but will be necessary to complete the item in all respect. All these incidental works/ costs which are not mentioned but are necessary to complete the work shall be deemed to have been included in the overall amount quoted by the contractor for various components of work.

No adjustment of rates shall be made for any variation in quantum of incidental works due to variation/change in actual working drawings. Also, no adjustment of rates shall be made due to any change in incidental works or any other deviation in such element of work (which is incidental to the items of work and are necessary to complete such items in all respects) on account of the directions of Engineer-in-charge Nothing extra shall be payable on this account.

6. ***The contractor shall make his own arrangements for obtaining water & electricity connections and make necessary payments directly to the department concerned.***
7. 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.
8. The contractor(s) shall study the soil investigation report for the site, available in the bid document/ office of the Engineer-in-charge and satisfy himself about complete characteristics of soil and other parameters at site. However, no claim on the alleged inadequacy or incorrectness of the soil data supplied by the department shall be entertained.
9. The tenderer shall see the approaches to the site. In case any approach from main road is required at site or existing approach is to be improved and maintained by the contractor, the same shall be provided, improved and maintained by the contractor at his own cost. No payment shall be made on this account.
10. The 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.
11. The contractor(s) shall inform/issue notices to the Municipality, police and other authorities that may be required as per law and obtain all requisite permission/ licenses for temporary obstructions, enclosures etc. Contractor(s) shall 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 property whether public or private and shall supply and maintain lights either for illumination or for cautioning the public at night.
12. For construction works which are likely to generate malba / rubbish, the contractor shall reuse it at site as directed by the Engineer-in-charge or hand over to recycling agents or dispose of at his own cost to the notified/specified Municipal dumping ground. No deduction on this account shall be made from the agency as well as no extra payment will be made to agency for the same.
13. The contractor shall take all necessary precautions to prevent any nuisance or inconvenience to the owners, tenants or occupiers of adjacent properties and to the public in general and to prevent any damage to such properties and any pollution of smoke, streams and water-ways. He shall make good at his cost and to the satisfaction of the Engineer-in-Charge, any damage to roads, paths, cross drainage work or public or private property whatsoever caused thereon by the contractor. All waste or superfluous materials shall be carried away by the contractor without any reservation entirely to the satisfaction of the Engineer-in-Charge.
14. Utmost care shall be taken to keep the noise level to the barest minimum so that no disturbance as far as possible is caused to the occupants / users of building/adjacent properties.
15. The works shall be carried out in accordance with the Architectural drawings and structural drawings to be issued/approved/NOC given 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 of the work and satisfy himself that the information available thereof 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 account of any discrepancy and/or incomplete information.

16. The 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 detailed drawings to developed by the contractor's consultant after getting NOC from the Engineer-in-Charge.
17. Other agencies may also be simultaneously executing works assigned to them for this Project and the contractor shall coordinate and facilitate for the same. The contractor shall leave such recesses, holes, openings trenches etc. as may be required for such related works (for which inserts, sleeves, brackets, conduits, base plates, 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 and brick work, if required, and nothing extra shall be payable on this account.
18. 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 of 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.
19. Some restrictions may be imposed by the security agencies/client on the working hours and on movement of labour, materials etc in the campus/site and may require issuing identity cards to all persons authorized by contractor to do work / visit the work site. The contractor shall be bound to follow all such restrictions / instructions and no claim whatsoever shall on this account will be entertained. The loss of time on this account, if any, shall have to be made up by generating additional resources etc.
20. The rates quoted by the contractor are deemed to be inclusive of site clearance, setting out work, profile, establishment of reference bench mark, spot levels, construction of all safety and protection measure, earth embankments, preparatory works, all testing of materials, working during monsoon, working at all depths, height and locations etc. unless specified in the schedule of quantities.
21. Royalty at the prevailing rates wherever payable shall have to be paid by the contractor on the boulders, metal, shingle, sand and bajri etc. Or any other material collected by him for the work direct to revenue authorities and nothing extra shall be paid by the department for the same.
22. No payment shall be made for any damage caused by rain, snowfall, flood or any other natural calamity, whatsoever during the execution of the work until handing over to the client. The contractor shall be fully responsible for any damage to the govt. property and work for which the payment has been advanced to him under the contract and he shall make good the same at his risk and cost. The contractor shall be fully responsible for safety and security of his material, T&P, Machinery brought to the site by him.
23. ***The contractor shall deploy resources e.g. manpower, labour, T&P, Plant & Equipment etc. as per actual requirement of work. No damages/compensation shall be payable on account of idle manpower, labour, T&P, Plant and Equipment and loss of profit etc. for whatsoever reason.***
24. The rates for all items of work shall, unless clearly specified otherwise, include cost of all labour, material, tools and plants and other inputs involved in the execution of the item.

25. The contractor (s) shall quote all-inclusive rates against the items in the schedule of quantities and nothing extra shall be payable for any of the conditions and specifications mentioned. In the tender documents unless specifically specified otherwise.
26. 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.
27. The work shall be executed and measured as per metric dimensions given in the Schedule of quantities, drawings etc. (FPS units wherever indicated are for guidance only).
28. Unless otherwise specified in the schedule of quantities, the rates tendered by the contractor shall be inclusive of all costs & taxes/levies/royalties etc. and shall apply to **all heights, leads and lifts and nothing extra shall be payable** on this account.
29. The foundation trenches shall be kept free from water while works below ground level are in progress.
30. No foreign exchange shall be made available by the Department for importing (purchase) of equipment, plants, machinery, materials of any kind or any other items required to be carried out during execution of the work. No delay and no claim of any kind shall be entertained from the Contractor, on account of variation in the foreign exchange rate.
31. All ancillary and incidental facilities required for execution of work like labour camp, stores, fabrication yard, offices for Contractor, watch and ward, temporary ramp required to be made for working at the basement level, temporary structure for plants and machineries, **temporary barricading or fencing around the working sites**, water storage tanks, installation and consumption charges of temporary electricity, telephone, water etc. required for execution of the work, protection works, testing facilities / laboratory at site of work, facilities for all field tests and for taking samples etc. during execution or any other activity which is necessary (for execution of work and as directed by Engineer-in-Charge), shall be deemed to be included in rates quoted by the Contractor. **Nothing extra shall be payable on these accounts.** Before start of the work, the Contractor shall submit to the Engineer-in-Charge, a site / construction yard layout, specifying areas for construction, site office, positioning of machinery, material yard, cement & other storage, fabrication yard, site laboratory, water tank etc.
32. For completing the work in time, the Contractor might be required to work in two or more shifts (including night shifts). Normally contractors shall not be allowed to execute the RCC, electrical and finishing work at night. Work at night shall, however, be allowed if the site conditions/circumstances so demand. No claim whatsoever shall be entertained on this account, not with-standing the fact that the contractor may have to pay extra amounts for any reason, to the labourers and other staff engaged directly or indirectly on the work according to the provisions of the labour and other statutory bodies regulations and the agreement entered upon by the contractor with them.
33. 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.
34. All material shall only be brought at site as per program finalized with the Engineer-in-Charge. Any pre-delivery of the material not required for immediate consumption shall not be accepted and thus not paid for.
35. The contractor(s) shall take instructions from the Engineer-in-Charge regarding collection and stacking of materials at any place. No excavated earth or building rubbish shall be stacked on areas where other buildings, roads, services and compound walls are to be constructed. The stacking shall

take place as per stacking plan however, if any change is required, the same shall be done with the approval of Engineer-in-Charge.

36. The Contractor shall bear all incidental charges for cartage, storage and safe custody of materials issued by department/arranged by the contractor.
37. ***All mass Reinforced Cement Concrete work/RCC in Structural Members shall be design mix concrete of specified grade. The contractor shall install on/near the project site automatic batching plant of desired capacity to be approved by Engineer-in-charge for production of design mix concrete which shall be used in the work or procure it from RMC plant to be approved by Engineer-in-charge.***
38. The terms machine batched, machine mixed, and machine vibrated concrete used elsewhere in agreement shall mean the concrete produced in concrete batching and mixing plant and if necessary transported by transit concrete mixers, placed in position by the concrete pumps, tower crane and vibrated by surface vibrator /needle vibrator / plate vibrator, as the case may be to achieve required strength and durability.
39. The cost of flooring is inclusive of providing sunken flooring in bath-rooms, kitchen, etc. and nothing extra on this account shall be payable.
40. Any legal or financial implications resulting out of carriage of earth from outside or disposal of earth shall be sole responsibility of the contractor. Nothing extra shall be paid on this account.
41. No chase cutting/dismantling of plaster/RCC/CC shall be allowed, so contractor has to execute the electrical work accordingly. The work should be planned in a systematic manner so that chase cuttings in the walls, ceilings and floors are minimized. Wherever absolutely essential, the chase shall be cut using chase cutting machines. Chases will not be allowed to be cut using hammer / chisel. The electrical boxes should be fixed in walls simultaneously while raising the brick work. The contractor shall ensure proper coordination of various disciplines viz. sanitary & water supply, electrical, fire-fighting and any other services.
42. The work of water supply, internal sanitary installations and drainage etc. shall be carried out as per CPWD Specifications, NBC-2016 and 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 wherever applicable.
43. In case of local Municipal regulations / restrictions by client /non-availability space at site if huts for labour are not allowed to be erected at the site of work, the contractor shall be required to provide such accommodation at suitable place at his own cost and nothing extra shall be paid on this account.
44. Any cement slurry added over base surface for continuation of concerting for better bond is deemed to have been built in the items and nothing extra shall be payable and no extra cement considered in consumption on this account.
45. Existing drains, pipes, cables, over-head wires, sewer lines, water lines and similar service encountered in the course of the execution of work shall be protected against the damage by the contractor at his own expense. In case the same are to be removed and diverted. The same shall be payable to the contractor. The contractor shall work out the cost and the same shall be approved by Engineer-in-Charge. 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.
46. The contractor shall be responsible for the watch and ward of the building complex and to safeguard materials, equipment, 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.

47. SETTING OUT

- 47.1. 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.
- 47.2. The contractor shall establish, maintain and assume responsibility for grades, lines, levels and bench marks. He shall report any errors or inconsistencies regarding grades, lines, levels, dimensions to the Engineer-in-Charge before commencing work. Commencement of work shall be regarded as the contractor's acceptance of such grades, lines, levels and dimensions and no claim shall be entertained at a later date for any errors found.
- 47.3. If at any time, any error in this respect shall appear during the progress of the work, the contractor shall, at his own expense rectify such error if so required to the satisfaction of the Engineer-in-Charge.
- 47.4. Though the site levels may be indicated in the drawings the contractor shall ascertain himself and confirm the site levels with respect to GTS bench mark from the concerned authorities.
- 47.5. The approval by the Engineer-in-Charge of the setting out by the contractor shall not relieve the contractor of any of his responsibilities.
- 47.6. The contractor shall be entirely and exclusively responsible for the horizontal, vertical and other alignment, the level and correctness of every part of the work and shall rectify effectively any errors or imperfections therein. Such rectifications shall be carried out by the contractor at his own cost to the instructions and satisfaction of the Engineer-in-Charge.

48. DE-WATERING

- 48.1. De-watering required, if any, shall be done conforming to BIS Code IS: 9759 (guide lines for de-watering during construction) and / or as per the specifications approved by the Engineer-in-charge. Design of an appropriate and suitable dewatering system shall be the Contractor's responsibility.
- 48.2. Such scheme shall be modified / augmented as the work proceeds based on fresh information discovered during the progress of work, at no extra cost. At all times during the construction work, efficient drainage of the site shall be carried out by the Contractor and especially during the laying of plain cement concrete, taking levels etc. The Contractor shall also ensure that there is no danger to the nearby properties and installations on account of such lowering of water table. If needed, suitable precautionary measures shall be taken by the Contractor. Also the scheme of dewatering adopted shall have adequate built in arrangement to serve as stand-bye to attend to repair of pumps etc. and disruption of power / fuel supply. Nothing extra shall be payable on this account.
- 48.3. In trenches where surface water is likely to get into cut / trench during monsoons, a ring bund of puddle clay or by any other means shall be formed outside, to the required height, and maintained by the Contractor. Also, suitable steps shall be taken by the Contractor to prevent back flow of pumped water into the trench. Nothing extra shall be payable on this account.
- 48.4. For works below ground level the contractor shall keep that area free from water. If dewatering or bailing out of the water is required, the contractor shall do the same at his own cost and nothing extra shall be paid. Nothing extra shall be paid for execution of work in or under water and / or liquid mud including pumping out of water as required.

49. PROGRAMME CHART

- 49.1. The Contractor shall prepare an integrated programme chart in MS Project/ Primavera software 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 fulfilment of the programme within the stipulated period or earlier and submit the same for approval to the Engineer-in-Charge within ten days of award of the contract. Non-submission of such programme shall attract the recoveries as mentioned in the Schedule-F of the tender document.
- 49.2. The programme chart should include the following:
- (a) Descriptive note explaining sequence of the various activities.
 - (b) Network (PERT/CPM/BAR CHART) in MS Project/Primavera Software (For small works, Bar-Chart in Excel sheet may be accepted as approved by Engineer-in-charge)
 - (c) Programme for procurement of materials by the contractor.
 - (d) Programme of procurement of machinery / equipment having adequate capacity, commensurate with the quantum of work to be done within the stipulated period, by the contractor.
- 49.3. In addition to above, the contractor shall submit shuttering schedule adequate to complete structure work within laid down physical milestone etc. and to achieve the progress of work as per programme, he must bring sufficient shuttering material required for cement concrete and R.C.C. works etc.
- 49.4. If at any time, 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. The modified schedule of programme shall be approved by the Engineer-in-Charge. Non-submission of such revised programme shall attract the recoveries as mentioned in the Schedule-F of the tender document.
- 49.5. 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 the 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.

50. PROGRESS REPORT

The contractor shall submit to the Engineer-in-charge on the 7th day of each month, 2 hard copies and one on soft copy (CD) of monthly progress report of the work. Such progress report will include the project progress, summary, work progress (planned vs actual), CPM chart, status of financial progress and achievement of milestone, manpower deployment status, inventory of materials and photographs of important activities. For delay in submission of the report, compensation @ Rs. 2000/- (Rupees Two Thousand only) per day of delay subject to maximum of Rs.20,000/- for each report will be recovered from the amount payable to the contractor.

51. SAFETY PRECAUTIONS

- 51.1. Contractor shall within two weeks of award of work, submit to the Engineer-in-Charge for his approval, list of measures for maintaining safety of manpower deployed for construction.
- 51.2. ***Contractor shall provide barricading all around the construction site at his own cost for segregating the construction site and also to control the dust pollution as per guidelines of NGT and Local Bodies/Authorities.*** Entry to the site shall be controlled for proper security of man and materials and to avoid accidents.

- 51.3. The Contractor(s) 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 damages and accidents caused to existing/new work due to negligence on his part. No hindrances shall be caused to traffic during the execution of the work.
- 51.4. In case of any accident of labours / contractual staff's the entire responsibility will rest on the part of the contractor and any compensation under such circumstances if becomes payable the same shall be entirely borne by the contractor and department shall have no role on this account.
- 51.5. It shall be ensured by the contractor that no electric live wire is left exposed or unattended to avoid any accidents in this regard.
- 51.6. 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.
- 51.7. For facia work, outer finishing and other RCC works etc. double steel scaffolding having two sets of vertical supports with steel staircase for inspection of works by engineer in charge shall be used. The supports shall be sound and strong, tied together with horizontal piece over which scaffolding planks shall be fixed.
- 51.8. In the event of the contractor(s) committing a default or breach of any of the provisions of the Central Public Works Department, Contractor's Labour Regulations and Model Rules for the protection of health and sanitary arrangements for the workers as amended from time to time or furnishing any information or submitting or filing any under the provisions of the above Regulations and' Rules which is materially incorrect, he/they shall, without prejudice to any other liability, pay to the Government of Rs.25,000/- per day for each day of default subjected to a maximum of 5 percent of the estimated cost of the work put to tender. The decision of the Engineer-in-Charge shall be final and binding on the parties.
- 51.9. The Contractor shall display all permissions, licenses, registration certificates, bar charts, other statements etc. under various labour laws and other regulations applicable to the works, at his site office.

52. SECURITY MEASURES

- 52.1. Contractor has to follow the security requirement of the campus and obtain necessary entry passes for the labour and vehicles and follow security checks at entry / exit gates, restriction on movement of vehicle, restricted timings of working etc. The Department however shall assist the contractor in obtaining such passes for movement of vehicles and labour. No claim whatsoever shall be entertained on account of delay in entry of vehicles and labour including restrictions in working hours, if there is any.
- 52.2. The contractor shall employ only Indian Nationals after verifying their antecedents and loyalty. The contractor shall, on demand submit list of his agents, employees and work people concerned & shall satisfy antecedents of such people.
- 52.3. The contractor & his work people shall observe all relevant rules regarding security promulgated in which work is to be carried out by the Controlling Administrative Authority of the campus/area (hereinafter referred to as "Administrator").
- 52.4. The contractor, his representative, workman shall be allowed to enter through specified gates & timing as laid down by the controlling authority. They shall be issued an identity card or an individual pass in

accordance with the standing rules & regulations & they should possess the same while working. The contractor shall be responsible for the conduct & actions of his workmen, agents/ representatives.

- 52.5. Normally contractor shall be allowed to carry out work between 7 AM to 6 PM. However, he may also be allowed to carry out the work beyond 6 PM & up to 7 AM if the site conditions/circumstances so demand with prior written permission from the "Administrator". However, if the work is carried out in more than one shift or at night, no claim on this account shall be entertained.
- 52.6. Normally contractor's material / vehicles etc shall be allowed to move in / go-out between 7 AM to 7 PM only & no movement of material / vehicles out of work site shall be allowed during night hours unless specific permission is obtained from the "Administrator".
- 52.7. In case if a separate entry has been allowed, the contractor has to make all arrangement for making a separate entry gate and barricading of the working area to segregate/separate the same from other areas. All these have to be done by the contractor at his own cost including safeguarding any untoward incident in the restricted area due to separate entry gate and barricading arranged by the contractor. No extra amount on this account shall be payable by the department.
- 52.8. In the event of any restrictions being imposed by the Security agency, CPWD, Traffic or any other authority having jurisdiction in the area on the working or movement of labour /material, the contractor shall strictly follow such restrictions and nothing extra shall be payable to the contractor on such accounts. The loss of time on these accounts, if any, shall have to be made up by augmenting additional resources whatever required. Nothing extra shall be payable on this account.

53. QUALITY ASSURANCE

- 53.1. 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.
- 53.2. 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.
- 53.3. The contractor shall depute Quality Manager exclusively for enforcement of quality control. Such Quality Manager should be a qualified engineer with minimum Eight years of similar experience. For other staff to be deployed for quality assurance, the contractor may refer to clause 36(i) under schedule "F" attached.
- 53.4. ***Wherever work is specified to be done through specialized agencies, their names shall be got approved well in advance from Engineer in charge. Failure to do so shall not justify delay in execution of work. It is suggested that immediately after award of work, contractor should negotiate with concerned specialist agencies and send their names for approval to Engineer in charge.***
- 53.5. All materials obtained from Govt. Stores or otherwise shall be got checked by the Engineer-in-Charge or his any authorized supervisory staff on receipt of the same at site before use.
- 53.6. The contractor shall provide at his own cost suitable weighing and measuring arrangements at site for checking the weight / dimensions as may be necessary for execution of work. The sealed samples are to be handed over to the testing lab by contractor in the presence of Junior Engineer/Assistant Engineer-in-Charge of work.

- 53.7. ***Samples of various materials required for testing shall be provided free of charges by the contractor. Testing charges, if any, unless otherwise provided shall be borne by the contractor. All other expenditure required to be incurred for taking the samples; conveyance, packing etc. shall also be borne by the contractor himself.***
- 53.8. The contractor or his authorized representative shall associate in collection, preparation, forwarding and testing of such samples. In case, he or his authorized representative is not present or does not associate him, the results or such tests and consequences thereon shall be binding on the contractor.
- 53.9. For certain items, if frequency of tests not mentioned in the CPWD Specifications and then relevant IS code shall be followed and tests shall be carried out as per the frequency specified therein.
- 53.10. If any load testing or special testing is to be done for any sample whose strength is doubtful, the cost of the same shall also be borne by the contractor.
- 53.11. 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. If a particular brand of material is specified in the item of work in Schedule of Quantity, the same shall be used after getting the same approved from Engineer-in-Charge. Wherever brand / quality of material is not specified in the item of work, the contractor shall submit the samples as per approved list of brand names given in the tender document / additional specifications for approval of Engineer-in-charge. For all other items, materials and fittings of ISI Marked shall be used with the approval of Engineer-in-Charge. Wherever ISI Marked material / fittings are not available, the contractor shall submit samples of materials / fittings manufactured by firms of repute conforming to relevant specifications or IS codes and use the same only after getting the approval.
- 53.12. In case of non-availability of material of the brands specified in the list of approved materials, an equivalent brand may be used after getting written approval of the Engineer-in-charge giving details to indicate the brand proposed to be used is equivalent to the brands mentioned in the agreement. Decision of the Engineer-in-charge shall be final and binding in this respect.
- 53.13. To avoid delay, contractor should submit samples as stated above well in advance so as to give timely orders for procurement. If any material, even though approved by Engineer-in-Charge is found defective or not conforming to specifications shall be replaced / removed by the contractor at his own risk & cost.
- 53.14. The contractor shall get the source of all other materials, not specified elsewhere 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.
- 53.15. The contractor shall get the water tested with regard to its suitability and conforming to the relevant IS Code. The contractor shall obtain written approval from the Engineer-in-Charge before he proceeds by using the same for execution of work. The water testing charges shall be borne by the contractor. If tube well water is not suitable, the contractor shall arrange Municipal water or from any other source at his own cost and nothing extra shall be paid on this account. The water shall be got tested at frequency specified in latest CPWD Specifications / BIS Code.
- 53.16. The Stone aggregate/stone, sand shall be brought from any quarries subjected to the said materials conform CPWD specifications.

- 53.17. The gradation of fine sand to be used in plaster work shall be strictly as per CPWD Specifications 2019, conforming to IS:1542-1977. The plastered surface shall be fairly smooth without any undulation of any kind for applying paint/white wash.
- 53.18. The contractor shall submit shop drawings of staging and shuttering arrangement, aluminium 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.
- 53.19. **The contractor shall invariably prepare the samples of finishing items** i.e. flooring of different types, external & internal finishing i/c colour scheme of paint, tiles in dado, flooring in platforms & staircase, water supply & sanitary fittings and any other item as per direction of Engineer-in-charge. The contractor shall proceed with further finishing items only after getting the samples of these items approved in writing from Engineer-in-charge. Toilets and in case of construction of suites/dormitories/night stay facilities, one sample room complete in all shape for each category, shall be prepared by the contractor and got approved from Engineer-in-charge in writing. The contractor shall be allowed to proceed with further quarters only after getting the sample room approved in writing from Engineer-in-charge. No extra claim whatsoever beyond the payments due at agreement rates will be entertained from the contractor on this account.
- 53.20. The construction joints shall be provided in predetermined locations only as decided by Engineer in charge. The cost of shuttering for these construction joints shall be included in item of Concrete work / RCC work and nothing extra shall be payable on this account to the contractor.
- 53.21. Water tanks, taps, sanitary, water supply and drainages pipes, fittings and accessories should conform to the specifications provided in bidding documents. The contractor(s) should engage approved, licensed plumbers for the work and get the materials (fixtures/fittings) tested, by the municipal Body/Corporation authorities, wherever required, at his own cost. The Contractor(s) shall submit for the approval to the Engineer-in-Charge the name of the plumbing agency proposed to be engaged by him.
- 53.22. All the hidden items such as water supply lines, drainage pipes, conduits, sewers etc. are to be properly tested in presence of Engineer in charge as per the design conditions submitted before covering.
- 53.23. 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.
- 53.24. Door/window frames/shutters and other factory-made materials shall be procured from reputed and approved manufacturers or their authorized dealers. Decision of Engineer-in-charge in this regard shall be final and binding.
- 53.25. 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 borne by the department.
- 53.26. The work shall be carried out in accordance with the 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 drawings, nomenclature of item and specification etc. issued for the work and satisfied himself for the information available there from is complete and unambiguous. The figure and written dimension of drawing shall be superseding the measurement by scale. The discrepancy if any, shall be brought to the notice of the engineer-in-charge before execution of the work. The contractor along

shall be responsible for any loss or damage occurring by the commencement of work on the basis of any erroneous and/or incomplete information and no claim whatsoever shall be entertained on this account.

53.27. Product Delivery, Storage and Handling of Chemicals:

- i) The contractor shall construct storage space for Chemicals materials to ensure that the storage conditions are as recommended by the manufactures.
- ii) All the materials shall be procured and delivered in sealed containers with labels legible and intact.
- iii) All the chemicals (polymers, epoxy, water proofing compound, anti-termite chemicals, plasticizer, Polysulphide, SBR based elastomeric, APP (Atactic Polypropylene Polymer), all exterior and interior paints, polish etc.) shall be procured in convenient packs say 20 litres/Kgs. capacity packing only or as approved by the Engineer-in-charge, and not in bigger capacity containers, say 200 litre (Kgs.) drums unless otherwise specifically permitted by the Engineer-in-charge. One sample from each lot of the chemical procured by the contractor shall be tested in a laboratory as approved by the Engineer-in-charge.
- iv) All material required for the execution of the work shall be got approved, procured and deposited with the Departmental supervisory staff. The materials shall be kept in joint custody of the contractor and the Department. The watch and ward of such material shall, however, remain to be the responsibility of the contractor and no claim, whatsoever, on this account shall be entertained. Different containers of each chemical shall be serially numbered on packing and also consumed in that order. Day- to-day account of receipt, issue and balance shall be regulated by the Department and proper account shall be maintained at site of work in the prescribed form as per the standard practice.
- v) All the chemicals shall be procured by the contractor directly from the manufacturer. In exceptional circumstances, the contractor may be allowed to procure the materials from the authorized dealers of the manufacturers, if specifically permitted by the Engineer-in-charge.
- vi) The original copies of challan/cash memos towards the quantity of various chemicals procured shall be made available by the contractor at the request from the Engineer- in-Charge and a copy of the same shall be kept in record.
- vii) The Name of manufacturers, manufacturer's product identification, and manufacturer's mixing instructions, warning for handling and toxicity and date of manufacturing and shelf life shall be clearly and legibly mentioned on the labels of each container.
- viii) The contractor shall submit for the chemicals procured, manufacturer's and / or authorized dealer's certificate regarding supplying and verifying conformance to the material specifications, as specified.
- ix) All filled containers shall be handled in safe manner and in a way to avoid breaking container seals.
- x) Empty containers of the chemicals should not be removed from site till the completion of work and shall be removed only with the written approval of the Engineer-in-charge.
- xi) All arrangements for measuring, dosing and mixing of material / chemicals at site have to be made by the contractor.
- xii) Contractor shall suitably advise his site Engineer and all the workers as regards safe handling

of chemicals. Necessary protective and safety equipments in form of hand gloves, goggles etc. shall be provided by the contractor and be also used at site.

- xiii) All incidental charges of any kind including cartage, storage and wastage and safe custody of material etc. shall be borne by the contractor and no claim, whatsoever, shall be entertained on this account.
- xiv) The chemicals shall be tested in an independent laboratory as approved by the Engineer-in-charge at the frequency as specified. If required, more samples may have to be tested as per the directions of the Engineer-in-charge. Nothing extra shall be payable on this account. However, testing charges shall be borne by the department for the samples satisfying the requirements specified in the tender.

53.28. Testing of Materials:

- (i) **Laboratory at site:** The contractor shall 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.

Not less than 90% tests for material be performed at site lab, 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.**

- (ii) **Other Laboratories:** 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 including cement** for which separate condition is provided in the tender document.

53.29. Maintenance of Site Registers:

- (i) All the Site Registers including Tests registers for 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 various 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) Inspection register.
 - g) Drawing register.
- (iii) All the entries in the registers will be made by the designated engineering staff of the contractor and same should be regularly reviewed by JE/AE/EE.

- (iv) All the registers of tests 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.
- (v) All samples of materials including cement concrete cubes shall be taken jointly with contractor by JE and out of this at least 50% samples shall be taken in presence of AE in charge. If there is no JE, all samples of materials including cement concrete cubes shall be taken by AE jointly with contractor. All the necessary assistance shall be provided by the contractor. Cost of sampling & testing are to be borne by the contractor and he shall be responsible for safe custody of samples to be tested at site/ outside laboratory.
- (vi) All the tests in field lab at construction site shall be carried out by the Engineering staff deployed by the contractor and shall be 100% witnessed by JE and 50% of tests shall be witnessed by AE-in-Charge. At least 10% of the tests are to be witnessed by the Executive Engineer. Minimum 25% of all samples should be tested in outside approved laboratory/ Govt. Engineering colleges.
- (vii) 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.

53.30. Removal of Rejected / Sub-standard Materials:

The following procedure should be followed in case of removal of rejected/sub-standard materials from the site of work.

- (i) Whenever any material brought by the contractor to the site of work is rejected, entry thereof should invariably be made in the site order book under the signature of the AE/AEE giving approximate quantity of such materials.
- (ii) As soon as the material is removed, a certificate to that effect may be recorded by the AE/AEE against the original entry, giving the date of removal a mode of removal i.e. whether by truck, carts or by manual labour. If removal is by truck, the registration number of the truck should be recorded.
- (iii) When it is not possible for the AE/AEE to be present at the site of work at the time of actual removal of the rejected/sub-standard materials from the site the required certificate should be recorded by the Junior Engineer and the AE/AEE should countersign the certificate recorded by the Junior Engineer.

53.31. Inspection of Work

In addition to the provisions of relevant clauses of the contract, the work shall also be open to inspection by the senior officers of CPWD in addition of the Engineer-in-Charge and his authorized representative. The contractor shall at times during the usual working hours and at all

times at which reasonable notices of the intention of the Engineer-in-Charge or other officers as stated above to visit the works shall have been given to the Contractor, either himself be present to receive the orders and instructions or have a responsible Site Engineer duly accredited in writing, to be present for that purpose Senior Officers of CPWD Authorities shall be inspecting the on-going work at site at any time with or without prior intimation.

54. AS BUILT DRAWINGS:

- 54.1. On completion of work, the Contractor(s) shall submit four (04) sets of "As Built Drawings" which shall include Building Drawings (Architectural & structural drawings) and services drawings like drainage, sewerage, water supply, road and electrical installations of the completed buildings/services. These drawings shall have details of layout with diameter of soil waste pipe and vertical stacks, ground and invert levels of all drainage pipes together with locations of all manholes and connections, layout of all water supply lines with diameters, locations of control valves, access panels etc. The agency shall also submit at least 2 sets of above drawings in soft copy (PDF, AutoCAD & BIM format) in Suitable Pendives.
- 54.2. Contractor shall submit literatures, manuals, warranty certificates etc. of various fittings, fixtures and equipment and specialized items installed in the completed building/services.
- 54.3. ***Final bill will not be paid, and Security Deposit shall not be released until submission of as built drawings as above.***

55. ADVANCE PAYMENTS:

Contractor shall not divert any advance payments or part thereof for any work other than that needed for completion of the contracted work. All advance payments received as per terms of the contract (i.e. mobilization advance, secured advance against materials brought at site, secured advance against plant & machinery and/or for work done during interim stages, etc.) are required to be re-invested in the contracted work to ensure advance availability of resources in terms of materials, labour, plant & machinery needed for required pace of progress for timely completion of work.

56. PANDEMIC & GRAP RESTRICTIONS:

- 56.1. ***Contractor shall comply all the Conditions, Procedures, Guidelines issued time to time by authority of Central/State Govt. in case of pandemic situations (e.g. COVID) and emergency measures imposed under Graded Response Action Plan (GRAP) to prevent deterioration of air quality. The Contractor shall quote the rates considering all these factors and nothing extra shall be paid on this account.***

57. SITE OFFICE:

The agency shall construct suitable site office for not less than 10 nos. persons with laboratory & display room not less than 30 sqm area at location as specified by Employer, including but not limited to following:-

- a) The site office accommodation of minimum 30 sqm area shall be provided with all necessary furniture 2 executive chair and, 5 visitor chair, 2 office table, with all electrical items like light, fans, Air conditioners, all office utilities, 65" LED screen with HDMI port etc. and complete wiring, water supply, sewerage and drainage etc. The contractor shall provide the office accommodation within 01 (One) month from the date of commencement of work failing which the compensation @ Rs. 25,000/- per month shall be recovered from the contractor.
- b) The contractor shall arrange to maintain the site office which includes watch and ward, day to day up keeping of the building and surroundings, periodic whitewashing/colour washing of the building including utilities, payment of electrical/water supply bills etc.

58. DRAWINGS:

The works to be governed by this contract shall cover delivery and transportation up to destination, safe custody at site, insurance, erection, testing and commissioning of the entire works.

The works to be undertaken by the contractor shall inter alia include the following:

- a) Preparation of detailed SHOP drawings and AS BUILT drawings wherever applicable.
- b) Obtaining Statutory permissions wherever applicable and required.
- c) Pre-commissioning tests as per relevant standard specifications, code of practice, Acts and Rules wherever required.
- d) Warranty obligation for the equipment and/or fittings/fixtures supplied by the contractor.
- e) Contractor shall prepare shop drawings based on the tender working drawings and wherever specified in the contract document. Contractor shall prepare and submit shop drawings for items of contract in which preparation of shop drawings by contractor and or his vendors/manufacturers is specified. Beside this, items involving design and detailing under the scope of contractor/vendor/manufacture, shall also require preparation and submission of shop drawings by the contractor.
- f) The contractor shall prepare shop drawings with clash free layout of all services and building elements, on BIM model, proposed to be finally executed at work by him / his vendors and submit it to Engineer-in-charge.
- g) The contractor shall prepare and submit shop drawings compatible with BIM model as well as AutoCAD software.
- h) The Contractor shall prepare and submit a detailed program for the preparation and submission of the shop drawings which should be compatible to the integrated program chart for the whole construction work.
- i) Contractor shall be responsible to ensure the shop drawings are in compliance of Scope of work, GFC drawings, design intents, stipulated Specifications and condition of contract agreement.
- j) Contractor shall be required to make modifications, if required by the Engineer- in- Charge, in the submitted shop drawings and shall resubmit modified shop drawings. When a shop drawing is revised, the particulars of the current revision shall be clearly marked or circled to facilitate checking. All prior revision numbers and references of drawings possibly superseded by the current issue shall also be clearly shown.

- k) After finalisation of shop drawings, sampling and mock-up of item shall be carried out at site. Thereafter, the item shall be taken up for full-fledged execution at site.
- l) The contractor shall prepare all the needed shop drawings well in advance and submit to Engineer-in-charge for his inputs, if any, before placing the order and execution of the item. Shop drawings shall be submitted to Engineer-in-charge, at least four weeks in advance of planned production, delivery and installation of any material to allow the Engineer-in-Charge ample time for scrutiny and give comments if any.
- m) Contractor shall be fully responsible for any delay caused, on account of delay in finalisation of shop drawings or modified shop drawings. No claims for extension of time shall be entertained because of any delay in the work due to his failure to produce shop drawings at the right time, in accordance with the approved program.
- n) Cost of all shop drawings and form work drawings to be furnished by the Contractor shall deem to be included in his tendered rates/quote for the work.

Contractor shall provide all the shop drawings or layout drawings for all the coordinated services before starting any work or placing any order for any of the services etc. These shop drawings/layout drawings shall be got approved from Engineer-in-charge before implementation and this shall be binding on the contractor. The contractor shall submit material submittals along with material sample for approval of Engineer-in-charge prior to delivery of material at site.

All the hidden items such as water supply lines, drainage pipes, conduits, sewers etc. are to be properly tested as per the design conditions before covering and their measurements in computerized measurement book duly test checked shall be deposited with Engineer in charge or his authorized representative, prior to hiding these items.

SPECIAL CONDITIONS FOR CIVIL WORKS

1.0 SPECIAL CONDITIONS FOR CEMENT:

- 1.1. The contractor shall procure 43/53 grade Ordinary Portland Cement (OPC) conforming to IS:8112/Portland Pozzolana Cement (PPC) conforming to IS: 1489 (Part-I) as required in the work, from reputed manufacturers of cement (as provided in list of approved makes) **or from any other reputed cement Manufacturer having a production capacity not less than one million tonnes per annum as approved by ADG/SDG.**

The tenderers may also submit a list of names of cement manufacturers which they propose to use in the work. The tender accepting authority reserves right to accept or reject name(s) of cement manufacturer(s) which the tenderer proposes to use in the work. No change in the tendered rates will be accepted if the tender accepting authority does not accept the list of cement manufacturers, given by the tenderer, fully or partially.

Supply of cement shall be made in 50 kg bags bearing manufacturer's name and ISI marking **or through cement bulker.** Samples of cement arranged by the contractor shall be taken by the Engineer-in-Charge and got tested in accordance with provisions of the relevant BIS codes. In case the test results indicate that the cement arranged by the contractor does not confirm to the relevant BIS code the same shall stand rejected and 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.

- 1.2. The cement shall be brought at site in bulk supply of approximately **10 tonnes** or as decided by the Engineer-in-Charge.
- 1.3. The cement godown of the capacity to store a minimum of **800 bags** of cement shall be constructed by the contractor at site of work for which no extra payment shall be made. In case the cement is **received/ stored in Silos**, the Silos shall be placed near the concrete batching plant and proper access shall be provided for replenishment of Silos.
- 1.4. 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 key 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.
- 1.5. 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 test laboratories. **The cost of tests shall be borne by the contractor**
- 1.6. 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 42 of the contract and shall be governed by conditions laid therein. Less than theoretical consumption of cement shall not be allowed and in case of excess consumption, no cost adjustment shall be paid.
- 1.7. The cement brought to 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.

- 1.8. The damaged cement shall be removed from the site immediately by the contractor on receipt of a notice in writing from the Engineer-in-Charge. If he does not do so within three days of receipt of such notice, the Engineer-in-Charge shall get it removed at the cost of the contractor.
- 1.9. 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.
- 1.10. 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.
- 1.11. In order to have an effective control over the issue of cement, the following drill should be observed:
 - (iii) The cement godown(s) should be properly and effectively double locked, keys of one of the locks remaining with the department and that of the other with the contractor.
 - (iv) The pages of the Cement Register should be as per Appendix-28 of CPWD Works Manual, machine numbered and each page initialed by the Executive Engineer.
 - (v) Periodical checking of cement godown.: The cement godown and the Cement Register should be checked by the Assistant Engineer/Executive Engineer in-charge of the work as per following schedule:
 - d) At least weekly or fortnightly, respectively, in case of works at the headquarters of the Assistant Engineer/Executive Engineer.
 - e) Whenever they visit the site of work in case of works that are located outside the Sub-Divisional/Divisional headquarters.

2.0 SPECIAL CONDITIONS FOR STEEL REINFORCEMENT BARS:

- 2.1. The Contractor shall procure IS marked **TMT reinforcement bars (Fe 500D or more) (Corrosion resistant steel i.e. : Low Alloy Steel with improved corrosion resistance conforming to IS: 1786-2008)** of various grades only from Reputed Steel manufacturers such as **SAIL, Tata Steel Ltd, RINL, Jindal Steel & Power Ltd and JSW Steel Ltd.**
- 2.2. For reinforced cement concrete or pre-stressed concrete works, the TMT reinforcement bars shall be conforming to IS:1786 - 2008 (Indian Standard Specification for high strength deformed steel bars and wires for reinforcement) of the following grades: Fe 415, Fe 415D, Fe 415S, Fe 500D, Fe 500S and Fe 550D as per specification/nomenclature of the item.
- 2.3. The contractor shall obtain manufacturer's certificate stating the process of manufacture, chemical composition, and test sheet giving result of each mechanical test applicable to the material purchased and submit it to the Engineer-in-charge. Each test certificate shall indicate the number of the cast to which it applies corresponding to the number or identification mark to be found on the material.
- 2.4. The Engineer-in-charge shall get each consignment tested for both chemical composition and physical properties (including bend and re-bend test) as specified in **IS:1786 from approved labs as per OM No. DG/SOP/24 dated 03.09.2021** as amended from time to time. It may be noted that Mechanical properties of Steel reinforcement bars shall be conforming to mechanical properties of equivalent

grade of normal TMT reinforcement bars as per IS:1786, however, its Chemical properties shall be complying with guidelines pertaining to Low Alloy Steel in IS:1786.

- 2.5. 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 or written orders from the Engineer-in-Charge to do so.
- 2.6. The steel reinforcement bars shall be brought to the site in bulk supply of 10 tonnes or more as decided by the Engineer-in-charge.
- 2.7. The steel reinforcement shall be stored by the contractor at site of work in such a way as to prevent distortion and corrosion and nothing extra shall be paid on this account. Bars of different sizes and lengths shall be stored separately to facilitate easy counting and checking.
- 2.8. For checking nominal mass, tensile strength, bend test, re-bend test etc. specimen of sufficient length shall be cut from each size of the bar at random at frequency not less than that specified below:

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

- 2.9. The contractor shall supply free of charge the steel required for testing including transportation to testing laboratories. **The cost of tests shall be borne by the contractor.**
- 2.10. The actual issue and consumption of steel on work shall be regulated and proper accounts maintained as provided in clause 10 of the contract. The theoretical consumption of steel shall be worked out as procedure prescribed in clause 38 of the contract and shall be governed by conditions laid therein. Less than theoretical consumption of reinforcement shall not be allowed and in case of excess consumption, no cost adjustment shall be paid.
- 2.11. Steel brought to site and steel remaining unused shall not be removed from site without the written permission of the Engineer-in-charge.
- 2.12. 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.
- 2.13. 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.
- 2.14. Reinforcement including authorized spacer bars and overlaps shall be measured in length of different diameters, as actually (not more than as specified in the drawing) used in the work, nearest to a centimetre. Wastage and unauthorized overlaps shall not be measured.
- 2.15. 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.
- 2.16. 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 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.

- 2.17. If the derived weight as in para 2.14 above is lesser than the standard weight as in para 2.13 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 13 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.
- 2.18. 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.
- 2.19. Tolerances on Nominal Mass (individual sample) shall be as under:

S. No.	Nominal size mm	Tolerances on the Nominal Mass (in %age)
1	Up to and including 10 mm	-8%
2	Over 10 up to & including 16 mm	-6%
3	Over 16 mm	-4%

3.0 SPECIAL CONDITIONS FOR PREVENTION OF AIR POLLUTION AS PER DIRECTIVES OF NATIONAL GREEN TRIBUNAL (NGT):

- 3.1. The contractor shall not store/dump construction material or debris on metalled road.
- 3.2. 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.
- 3.3. 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.
- 3.4. The contractor shall ensure that all the trucks or vehicles of any kind which are used for construction purpose or are carrying construction material like cement, sand and other allied materials are fully covered. The contractor shall take all necessary precautions that the vehicles are properly cleaned and dust free to ensure that enroute their destination, the dust, sand or any other particles are not released in air / contaminate air.
- 3.5. 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.
- 3.6. 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 relating to dust emission.
- 3.7. 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.

- 3.8. The contractor shall ensure compulsory use of wet jet in grinding and stone cutting.
- 3.9. The contractor shall comply all the preventive and protective environmental steps as stated in the MoEF guidelines, 2010.
- 3.10. The contractor shall carry out on road inspection for black smoke generating machinery. The contractor shall use cleaner fuel.
- 3.11. The contractor shall ensure that all DG sets comply emission norms notified by MoEF.
- 3.12. 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.
- 3.13. 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.
- 3.14. The paving of the path for plying of vehicles carrying construction material is more permanent solution to dust control and suitable for longer duration projects.
- 3.15. **The contractor shall invariably prepare the samples of finishing items** i.e. flooring of different types, external & internal finishing i/c colour scheme of paint, tiles in dado, flooring in platforms & staircase, water supply & sanitary fittings and any other item as per direction of Engineer-in-charge. The contractor shall proceed with further finishing items only after getting the samples of these items approved in writing from Engineer-in-charge. Toilets and in case of construction of suites/dormitories/night stay facilities, one sample room complete in all shape for each category, shall be prepared by the contractor and got approved from Engineer-in-charge in writing. The contractor shall be allowed to proceed with further quarters only after getting the sample room approved in writing from Engineer-in-charge No extra claim whatsoever beyond the payments due at agreement rates will be entertained from the contractor on this account.

PARTICULAR SPECIFICATIONS FOR CIVIL WORKS

1.0 GENERAL

- 1.1 Except for the items, for which Particular Specifications are given herein or where it is specifically mentioned otherwise in this bid document, the work shall generally be carried out in accordance with the "CPWD Specifications - 2019 (Vol. I & II) for Civil works or their latest version with up to date correction slips and CPWD Specification for Horticulture works with up to date correction slips (hereinafter to be collectively referred to as 'CPWD Specifications'). Wherever CPWD Specifications are silent, the latest BIS Codes/Specifications, National Building Code-2016, MoRTH Specification, Manufacturers Specifications, Sound Engineering practices or well-established local construction practices as decided by the Engineer-in-charge shall be followed.
- 1.2 A reference made to any Indian Standard Specifications in these documents, shall imply to the latest version of that standard, including such revisions / amendments as issued by the Bureau of Indian Standards up to 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.
- 1.3 Unless otherwise specified in the schedule of quantities, the rates for all items of the work shall be considered as inclusive of pumping out or bailing out water if required for which no extra payment will be made. This will include water encountered from any source, such as rains, floods subsoil water table being high due to any other cause whatsoever.

2.0 EARTH WORK

- 2.1 The work shall be done in accordance with CPWD Specifications - 2019 - Vol. I & Vol. II and NBCS - 2026 with up to date correction slips.
- 2.2 Excavation shall be undertaken to the width of the Basement / Retaining wall footing including necessary margins for construction operation as per drawing or directed otherwise. Where the nature of soil or the depth of the trench and season of the year, do not permit vertical sides, the contractor at his own expense shall put up the necessary shoring, strutting and planking or cut slopes with or without steps, to a safer angle or both with due regard to the safety of personnel and works and to the satisfaction of the Engineer, Measurement of plan area of excavation for payment shall be permitted only. Nothing extra shall be paid for making steps and slopes etc. as required.
- 2.3 The contractor shall make at his own cost all necessary arrangements for maintaining water level, in the area where works are under execution low enough so as not to cause any harm to the works or problems in carrying out with the execution and the rates for all items of work shall be considered as inclusive of pumping out or bailing out water, if required, for which no extra payment shall be made. This will include water coming from any source, such as rains, accumulated rain water, floods, leakages from sewer and water mains, subsoil water table being high or due to any other cause whatsoever. The contractor shall make necessary provision of pumping, dredging, and bailing out water coming from all above sources and excavation and other works shall be kept free of water by providing suitable system approved by the Engineer-in-charge.
- 2.4 Sub-soil water table at work site is reported to be more than 30m below general ground level. The water level may vary due to rainy season or due to dewatering etc. in order to avoid possibility of basement floor of building being getting uplifted/damaged due to water pressure, the contractor shall make arrangement for lowering the ground water table below the proposed foundation level as approved by Engineer-in-charge. Sub soil water table shall be maintained at least 50 cm below the P.C.C. level during laying of P.C.C., water proofing treatment, laying of basement raft and beams including filling of earth/sand under the basement floor. The water table shall not be allowed to rise

above base of raft level until completion of outer retaining walls including water proofing of vertical surface of walls and back filling along the walls up to ground level and until the structure attains such height to counter balance the uplift pressure. However, the contractor should inspect the site and make his own assessment about sub-soil water level likely to be encountered at the time of execution and quote his rates accordingly. Rate of all items are inclusive of pumping out or bailing out water, if required. Nothing extra on this account whatsoever shall be paid to him unless otherwise specified. The sequence of construction shall be got approved by the Engineer-in-charge.

- 2.5 All the major excavation shall be carried out by mechanical excavator. No extra payment shall be made for that.
- 2.6 Any trenching and digging for laying sewer lines/water lines/cables etc. shall be commenced by the contractor only when all men, machineries and materials have been arranged and closing of the trench(s) thereafter shall be ensured within the least possible time.
- 2.7 The rates are inclusive for all depths & nothing extra shall be paid for additional lift etc.

3.0 SHUTTERING / FORM WORK

- 3.1 The work shall be done in accordance with CPWD Specifications - 2019 - Vol. I & Vol. II with up-to-date correction slips.
- 3.2 Steel shuttering as approved by the Engineer-in-Charge shall be used by the contractor. Minimum size of shuttering plates shall be 600mm x 900mm except for the case when closing pieces required to complete the shuttering panels. Dented, broken, cracked, twisted or rusted shuttering plates shall not be allowed to be used on the work.
- 3.3 The shuttering plates shall be cleaned properly with electrically driven sanders to remove any cement slurry or cement mortar or rust. Proper shuttering oil or debonding compound shall be applied on the surface of the shutter plates in the requisite quantity before assembly of steel reinforcement.
- 3.4 The joint filler shall be resilient closed cell expanded polyethene and non-tainting.
- 3.5 Providing joint filler of required thickness in position to substrate using either double-sided foam adhesive tape or neoprene synthetic rubber adhesive. When forming expansion joint with the Board in in-situ concrete, joint sealing slots can be readily formed in the following matter-
 - a) Before installing, simply cut off a strip of the required depth. Then install the filler flush with the finished surface.
 - b) Prior to sealing, the top strip can then be pulled easily from the joint to provide an uncontaminated sealing slot ready for preparation and sealing.

4.0 REINFORCEMENT

- 4.1 The reinforcement shall be done as per CPWD Specifications - 2019 - Vol. I & Vol. II with up-to-date correction slips.
- 4.2 The item of reinforcement of RCC work includes all operations including straightening, cutting, bending, welding, binding with annealed steel or welding and placing in position at all the floors with all leads and lift complete as per CPWD Specification - 2019 - Vol. I & Vol. II with up-to-date correction slips.
- 4.3 To avoid displacement of bars in any direction and to ensure proper cover, only factory-made round type/rectangular cover blocks shall be used by the contractor. Nothing extra shall be payable on this account.

5.0 CONCRETE WORK

- 5.1 The work shall be done in accordance with CPWD Specifications - 2019 - Vol. I & Vol. II with up-to-date correction slips.
- 5.2 ***If the quantity of cement actually used in the work is found to be more than the theoretical quantity of cement including authorized variation, nothing extra shall be payable to the contractor on this account.***
- 5.3 For non-scheduled items, the decision of the Superintending Engineer regarding theoretical quantity of the cement which should have been actually used shall be final and binding on the contractor.

6.0 RCC WORK (DESIGN MIX CONCRETE)

- 6.1 The RCC work shall be done with Design Mix Concrete unless otherwise specified in the nomenclature of items, wherever letter M has been indicated, the same shall imply for the Design Mix Concrete. The Design Mix Concrete will be designed based on the principles given in IS:456, IS:10262 and SP 23. The concrete mix shall be designed for specified target mean compressive strength in order to ensure that the work test results do not fall below the acceptance criteria specified for the concrete mix. The contractor shall design mixes for each class of concrete indicating that the concrete ingredients and proportions will result in concrete mix meeting requirements specified. The cement shall be actually weighed as presumption of each bag having 50 kg shall not be allowed. In case of use of admixture, the mix shall be designed with these ingredients as well. The specification mentioned herein below shall be followed for Design Mix Concrete.

6.1.1 INGREDIENTS:

Coarse Aggregate: As per CPWD Specifications

Fine Aggregate: As per CPWD Specifications.

Water: As per requirements laid down in IS 456-2000 and CPWD specifications.

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 PPC of grade 43 or higher grade is brought to site by contractor, the issues like payments rate as well as the quantity to be used in the design mix concrete will remain unchanged.

Admixtures/Plasticisers: Admixtures shall not be used without approval of Engineer-in-charge. Wherever required, admixtures of approved quality shall be mixed with concrete to achieve the desired workability within specified water cement ratio. The admixture shall conform to IS:9103. The chloride content in the admixture shall satisfy the requirement of BS:5075. The total amount of chlorides in the admixture mixed concrete shall also satisfy the requirements of IS:456-2000.

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.

- 6.1.2 **WORKABILITY:** The Concrete mix will be designed for minimum workability as specified in para 7 of IS:456-2000. Workability of Concrete (Unless otherwise specified elsewhere or as decided by Engineer-in-charge. The recommended values of slump for various members are given below:

(i) Columns - 25 to 35 mm, (ii) Beams - 30 to 40 mm (iii) Slabs – 30 to 50 mm.

- 6.1.3 **GRADE OF CONCRETE:** The compressive strength of various grades of concrete shall to be given as below:

Grade designation	Compressive strength on 15 cm cubes min. 7 days (N/mm ²)	Specified characteristic compressive strength at 28 days (N/mm ²)	Minimum cement quantity (Kg. per cum)	Maximum water cement ratio
M 25	As per design	25	As per CPWD specification/ BIS Code	0.50
M 30	As per design	30		0.45
M 35	As per design	35		0.45
M 40	As per design	40		0.40

Note: In the designation of concrete mix letter M refers to the mix and the number to the specified characteristic compressive strength of 15 cm – Cube at 28 days expressed in N/mm²

- 6.1.4 CEMENT CONTENT: It is specifically highlighted that in addition to the above requirements the maximum cementitious content * for any grade shall be limited to 430 kg / cubic metre.

The minimum cement content of Mix design shall be as per CPWD Specifications and relevant DSR Items.

- 6.1.5 MIX DESIGN: The concrete design mix with or without admixture will be carried out by the contractor through IIT/NIT/Reputed Govt. Engineering Institutions/ Approved Laboratories as directed by the Engineer-in-charge at his own expenses for designing the concrete mix in accordance with relevant IS Codes and to conduct laboratory test to ensure the target strength and workability criteria for a given grade of concrete

The various ingredients for mix design / laboratory tests shall be sent to the lab / test houses through the Engineer-in-charge immediately after award of work and the samples of **such aggregate sent shall be preserved at site by the department.** The admixture if used by contractor shall be at his own cost without any extra payment.

The contractor shall submit the mix design report from any of above approved laboratories for approval of Engineer-in-charge within 30 days from the date of issue of letter of acceptance of the tender.

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.

- 6.1.6 APPROVAL OF DESIGN MIX: The mix design for a specified grade of concrete shall be done for a target mean compressive strength $T_{ck} = F_{ck} + 1.65s$

Where F_{ck} = Characteristic Compressive Strength at 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 per IS 456: 2000.

Out of the six specimens 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.

- 6.1.7 CHARGES FOR DESIGN MIX: All cost of mix design and testing connected therewith including charges payable to the laboratory shall be borne by the contractor.

6.2 DESIGN MIX CONCRETE FROM FULLY AUTOMATIC COMPUTERISED CONCRETE BATCHING AND MIXING PLANT

6.2.1 PROPORTIONING CONCRETE: In proportioning cement concrete, the quantity of both cement and aggregates shall be determined by weight. The cement shall be weighed separately from the aggregates. Water shall either be measured by volume in calibrated tanks or weighed. All measuring equipment shall be maintained in a clean and serviceable condition. The amount of mixing water shall be adjusted to compensate for moisture content in both coarse and fine aggregates. The moisture content of aggregates shall be determined in accordance with IS: 2386 (Part III). Suitable adjustments shall also be made in the weights of aggregates to allow for the variation in weight of aggregates due to variation in moisture content.

6.2.2 PRODUCTION OF CONCRETE: The concrete shall be produced in a central batching and mixing plant with, computerized printing for contents and admixture dosage, producing at least 15 Cum concrete per hour. The batching plant shall be fully automatic. Automatic batcher shall be charged by devices which, when actuated by a Single starter switch will automatically start the weighing operation of each material and stop automatically, when the designated weight of each material has been reached. The batching plant shall have automatic arrangement for dispensing the admixture and shall also be capable of discharging water in more than one stage. A print out from the batching plant for every lot shall be submitted. A batching plant essentially shall consist of the following components:

- Separate storage bins for different sizes of aggregates, silo for cement and water storage tank.
- Batching equipment
- Mixers
- Control panels
- Mechanical material feeding and elevating arrangements

The compartments of storage bins for aggregates shall be approximately of equal size. The cement compartment shall be centrally located in the batching plant. It shall be watertight and provided with necessary air vent, aeration fittings for proper flow of cement & emergency cement cut off gate. The aggregate and sand shall be charged by power operated centrally revolving chute. The entire plant from mixer floor upward shall be enclosed and insulated. The batch bins shall be constructed so as to by self-cleansing during drawdown. The batch bins shall in general conform to the requirements of IS:4925.

The batching equipment shall be capable of determining and controlling the prescribed amounts of various constituent materials for concrete accurately i.e. water, cement, sand, individual size of coarse aggregates etc. The accuracy of the measuring devices shall fall within the following limits.

Measurement of Cement	:	$\pm 2\%$ of the quantity of cement in each batch
Measurement of Water	:	$\pm 3\%$ of the quantity of water in each batch
Measurement of Aggregate	:	$\pm 3\%$ of the quantity of aggregate in each batch
Measurement of Admixture	:	$\pm 3\%$ of the quantity of admixture in each batch

6.2.3 MIXING CONCRETE: The mixer in the batching plant shall be so arranged that mixing action in the mixers can be observed from the operator's station. The mixer shall be equipped with a mechanically or electrically operated timing, signalling and metering device which will indicate and assure completion of the required mixing period. The mixer shall have all other components as specified in IS:4925.

- 6.2.4 **TRANSPORTATION, PLACING AND COMPACTION OF CONCRETE:** Mixed concrete from the batching plant shall be transported to the point of placement by transit mixers or through concrete pumps or steel closed bottom buckets capable of carrying 0.6 cum concrete. In case the concrete is proposed to be transported by transit mixer, the mixer 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 as 70 m / minute at its largest diameter. The agitating speed of the agitator shall be not less than 2 rev / min. nor more than 6 rev / min. of the drum. The number of revolutions of the mixing drum or blades at mixing speed shall be between 70 to 100 revolutions 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 requirements shall conform to IS:5892.

In case concrete is to be transported by pumping, the conduit shall be primed by pumping a batch of mortar / thick cement slurry through the line to lubricate it. Once the pumping is started, it shall not be interrupted (if at all possible) as concrete standing idle in the line is liable to cause a plug. The operator shall ensure that some concrete is always there in the pump-receiving hopper during operation. The lines shall always be maintained clean and shall be free of dents.

Materials for pumped concrete shall be batched consistently and uniformly. Maximum size of aggregate shall not exceed one-third of the internal diameter of the pipe. Grading of aggregate shall be continuous and shall have sufficient ultra-fine materials (materials finer than 0.25mm). Proportion of fine aggregates passing through 0.25mm shall be between 15 & 30% and that passing through 0.125 mm sieve shall not be less than 5% of the total volume of aggregate. When pumping long distances and through hot weather, set-retarding admixtures may be used. Admixtures to improve workability can be added. Suitability of concrete shall be through pumping shall be verified by trial mixes and by performing pumping tests.

- 6.3 **PREPARATION OF MIXES AS PER APPROVED DESIGN MIX AND CONDUCTING CONFIRMATORY TEST AT FIELD LAB:** The contractor shall make the cubes of trial mixes as per approved Mix design at site laboratory for all grades, in presence of Engineer-in-charge using sample of approved materials proposed to be used in the work prior to commencement of concreting and get them tested in his presence to his entire satisfaction for 7 days and 28 days. Test cubes shall be taken from trial mixes as follows.

For each mix, a set of six cubes shall be made from each of the three consecutive batches. Three cubes from each set of six shall be tested at age of 7 days and remaining three cubes at age of 28 days. The cubes shall be made, cured, transported and tested strictly in accordance with specifications. The average strength of nine cubes at age of 28 days shall exceed the specified target mean strength for which design mix has been approved, the evaluation of test results will be done as per IS : 456-2000.

- 6.3.1 **TEST SPECIMEN:** Work strength test shall be conducted in accordance with IS:516 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. Additional samples shall be prepared, if required, as per direction of Engineer-in-charge for testing samples cured by accelerated method as described in IS: 9103.
- 6.3.2 **TEST RESULTS OF SAMPLE:** The test results 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 tests shall be done at the laboratory established at site by the contractor and remaining 10% in the laboratory of Central Designs Organisation, CPWD or in any other laboratory as directed by the Engineer-in-charge.

6.3.3 STANDARD FOR ACCEPTANCE: Standard of acceptance shall be same as specified in clause 16 of IS 456-2000.

6.3.4 Measurement - As per CPWD specifications.

6.3.5 Tolerances - As per CPWD specifications

6.3.6 RATE:

6.3.6.1 The rate includes the cost of materials and labour involved in all the operations described above including for the cost of centring, shuttering and reinforcement.

6.3.6.2 In case of actual average compressive, strength being less than specified strength which shall be governed by para "Standard of Acceptance" as above the rate payable shall be worked out accordingly on pro-rata basis.

6.3.6.3 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 tests (like cutting cores, ultrasonic pulse velocity test, load test on structure or part of structure etc) to be carried out at the cost of contractor to ascertain if the portion of structure wherein concrete represented by the sample has been used, can be retained on the basis of results of individual or combination of these tests.

The contractor shall take remedial measures necessary to retain the structure as approved by the Engineer-in-charge without any extra cost. However, for payment, the basis of rate payable to contractor shall be governed by the 28 days cube test results and reduced rates shall be regulated in accordance with para 5.4.13 of Revised CPWD Specification 2019, Vol.-I.

7.0 PRE-CAST RCC WORK

7.1 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.

7.2 Pre-cast units shall be clearly marked to indicate the top of member and its locations.

7.3 Pre-cast units shall be stored, transported and placed in position in such a manner that these are not damaged.

8.0 BRICK WORK

8.1 Unless otherwise specified FPS Bricks shall be used in all items of brick work. The classification of bricks brought by the contractor shall strictly conform to CPWD Specifications – 2009 Vol-1 & II with upto date correction slips or as specified. The work shall also include for leaving chases / notches for dowels / cramps for all kinds of cladding to come over brick work.

9.0 AAC BLOCK MASONRY WORKS:

9.1 Specifications of AAC blocks shall be conforming to IS:2185/1984

9.2 The Blocks wherever used shall be of minimum 250 mm thickness except partition walls where 150mm thickness may be allowed.

9.3 Polymer modified adhesive mortar shall be used for construction of masonry walls as per the approval of Engineer in Charge and manufacturer's specifications. Adequate mesh mechanism of membrane

fabric as per manufacturer specification will be necessary to avoid ingress / transgress of thermal cracks in the joints of the masonry.

- 9.4 Wherever required RCC Bands of required thickness (minimum 100mm thick) at every one (01) metre interval in vertical plane shall be provided by the contractor in the masonry walls as a part of scope of work.
- 9.5 For Low height Masonry Walls, RCC Coping shall be provided of required sizes as per drawing and direction of Engineer in charge.
- 9.6 The blocks shall not be soaked in water and instead they shall be dipped in water and taken out immediately to have only moist surface.
- 9.7 Bed joint 2 Nos. 6mm dia reinforcement bars may be placed in the joints after every 3rd course to have good lateral stability.
- 9.8 It shall be ensured that the lintels rest at either end of window opening only on full block and not on half or part blocks. Reinforcement shall be placed in the sill course of window openings in two successive horizontal joints and extend the same at least to 600 mm on either side of the jamb surface.
- 9.9 At a RCC column interface an MS anchor ("L" shape), of size 50x4 mm, 300 mm long out of which 100 mm length of L fixed on column using minimum two SS screws with PVC sleeves and 200 mm side of L embedded in masonry, be placed and fixed with screws at every 4th course so as to anchor the wall with RCC column for better lateral stability.
- 9.10 Curing of the masonry shall be done only by spraying water and no flooding shall be done by water jets / buckets.
- 9.11 Preferably Pre-Cast Concrete Solid Block M10 as per CPWD Specifications will be used in the toe wall, boundary wall and other masonry work below plinth/ foundation. These Blocks shall be manufactured from C&D materials from the approved manufacturers.
- 9.12 Wherever required and considered by Engineer-in-charge necessary to use clay FPS bricks, the same shall be used in the work with mortar as per CPWD specification. These shall also in the scope of work and tendered amount.

10.0 SCAFFOLDING

- 10.1 Double steel scaffolding having two sets of vertical supports shall be provided. The supports shall be sound and strong, tied together with horizontal pieces over which scaffolding planks shall be fixed.

11.0 STONE / MARBLE /GRANITE WORK (OTHER THAN MASONARY)

- 11.1 The execution of stones work shall be in general as per CPWD Specifications - 2019 - Vol. I & Vol. II with up-to-date correction slips.
- 11.2 All holes, rebates, recesses etc. for providing fixing and inserts shall be predrilled and pre-cut and worked using precision machine tools. Nothing extra on this account shall be payable.
- 11.3 SAMPLES FOR STONE WORK: Samples of each item of stone work either individually or in combination shall be prepared for approval of Engineer-in-Charge before commencement of work.
- 11.4 Sequence of execution for cladding work shall be suggested by the contractor for approval of Engineer-in-Charge.

12.0 WOOD WORK

- 12.1 The wood work in general shall be carried out as per CPWD Specifications - 2019 Vol. I & II with up-to-date correction slips.
- 12.2 The samples of species of timber to be used shall be got approved and deposited by the contractor with the EE before commencement of the work. The contractor shall produce cash vouchers and certificates from kiln seasoning or/and chemical treatment plants about the timber section to be used on the work having been kiln seasoned or/and chemically treated by them.
- 12.3 Factory made shutter as specified shall be obtained from factories approved by the Engineer in charge. The contractor shall inform well in advance to the Engineer-in-charge the names and address of the factory from where the contractor intends to get the shutters manufactured. The contractor will place order for manufacture of shutters only after written approval of the Engineer-in-charge in this regard is given. The contractor is bound to abide by the decision of the Engineer-in-charge and recommend a name of another factory from the approved list in case the factory already proposed by the contractor is not found competent to manufacture quality shutters. Shutters will however be accepted only if this meet the specified tests. The contractor will also arrange stage wise inspection of the shutters at factory to the Engineer-in-charge or his authorized representative. Contractor will have no claim if the shutters brought at site are rejected by Engineer-in-charge in part or in full lot due to bad workmanship / quality even after inspection of factory. Such shutters will not be measured and paid, and the contractor shall remove the same from the site of work within 7 days after the written instruction in this regard are issued by Engineer in Charge or his authorized representative.
- 12.4 All fittings and fixtures shall be got approved from the Engineer-in Charge before procurement well in advance and the approved samples shall be kept at site till completion of the work.
- 12.5 Glazing for toilets shall be of translucent type.
- 12.6 The shape and size of beading shall be as per drawings. The joints of beading shall be mitred.

13.0 STEEL WORK

- 13.1 Work shall be carried out as per CPWD Specifications - 2019 - Vol. I & Vol. II with up-to-date correction slips.
- 13.2 The rate of T- angle iron frame shall include the following.
 - (a) M.S. sill/tie of 10mm dia bar welded to T-iron frames to keep the frames vertical in correct position. The sill / tie shall be embedded in floor concrete. No tie is necessary for window frames.
 - (b) Each T – iron frame for doors shall have 4 Nos. M.S. lugs 15x3mm, 10 cm long welded to each vertical member of the frame.
 - (c) M.S. flat 6 x 25mm, 100mm long having threaded holes (No. of flats shall correspond to the no. of butt hinges to be fixed to door / window shutters) shall be welded at appropriate places at the back of the T-iron frames for fixing the required butt hinges to the frame with machine screws.
- 13.3 All welded structural steel work shall be tested for quality of weld as laid down in IS:822-1970 before actual erection if required.

14.0 FLOORING WORKS

- 14.1 All work in general shall be carried out as per CPWD Specifications- 2009 - Vol.I& Vol. II with up-to-date correction slips.
- 14.2 Various types of flooring, skirting, dado and window sill work shall be carried out by the contractor referring the Schedule of finishes / floor finishing layouts as per Architectural drawings.

- 14.3 Whenever flooring is to be done in patterns tiles/ stone, the contractor shall get samples of each pattern laid and approved by the Engineer-in-Charge before final laying of such flooring for which nothing extra shall be paid.
- 14.4 Different stones/ tiles used in pattern flooring as per the approved architectural drawings and nothing extra for laying pattern flooring shall be paid. No additional wastage if any shall be accounted for any extra payment.
- 14.5 The proper gradient shall be given to flooring for toilets, varrandah, kitchen, court yard, etc. as per the directions of Engineer-in-Charge. For this there may be extra thickness of dry mortar below the tiles/stone slabs. These gradients should be insured in the shuttering itself. Nothing extra shall be paid for this as this is included in the tendered cost.
- 14.6 The rate of items of flooring is inclusive of providing sunken flooring in bathrooms, kitchen etc. and nothing extra on this account is admissible. The samples of flooring, dado & skirting as per approved pattern shall be prepared & got approved from the Engineer-in-charge before execution of work.
- 14.7 Ceramic Tiles/Vitrified Tiles Work/ Granite stone flooring
- 14.7.1 Work shall be carried out as per CPWD Specifications- 2009 Vol I & II with up-to-date correction slips and as per manufactures specifications.
- 14.7.2 Rates shall be inclusive of all operations including labour, material, T&P, scaffolding etc. complete. Nothing extra shall be payable on any account.
- 14.7.3 One-piece Granite stone for treads / risers in staircase shall be used and nothing extra shall be paid on this account.
- 14.8 Contractor shall need to protect the finished floor surface during execution of other activities using Cello or approved equivalent bubble guard of minimum 500 GSM thick (minimum size 8' x 4'), fixing the same over floor surface with mastic tape or another approved adhesive. Removing protective layer during handing over, disposal of all debris out of site, cleaning the entire covered flooring area as directed by the Engineer-in-charge.
- 15.0 STAINLESS STEEL RAILING/HANDRAILS:**
- 15.1 GENERAL: The contractor shall apply all materials, labour, tools, ladders, scaffolding and other equipment necessary for the completion and protection of all stainless-steel work.
- 15.2 MATERIAL: All stainless-steel pipes and plates shall conform to AISI 316 grade and the relevant clauses associated with this grade of steel to be followed.
- 15.3 SURFACE FINISH: Surface finish of all the stainless-steel materials will be in 240 grit satin finish / matt finish.
- 15.4 ACCESSORIES: Fixing will be done by stainless steel expansion bolts of approved size and make as per Engineer-in-charge and welding to be done by using organ welding rods and the surface being duly finished and cleaned by K2 passivation, which is nitric acid plus fluoric acid solution treatment by which the chances of corrosion will be eliminated, and any burn out makes on the metal will also be eliminated.
- 15.5 COATING MASS: All stainless-steel material will have to be coated by a solution of Inox to avoid finger in prints and avoidance of settlement of environment / atmospheric dust.

16.0 FINISHING:

- 16.1 The work shall be carried out as per CPWD Specifications- 2019 Vol.-I & Vol. II with up-to-date correction slips.
- 16.2 All painting material shall be brought to the site of work in the original sealed containers. The material brought to the site of work shall be sufficient for at least 30 days of work. The material shall be kept under the joint custody of contractor and representative of the Engineer-in-Charge. The empty containers shall not be removed from the site till the completion of the work without permission of the Engineer-in-Charge.

17.0 SANITARY WORKS, WATER SUPPLY & RAINWATER PIPES:

17.1 Sanitary Works

- 17.1.1 Work under this section shall consist of providing and fixing and installing all sanitary fittings/ fixtures, chromium plated fittings and accessories minimum as indicative schedule of finishes.
- 17.1.2 Without restricting to the generality of the foregoing the sanitary fixtures & fittings shall include the following:
- Sanitary fixtures
 - Chromium plated fittings
 - Stainless steel sinks
 - Accessories e.g. toilet paper holders, robe, dispenser etc.
- 17.1.3 Whether specifically mentioned or not all fixtures and appliances shall be provided with all fixing devices, nuts, bolts, screws, hangers as required.
- 17.1.4 All exposed pipes within toilets and near fixtures shall be chromium plated brass or copper unless otherwise specified.

17.2 General Requirements

- 17.2.1 All materials, sanitary fixtures and fittings shall be new and of best quality confirming to CPWD specifications and subject to the approval of Engineer in charge.
- 17.2.2 All Appliances, fixtures and fittings shall be provided with all such accessories as are required to complete the item in working condition whether specifically mentioned or not specifications, and drawings. Accessories shall include proper fixing arrangement, brackets, nuts, bolts, screws and required connection pieces.
- 17.2.3 Fixing screws shall be half round head chromium plated brass screws with C.P. washers where necessary.
- 17.2.4 Porcelain sanitary ware shall be glazed vitreous china of first quality free from warps, cracks and glazing defects confirming to I.S. 2556.
- 17.2.5 Sinks for pantry or kitchen shall be stainless steel or as specified in the Drawings.
- 17.2.6 Chromium plated fittings shall be cast brass chromium plated of the best quality approved by Engineer in charges.
- 17.2.7 All Appliances, fittings and fixtures shall be fixed in a neat workmanlike manner true to level and heights shown on the drawings and in accordance with the manufacturer's recommendations. Care shall be taken to fix all inlet and outlet pipes at correct positions at proper location and height. Faulty locations shall be made good and any damage to the finished floor, Filing Plaster, Paint, insulation shall be made good by the Contractor at his own cost.

17.2.8 Sanitary appliances, subject to the type of appliance and specific requirements, shall be fixed in accordance with the relevant standards and the following:

- a) Contractor shall, during the entire period of installation and till hand over protect the appliances by providing suitable cover or any other protection so as to absolutely prevent any damage to the appliances until handing over. (The original protective wrapping shall be left in position for as long as possible).
- b) The appliance shall be fixed in a manner such that it will facilitate subsequent removal if necessary.
- c) All appliances shall be securely fixed. Manufacturers' brackets and fixing methods shall be used wherever possible. Compatible rust- proofed fixings shall be used. Fixing shall be done in a manner that minimizes noise transmission.
- d) Pipe connections shall be made with demountable unions. Pipe work shall not be fixed in a manner that it supports or partially supports an appliance.
- e) Appliances shall be fixed so that water falls to the outlet.
- f) Appliances shall be fixed true to level firmly fixed to anchor or supports provided by the manufacturer and additional anchors or supports where necessary.
- g) Manufacturer Warrantee certificate for all the fixtures will be handed over to client (PNB) upon handing over of building upon completion of all works (except O&M). The period of warrantee will start from date of handing over of building to client (PNB).

17.3 Sanitary fittings & Fixtures

17.3.1 Sanitary fittings and fixture shall be of premium quality of approved make, minimum as per indicative schedule of finishes and Architectural drawings, requirement of space, location complete in all respects including accessories, labour, workmanship etc. Colour shade, shape, size shall be selected and approved by Engineer-in-Charge.

17.3.2 All appliances, fixtures and fittings shall be tested before and after installation. Water seals of all appliances shall be tested. The Contractor shall block the ends of waste and ventilation pipes and shall conduct an air test with a pressure of 38mm water gauge for minimum of 3 minutes in accordance with BS: 5572.

17.4 Internal Drainage:

17.4.1 Internal drainage scheme shall be designed by the contractor and got approved by Engineer in charge.

17.4.2 Work under this section shall consist of providing and fixing all labour, materials and T&P, required to completely install all soil, waste, vent, rain water pipes and fittings as per relevant BIS codes and CPWD specifications.

17.4.3 Without restricting to the generality of the foregoing, the soil, waste, vent, rain water pipe system shall include the following:

- a) Soil waste and vent pipes (Vertical and Horizontal) fittings, joints, clamps and connections to sewer line as per approved.
- b) Floor traps, Cleanout plugs and inlet fittings.
- c) Waste pipe connection from all fixtures.
- d) Rain water pipes & fitting (Terrace Rain Water and Balcony Drain).

- e) All pipe fittings exposed or on wall shall be painted with two or more coat of desired shade and colour. All sanitary fittings should be supported with proper hanging arrangement.
- f) Testing as per relevant codes.
- g) Any exposed rainwater or other pipes in balcony etc. to be covered with GRC or other suitable material as approved by Engineer-in-Charge.
- h) Arrangement for drainage of condensation water from VRV unit in balcony and from indoor units the drainage pipes shall be suitably covered.
- i) The scope also includes access doors/opening for clean out, accessible for maintenance i/c MS ladder, platform etc. at suitable locations with primer and paints complete.

18.0 ALUMINIUM DOOR, WINDOW, VENTILATOR WORKS:

18.1 Extent and Intent:

- 18.1.1 The work shall be carried out through an approved specialized agency, who shall furnish all materials, labour, accessories, equipment, tool and plant and incidentals required for providing and installing aluminium doors, windows, claddings, louvers and other items as called for on the drawings. The specialized agency for the Aluminium work shall be got approved from the Engineer-in-charge, well before actual commencement of the item of work. Necessary performance certificates in respect of agencies proposed to be engaged shall be submitted within 30 days from the date of issue of acceptance letter to substantiate technical capability and experience of the agency for prior approval of the Engineer-in-charge.
- 18.1.2 The drawings and specifications cover the major requirement only. The supplying of additional fastenings, accessory features and other items not mentioned specifically herein, but which are necessary to make a complete installation shall be a part of this contract.

18.2 General:

- 18.2.1 Work shall be carried out as per CPWD Specifications- 2019 Vol. I & Vol. II with up-to-date correction slips.
- 18.2.2 Aluminium doors, windows etc. shall be of sizes, section details as shown on the drawings. The details shown on the drawings indicate generally the sizes of the component's parts and general standards. These may be varied slightly to suit the standard adopted by the manufacturer. Before proceeding with any manufacturing, the contractor shall prepare and submit complete manufacturing and installation drawings for approval of the Engineer-in-Charge and no work shall be performed until the approval of these drawings is obtained.

18.3 Shop Drawings:

The contractor shall submit the shop drawings of doors. Windows, louvers, cladding and other aluminium work, based on architectural drawings, to the Engineer-in-Charge for his approval. The drawings shall show full size sections of doors, windows etc. thickness of metal (i.e. wall thickness), details of construction, sub frame/ rough ground profile, anchoring details, hardware as well as connection of windows, doors and other metal work to adjacent work. Samples of all joints and methods of fastening and joining shall be submitted to the Engineer-in-Charge for approval well in advance of commencing the work.

18.4 Samples:

Samples of doors, windows, louvers etc. shall be fabricated, assembled and submitted to the Engineer-in-Charge for his approval. They shall be of sizes types etc. as decided by Engineer-in-Charge. All samples shall be provided at the cost of the contractor.

18.5 Sections:

Minimum doors and windows shall be fabricated from extruded section of profile of detailed on drawings. The sections shall be extruded by the manufacturers approved by the Engineer-in-charge. The aluminium extruded sections shall conform IS designation 63400-WP (HV9WP Old designation) with chemical composition and technical properties as per IS:733 and IS:1285. The permissible dimensional tolerance of the extruded sections shall be such as not to impair the proper and smooth function/ operation and appearance of doors and windows.

18.6 Fabrication:

Doors, windows, etc. shall be fabricated to sizes as shown at factory and shall be of section, sizes combinations and details as shown in the Architectural Drawings. All doors, windows etc. shall have mechanical joints. All members shall be accurately machined and fitted to form hairline joints prior to assembly. The joint and accessories such as cleats, brackets, etc. shall be of such materials as not to cause any bimetallic action. The fabrication of doors, windows, etc. shall be done in suitable sections to facilitate easy transportation, handling and installation. Adequate provision shall be made in the door and window members for anchoring to support and fixing of hardware and other fixtures as approved by the Engineer-in-Charge.

18.7 Powder Coating:

All aluminium sections shall be powder coated 50 microns to required colour as specified in the item and as per direction of Engineer-in-Charge. Polythene tape protection shall be applied on the powder coated section before they are brought to site. All care shall be taken to ensure surface protection during transportation, storage at site and installation. The tape protection shall be removed on installation. The samples will be tested in the approved laboratory and cost of samples, cost of testing, shall be borne by the contractor.

18.8 Protection of Finish:

All aluminium members shall be wrapped with approved self-adhesive non- staining masking tapes.

18.9 Handling and stacking:

18.9.1 Fabricated materials shall be stacking in an approved manner to protect the material against any damage during transportation. The loading and unloading shall be carried out with utmost care, on receipt of materials at site, they shall be carefully examined to detect any damaged pieces. Arrangements shall be made for expeditious replacement of damaged piece/ parts. Materials found to be acceptable on inspections shall be repacked in crates and stored safely.

18.9.2 In the case of Composite windows and doors, the different units are to be assembled first. The assembled Composite units should be checked for line, level and plumb before final fixing is done. Units may be serial numbered and identified as how to be assembled in their final location of situation so warrants.

18.9.3 Where aluminium comes into contact with masonry brickwork, concrete, planter or dissimilar metals, it shall be coated with approved insulation lacquer, paint or plastic tape to ensure that electro- chemical corrosion is avoided. Insulation material shall be trimmed off to a clean flush line on completion.

- 18.9.4 The contractor shall be responsible for assembling Composite, bedding and filling the groove with backup roads polysulphide sealant inside and outside, placing the doors, windows etc. in their respective opening. After the doors/ windows have been fixed in their correct assigned position, the open hollow sections abutting masonry concrete shall be fitted with approved polysulphide sealant densely packed and neatly finished.
- 18.9.5 The contractor shall be responsible for doors, windows, etc. being set straight plumb, level and for their satisfactory operation after fixing is complete.
- 18.10 Installation
- 18.10.1 Just prior to installation the doors, windows etc. shall be un-crated and stacked on edge on level bearers and supported evenly. The frame shall be fixed into position true to line and level using adequate number of expansion machine bolts, anchor fasteners of approved size and manufacturer and in an approved manner. The holes in concrete/ masonry members for housing anchor bolts shall be drilled with an electric drill.
- 18.10.2 The doors, windows assembled as shown on drawings shall be placed in correct final position in this opening and marks made on concrete members at jambs, sills and heads against the holes provided in frames for anchoring. The frame shall then be removed from the opening and laid aside. Neat hole with parallel sides of appropriate size shall then be drilled in the concrete members with an electric drill at the marking to house the expansion bolts. The expansion bolts shall then be inserted in the holes, struck with a light hammer till the nuts is forced into the anchor shell. The frame shall then be placed in final position in the opening and anchored to the support through cadmium plated machine screws of required size threaded to expansion bolts. The frame shall be set in the opening by using wooden wedges at supported and bar plumbed in position. The wedge1s shall invariably be placed at meeting points of glazing bars and frames.
- 18.11 Neoprene Gaskets:
- The contractor shall provide and install Neoprene gaskets of approved size and profile at all locations as shown and as called for to render the doors, windows etc. absolutely air tight and weather tight. The contractors shall produce samples of the gaskets for approval and procure after approval only.
- 18.12 Fittings:
- Hinges, stays, handles, tower bolts, locks and other fittings shall be of excellent quality and manufacturers shall be approved by the Engineer-in-Charge.
- 18.13 Manufacturer's Attendance:
- The manufacturer immediately prior to the commencement of glazing shall adjust and set all windows and doors and accept responsibility for the satisfactory working of the opening frames.
- 18.14 Mastic Cement:
- The gaps between frames and supports and also any gaps in the windows section shall be raked out as directed and filled with mastic cement of approved colour and make to ensure complete water tightness. The mastic cement shall be of such colour and Composition that it would not stain the masonry/ concrete work, shall receive paint without bleeding, will not sag and shall not set hard or dry out under any conditions of weather. The samples of mastic cement to be used for this purpose shall be got approved by the Engineer-in-Charge before its actual use.
- 18.15 Sealant:
- 18.15.1 Use modified silicone for joint subject to movement and in glazing.

- 18.15.2 Surfaces to receive sealant shall be properly prepared, cleaned, primed and excess sealant removed from finished surfaces.
- 18.15.3 Sealed joints shall be neatly tooled and surfaces smoothed.
- 18.15.4 Follow the instruction of the sealant manufacturers.
- 18.15.5 Colour of the sealant shall be approved by the Engineer-in-Charge.
- 18.16 Glazing:
- 18.16.1 Glazing shall generally be accomplished from the inside of building.
- 18.16.2 The glazing system shall be designed to this end use a continuous EPDM compression gasket on both sides (Present Gasket on one side of glazing pocket and roll in gasket on another side). A continuous wet seal shall be employed to ensure a complete water tightness.
- 18.16.3 Maintain a minimum glazing bite, edge clearance and surface clearance depending on the glass as recommended by the glass manufacturer.
- 18.17 Sealant and Gasket Application:
- 18.17.1 Sealant and gasket shall be provided wherever shown in the drawings or required for a permanently weather tight installation. The sealing mechanism is necessary but is not indicated, it shall be of type recommended by the sub- contractor and approved by the Engineer-in-Charge.
- 18.17.2 All adjoining surfaces shall be protected to receive sealant against staining by masking and/ or other methods.
- 18.17.3 Joints and joint surfaces shall be clean, dry, and free of any material that may have an adverse effect on the bonding and/ or seal of the sealant and gasket materials.
- 18.17.4 Apply sealant and gasket under the conditions recommended by the manufacturer(s). Prime all surface to receive sealant and gasket unless recommended otherwise, use no sealant that has started to set in its container or a sealant that has exceeded the self-life published by the manufacturer.
- 18.17.5 Fill all joints continuously and completely with sealant, forming a neat, uniform, concave bead. Finish the material flush with adjoining surfaces unless shown on the drawings. All sealant surfaces shall be tooled smooth.
- 18.17.6 Tensile or shear stress in structural silicone sealant joint shall not exceed 1.4 kg/ sqm.
- 18.18 Protection & Cleaning: The contractor shall adequately protect all components and accessories from *damage* during shipments, storage at job site, erection and after completion of the work. At such time as may be directed, the sub-contractor shall remove all protective tapes or coating, thoroughly clean all anodized aluminium and glass surfaces with suitable cleaning agent, make final adjustments to all ventilators, etc. and hardware leaving all in first class working order.
- 18.19 Details of Tests
- 18.19.1 The various tests on aluminium sections shall be conducted in accordance with the relevant IS codes.
- 18.19.2 The minimum number of tests for powder coating and corrosion resistance shall be as given below:

S. No.	Details	No. of Tests
1	Doors, Windows & Ventilators	5% of Nos. manufactured.

- 18.19.3 The samples of major member of each unit of doors/ windows shall be selected at random by Engineer-in-Charge as such that all the aluminium section be got tested.
- 18.19.4 The cost of samples, carriage or the samples and testing charges, if any, shall be borne by the contractor.
- 18.20 Acceptance Criteria:
- The Aluminium sections shall conform to the provisions of the relevant items. For payment purpose only, actual weight of sections shall be taken into account. However, if the sectional weight of any Aluminium section is higher than the permissible variation then the weight payable shall be restricted to the weight of the section including permissible variation.
- 18.21 Measurement:
- Payment by weight shall be made for Aluminium sections including beading only and all fixing angles cleats fittings and fixtures such as handles and hinges etc., shall not be included in the weight to be paid.
- 18.22 Rates:
- The rates of the items shall include the cost of all materials, labours and inputs required
- 18.23 *Factory* made glazed Steel/Aluminium Doors, Windows & Ventilators shall be manufactured in a workshop approved by the Engineer-in-charge.

19.0 METAL FIRE CHECK DOORS / WINDOW / PARTITIONS

- 19.1 Contractor shall be responsible for obtaining "No objection Certification from Fire Department for the executed work. Accordingly, Metal Fire check door/ window/ partition shall be executed in all Staircase, Passage, Lobby, Electric shafts and anywhere required at site as per requirement of Fire Department / NBC-2016. The Item should be executed by a specialized agency. Necessary shop drawings for the fire door /window/ partition shall be prepared by the specialized vendor and submitted to Engineer-in charge for approval. Only after approval, the specialized vendor goes ahead with procuring and installing the doors, windows & partitions etc.

Note: Low voltage shaft door and frame shall not be fire rated but match the fire doors in appearance. The door and frame shall be of polyester powder coated aluminium/ GI with 6mm thick toughened glass glazing with locking arrangement and necessary fittings.

- 19.2 The work shall be done in accordance with CPWD Specifications - 2019 - Vol. I & Vol. II and NBCS - 2026 with up to date correction slips
- 19.2.1 Fire check doors shall be of 2-hour fire rated and shall satisfy the performance criteria of Fire Resistance - Stability, Fire Integrity and Insulation as per BS:476 Part-22 and IS:3614 Part-II as below:
- Stability: The fire check door should not collapse during the rated period of fire under the specified fire conditions. The fire check doors provide safe access to the escape route in the building namely protected corridors and staircase.
- Integrity: The fire check doors should not allow the passage of hot gases or the flames or the flames through the rebate or the gap between the door frame and shutters for the duration of its fire rating.
- Insulation: The mean temperature of fire door on unexposed side should not exceed 140 °C above ambient temperature for the duration of its fire rating.
- 19.2.2 Testing:

One door assembly shall be selected at random out of the entire lot, one for single leaf and one for double leaf and shall be tested for two hours fire rating. The testing shall be got done from CBRI, Roorkee or any other accredited NABL test laboratory approved by the Engineer-in-charge. The cost of materials, for testing and transportation/packing, testing charges and other incidental charges, shall be borne by the contractor. In case the door fails to meet the requirement, the entire lot shall be rejected.

20.0 STRUCTURAL GLAZING

20.1 General:

The work shall be carried out through an approved specialized agency, who shall furnish all materials, labour, accessories, equipment, tool and plant and incidentals required for providing and installing Structural Glazing work. The specialized agency shall be got approved from the Engineer-in-charge, well before actual commencement of the item of work. Necessary performance certificates in respect of agencies proposed to be engaged shall be submitted within 30 days from the date of issue of acceptance letter to substantiate technical capability and experience of the agency for prior approval of the Engineer-in-charge.

The Contract Documents define only the design intent and general performance requirements. The Contractor is entrusted with total responsibility for design, structural calculations, shop drawings, fabrications, installation, warranties, certifications and related documentation.

The Contractor shall be entirely responsible for the design, fabrication and erection of the systems, and all work shall be performed entirely by his own forces.

Design approved metal framing members to accommodate expansion and contraction of components without buckling, creating stress on glass, structural components and fasteners, joint seals or other damaging effects.

The Contractor shall provide to sealant manufacturer samples of all relevant substrates, including finished aluminium, coated glass, gaskets, setting blocks and brackets.

Sealant manufacturer shall perform tests to verify adhesion, staining and chemical compatibility. The Contractor shall use sealants and substrates only in combinations for which favourable addition and compatibility results have been obtained.

Aluminium surfaces in contact with mortar, concrete, plaster, masonry, wet application of the fire proofing and absorptive materials shall be coated with an anti- galvanic, moisture barrier material.

20.2 Conceptual design:

- Component and hardware description.
- Design, fabrication & execution methodologies.
- Detailed bar chart & showing all activities from macro to micro details.
- Structural design and engineering fabrication, supply and erection of the Structural/ Structural Glazing wall system including but not limited to the following:
 - Extrusion aluminium framing members.
 - All interior trim covers and closures.
 - All anchor clips, fasteners, and brackets.
 - Glazing, including materials, gaskets, sealants, spacers and related work.

- A continuous gutter system at each floor of the unitized Structural Glazing wall.
- Field water tests.

20.3 Samples:

Sample of one typical panel shall be fabricated, assembled and installed for approval. It shall be of type as per approved drawings. All samples shall be provided at no cost to the Project In-charge.

20.4 Design Considerations:

The Contractor should possess adequate engineering background and facilities inclusive of trained system personnel from their parent company and should be able to prove their design and engineering capabilities to meet structural design parameters. The Contractor should carry adequate Professional Indemnity Insurance supporting a design warranty to the benefit of the Project In-charge. Copies of the same to be forwarded to the Project In-charge within 2 weeks of signing the Agreement.

The Contractor shall submit structural calculations for the system and it shall be stamped and signed by a qualified structural engineer, including mock-up complying with current design rules of the relevant aluminium code include analysis for wind, dead loads, deflections and if appropriate seismic loads on framing members and anchors. All Structural Glazing shall have mechanical joints shall be designed IS 875.

The design shall also ensure that the maximum deflection of any member shall not exceed 1/175 of the span between supports or 20mm, whichever is less for vertical elements & 1/250 of the span between supports for horizontal elements. Air leakage through windows should not exceed 0.60 Cu.ft/Sq.ft. Minimum design pressures both inward, outward and acting perpendicular to glass (including return surfaces) shall be per the requirements the Indian Wind Loading Code IS 875 Part 3 and earthquake regulations.

The framing members should be designed such that deflection perpendicular to the wall plane of any unsupported span shall not exceed 1/175 or 20mm whichever is the least, under the required design load both positive and negative. Also, no failure of structural silicone Jolts, damage to joinery, components, or permanent set in the framing members in excess of 0.2 percent of the span shall occur under 1.5 times the design load. Deflection in the wall plane of any glazed horizontal span should not exceed ½ the glass edge clearance dimension below.

The Contractor shall also submit the calculations for the structural silicone joint, size as required.

20.5 Water Tightness:

A complete drainage system must be incorporated into the Structural Glazing wall frame. Water leakage and condensation shall be drained or discharged to exterior face of the wall and all internal spaces shall be vented by acceptable means to ensure air-pressure equalization when possible.

Drainage system shall be sealed off per floor height to prevent infiltrated water from leaking to lower floors.

Movement of water behind and on exposed surfaces must be controlled to ensure that water is not retained and that elements will not be damaged or corroded by water and to minimize the potential for algae and fungus growth as a result of standing or trapped water.

20.6 Shop Drawings:

The Contractor shall prepare detailed shop drawings incorporating all allowances for construction and fabrication tolerances.

The Contractor shall submit detailed shop drawings for the Structural wall system, aluminium composite panel cladding works to the Project In-charge for review.

The Architect's review will be conformance to the design concept and for the general arrangement only. And such review shall not relieve the Contractor of any responsibilities as stated herein or any other applicable items herein specified.

The Shop drawings shall show joinery techniques, provisions for horizontal and vertical expansion, glass and metal thickness, framing and anchor member profiles, identification all materials including metal alloys, glass types, fasteners and glazing materials, all shop and field sealants by product name. This shall also show relative

layout of all adjacent walls, beams, columns and slabs with all dimensions to each other and grid lines/ dimension position of glass edge relative to metal daylight, anchorage details to the building structure and coping details at the parapet are also to be submitted. The drawing shall also indicate all gaskets, weather strips and Aluminium extrusions.

Shop Drawings shall be signed and sealed by a Qualified Structural Engineer with specific experience in Structural Glazing Wall construction and design.

20.7 Samples:

The Contractor shall submit samples for review three (3) sets of labelled samples of each required type and colour of metal finish, on 300mm long sections of aluminium extrusion shapes. Samples must show extremes of colour texture variation. Samples will be reviewed by Project In-charge for colour and texture only. Compliance with other requirements is the responsibility of the Contractor. Colour and texture range of production material shall match approved samples.

Project In-charge reserves the right to require samples which will show the fabrication techniques and workmanship of the component parts, and the design of accessories and other exposed auxiliary items, before fabrication of this work proceeds.

The Contractor shall also submit samples for review three (3) sets of labelled samples of sealant backers, anchor components, anchor assemblies and epoxies.

20.8 Aluminium:

Extruded aluminium sections should conform to BIS designation HE9WP/HV9WP, the chemical composition requirements of IS:733, and technical properties as laid down in IS:1285. Standard commercial tolerances shall apply to finished, fabricated and assembled materials.

The sections of mullions and transoms shall be designed to withstand deflection and wind pressure as described in specifications and shall be rigid enough to support and retain the glass and other construction variation as indicated.

Reinforcing member, where used, shall be completely enclosed and if fabricated from steel shall be galvanized and protected with two coats of zinc chromate where welded shall be treated in the same way.

The frames shall be formed by integrated PVDF 3 coats (40 – 45 microns) as per AAMA 2605 specification aluminium section with provision to receive fixed glass spandrel and other construction variation as indicated.

Sections of the frame shall be cut and profiled for assembly in the best workman like manner and finished in a neat and weatherproof construction with proper tempering of aluminium sections.

All dimensions of the Structural Glazing wall shall conform to the overall sizes shown on the drawings. They shall be fabricated to proven and tested detail designs. All parts shall be supplied ready for fixing and complete with all necessary fittings. The exact dimensions for frame work shall be physically checked at site before starting fabrication.

All joints shall be mechanical, jointed with aluminium angles with stainless steel screws.

20.9 Silicone Sealant:

The Contractor shall send a sample of PVDF 3 coats (40 – 45 microns) as per AAMA2605 specification aluminium section & selected glass to the silicon sealant manufacturer and get his approval. A copy of that certificate to be submitted to Project-In-charge. The cost of samples, carriage of the samples and testing charges, if any shall be borne by the Contractor.

The Contractor shall submit, for record only, glass manufacturer's written statement that any insulated glass, reflective glass and spandrel glass is supported by structural silicone is suitable for such application.

The colour/ shade of sealant shall be decided by the Engineer-in-charge and the Contractor to get approval before procurement.

20.10 Glass Specification:

Providing and fixing aluminium semi unitized vertical Structural glazing system with glazed vision panel and spandrel panel of approved make having main frame of verticals and horizontals made out of specially designed extruded aluminium sections to withstand wind pressure at a height of 40m and fabricated, fixed at all levels, elevation and heights to the Masonry / RC walls with necessary clamps, brackets and anchor fasteners. All clamps and brackets shall be Mild Steel Hot dip galvanized minimum 80 microns thick and shall conform to IS: 4759-1996. The extruded aluminium section shall be anodized in approved colour with an anodic coating of minimum 20 microns. Extruded section shall be of 6063 T5 or T6 alloy conforming to ASTM B 221. Any other fastening straps, nuts, bolts, rivets, washers, Fire stops at all floor levels etc. shall be in stainless steel SS 304 grade. All tapes shall be of approved make. The system shall be designed to withstand a wind pressure of 200 kg/Sqm and shall be fixed to the masonry/RC walls with necessary clamps, brackets and anchor fasteners, clamps and brackets shall be Hot dip galvanized minimum 80 microns thick all complete as per manufacturer's manual and specifications. The spandrel panel shall have 50mm thick fiber glass insulation of 48 kg/Cum density of approved make conforming to IS-8183 and 1.0 mm thick Twiga black tissue conforming to BS 476 Part 7. This insulation shall be enclosed in a GI tray fabricated out of 1mm thick. GI sheet and fixed to the glazing framework with stainless steel fasteners. The gap between the GI framework and the concrete framework shall be sealed with Aluminium flashing fixed with stainless steel fasteners. All gaps shall be sealed with Silicone sealant of approved brand. Insulation should be provided in between the Structural glazing aluminium frame work (i.e., behind the spandrel glazed panel) and the structure.

Providing DG glass consisting of 6 mm thick toughened glass inside and 6 mm thick toughened glass outside having 12 mm air gap having VLT = 69 to 73 %, External reflectance = 8 to 12%, Internal reflection = 10 to 14%, Solar factor = 0.51 to 0.55, U value = 1.6 to 2 W/sqm K etc

20.11 Accessories:

Silicon gaskets, weather stripping, extruded seals and spacers, which do not come into contact with structural silicone sealant shall be of Silicon gasket or approved equivalent. Where in parallel contact with structural silicone sealants, all gaskets, setting blocks and spacers other than foam glazing tapes shall be of heat cur silicone rubber, chemically compatible with the silicone sealant and suitable for

the specific purpose intended. All extruded gaskets, weather stripping and spacers other than foam glazing tapes shall have continuous mechanical engagement to framing members adhesive attachment is not acceptable.

The cladding system shall be constructed with (and shall maintain during its design life) a standard of seal which shall not result in any reduction of sound insulation performance.

Gaskets, weather stripping and seals used to achieve the required weather proofing and/ or air tightness shall be selected to accommodate fully the range of dimensional tolerances associated with fabrication and installation of the cladding system. Gaskets, weather stripping and seals shall be formed from materials capable of retaining their elastic qualities, dimensions and resistance to physical and chemical attack sufficient to maintain the full water tightness, air tightness and acoustic performance for the design life of the Structural wall.

Extruded gaskets, weather stripping, seals and spacers mechanically engaged by flutes or pockets extruded in framing member shall be installed without residual tension or extension. Dry lubricants may be used to reduce drag during installation of synthetic rubber extrusions and to induce compression so as to prevent gradual elastic shrinkage and retraction from their ends. Wet lubricants containing detergent shall not be used for any purpose which may bring the liquid into contact with the coated surfaces of vision and spandrel glass.

20.12 Fabrication & Installation:

Installation shall be in true line vertically and horizontally.

Work shall be done by competent workmen who are thoroughly skilled in their trade. Assemblies shall be neat and free of defects that impair strength, function or appearance. The work shall be accomplished in compliance with the specified criteria without buckling opening or joints. Under stress on fasteners, sealants and gaskets, opening of welds cracking of glass leakage noises and other harmful effects.

As far as practicable fitting and assembly of the work shall be done in the shop.

All exposed work shall be carefully matched to produce continuity of line and design.

All joints in exposed metal work, unless otherwise shown or specified shall be accurately fitted and rigidly secured with joint sizes conforming to industry standards.

Except where otherwise shown specified or directed the method of assembly and joining shall be as per approved shop drawings. Fabricate and fasten metal work so that the work will not be distorted nor the fasteners over stressed from the expansion and contraction of the metal.

All welding shall be in accordance with the appropriate recommendations of the Indian welding codes and shall be done with electrodes and/ or by methods recommended by the manufacturer of the alloys being welded. All welds behind finished surfaces shall be done as to minimize distortion and/ or discoloration on the finished side. All weld spatter and welding oxides on finished surfaces shall be removed by de-scaling and/ or grinding.

Unless otherwise shown or specified, all weld beads or exposed surfaces shall be ground and finished to match and blend with finish on adjacent parent metal. Grinding and polishing of nonferrous metal shall be done only with clean wheels and compounds free from iron and iron compounds. No soldering and/ or brazing shall be allowed.

The Contractor shall conceal all the fasteners where visible in the finished work.

All aluminium components shall fabricate before finishing, cutting of components will not be acceptable.

As the building is exposed to varying weather actions, all fasteners shall be stainless steel, self-tapping screws with Aluminium brackets. Steel anchors shall be pre-holed and galvanized. The bolts shall be steel chromium plated along with nuts and covered with butyl sealing compound.

Where aluminium comes into contact with masonry, brickwork, concrete, plaster or dissimilar metals, it shall be coated with an approved insulation lacquer, paint or plastic tape to ensure that electro-chemical corrosion is avoided.

The Contractors shall be responsible for placing in position the Structural Glazing wall frames for the satisfactory performance and should be totally leak proof for a minimum period of ten years Sealant and Gasket Application

Sealant and gasket shall be provided wherever shown in the drawings or required for a permanently weather tight installation. The sealing mechanism for each location and use shall be as indicated on drawings in those locations where a mechanism is necessary but is not indicated. It shall be of type recommended by the Contractor and approved by the Project In-charge.

All adjoining surfaces shall be protected to receive sealants against staining by masking and/ or other methods.

Joints and joint surfaces shall be clean, dry and free of any material that may have an adverse effect on the bonding and/ or seal of the sealant and gasket materials.

Apply sealants and gasket under the conditions recommended by the manufacturer(s) Prime all surface to receive sealants and gasket unless recommended otherwise use no sealant that has started to set in its container or a sealant that has exceeded the self-life published by the manufacturer.

Fill all joints continuously and completely with sealant forming a neat uniform concave bead. Finish the material flush with adjoining surfaces unless otherwise shown on the drawings. All sealant surfaces shall be tooled smooth.

20.13 Certification:

The Contractor shall submit a letter of certification from the sealant manufacturer stating that the sealant has been tested for adhesion and compatibility on production samples of metals, glass, and other glazing components, and that all sealant details and application procedures shown on the reviewed shop Drawings are acceptable for use.

Where the Structural Glazing wall and other cladding impinges on, intercepts, covers, is attached to or supported by the work of other trades, for instance at parapet-level junctions with roof membranes and back-up walls, the Contractor's shop drawing and location drawings shall clearly distinguish elements and components of construction by other.

Anchorage System and Building Frame

Each mullion shall be fixed to the structural slab at each floor level. All steel fasteners shall be galvanized to minimum 80-90 microns coated with zinc chromate primer and supplied by the Contractor.

20.14 Water Tightness:

No gross leakage shall be observed when subject to test for water penetration as described in BS 4315 Part-1.

20.15 **GUARANTEE:**

- 20.16 The Structural Glazing work shall carry 5 Years guarantee for proper design and performance to be reckoned from the date of completion of the entire work under the contract against faulty workmanship, finishing, unsound materials and other related problems.
- 20.17 The design and installation shall be to the best international standards and shall specially take account of wind and seismic loads, storms, thermal stresses, building movements and the like.
- 20.18 The 5 year guarantee shall be furnished in non-judicial stamp paper of value Rs.100/- or more, in prescribed Performa. The guarantees shall be submitted before final payment and shall not in any way limit any other rights to correct which the Employer may have under the Contract.
- 20.19 In addition to above, 10% (Ten percent) of the cost of "Structural Glazing Work" shall be withheld from the bills towards guarantee as per decision of Engineer-in-Charge whose decision will be final and binding. This amount to be withheld towards guarantee shall be in addition to the other amounts to be withheld as mentioned elsewhere in the contract agreement. However, half of this withheld amount would be released after two years from the date of completion of the work, if the performance, as required, is satisfactory. The remaining withheld amount shall be released after 5 years from the date of completion of work, if the performance, as required, is satisfactory. If any defects are noticed during the guarantee period, it shall be rectified by the Contractor within seven days of issue of notice to the Contractor, temporarily, to the satisfaction of the CPWD/ Client Department or any other authorized representative of client department and within a period of one month the permanent rectification of the defects/replacement of defective materials should be carried out by the Contractor. If not attended to, the same shall be got done through other Contractor at the risk and cost of the Contractor and the cost, which shall be final and binding on the Contractor, shall be recovered from the amount withheld towards the guarantee as mentioned above or any other amount due to the Contractor. However, the amount withheld as guarantee can be released in full against irrevocable bank guarantee from a Schedule/Nationalized Banks, of the same amount, for the guarantee period is submitted by the Contractor in favour of Engineer-in-charge. The defects, if any, shall be rectified, retaining the same aesthetics and other functional parameters of the original work.

21.0 WATER PROOFING WORK

- 21.1 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. Guarantee 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 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.
- 21.2 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.
- 21.3 Treatment for roof surface with integral cement based compound (brick coba). This item shall be got executed from specialized agency to be got approved from Engineer-in-Charge. However, if work is got done through specialized agency, as approved by the Engineer-in-charge.

- 21.4 The brick bats shall be from over burnt bricks. The proprietary water proofing compound shall bear ISI mark and shall conform to IS: 2645. Before execution of work water proofing compound has to be brought to and a certificate of its conforming to IS code should be produced. The proprietary water proofing compound shall be added at the rate recommended by the specialist firms but not exceeding 3 percent by weight of cement. The Engineer in charge reserve the right to collect the random sample from material brought at site and gets it tested from laboratory of his choice. The material which does not conform to the specification shall have to be removed forthwith by the contractor.
- 21.5 The finished surface after water proofing treatment shall have minimum slope of 1 in 80. At no point shall the thickness of water proofing treatment be less than 65 mm.
- 21.6 While treatment of roof surface is done, it shall be ensured that the outlet drain pipes have been fixed and mouths at the entrance have been eased and rounded off properly for easy flow of water.
- 21.7 The surface where the water proofing is to be done shall be thoroughly cleaned with wire brushes. All loose scales mortar splashes etc. shall be removed and dusted off. The surface shall be treated with neat cement slurry admixed with proprietary water proof compound to penetrate into crevices and fill up all the pores in the surface.
- 21.8 This cement slurry shall be applied at the junction of parapet and terrace slab including the vertical face of the parapet.
- 21.9 After the slurry coat is laid, layer of over burnt brick bats shall be laid in cement mortar of mix as specified by specialist firm but not leaner than 1:5 (1 cement: 5 coarse sand) admixed with proprietary water proofing compound to required gradient and joints filled to half the depth. The bricks bat layer shall be rounded at the junction with the parapet and tapered towards top for a height of 300mm. Curing of this layer shall be done for 2 days.
- 21.10 After curing the surfaces shall be applied with a coat of cement slurry admixed with proprietary water proofing compound.
- 21.11 Joints of bricks bat layer shall be filled fully with cement mortar of mix as specified by the specialist firm but not leaner than 1:5 (1 cement: 5 coarse sand) admixed with proprietary water proofing compound and finally top finished with average 20 mm thick layers of cement mortar 1:4 (1 cement: 4 coarse sand) and finished smooth with cement slurry mixed with proprietary water proofing compound. The finished surface shall have marking of 300x300 mm false squares to give the appearance of tiles.
- 21.12 Curing of water proofing treatment shall be done for a minimum period of two weeks by flooding the water by making kiaries etc.
- 21.13 **MESUREMENTS:** The measurements shall be taken for plan area of terrace only. Length and breadth shall be measured correct to one centimeter and area shall be worked out to nearest 0.01 sqm. No deduction in measurements shall be made for either opening or recesses for chimneys, stacks, roof lights and the like of areas up to 0.10 sqm nor anything extra shall be paid for forming such openings. For similar areas exceeding 0.10 sqm, deductions will be made in measurements for full openings and nothing extra shall be paid for making such opening.
- 21.14 **Rates:** The rate shall include the cost of all labour and materials involved in all the operations described above.
- 21.15 **GUARANTEE**
- 21.15.1 The Water Proofing work shall carry **10 (Ten) Years** for proper performance to be reckoned from the date of completion of the entire work under the contract against faulty workmanship, leakage and

other related problems. A 10 (Ten) Years Guarantee bond in prescribed Performa attached herewith shall be submitted by the contractor which shall also be signed by both the specialized agency and the contractor to meet their liability / liabilities under the guarantee bond. However, the sole responsibility about efficiency of water proofing treatment shall rest with the building contractor.

21.15.2 Five percent of the cost of water proofing work shall be retained as security deposit and the amount so withheld would be released after ten years from the date of completion of the entire work under the agreement, if the performance of the work done is found satisfactory. If any defect is noticed during the guarantee period, it shall be rectified by the contractor within seven days of receipt of intimation of defects in the work. If the defects pointed out are not attended to within the specified period, the same will be got done from another agency at the risk and cost of contractor.

21.15.3 However, the security deposit deducted may be released in full against bank guarantee of equivalent amount in favour of Engineer in charge, if so, decided by the Engineer in charge.

21.15.4 The Security deposit against this item of work shall be in addition to the security deposit mentioned elsewhere in contract form.

**GUARANTEE TO BE EXECUTED BY THE CONTRACTOR FOR REMOVAL OF DEFECTS AFTER
COMPLETION IN RESPECT OF SPECIALIZED ITEMS OF WORK**

This agreement made this..... day of Two Thousand between
.....M/s(hereinafter called the GUARANTOR on the one
part) and the President of India (hereinafter called the Government on the other part)

WHEREAS THIS agreement is supplementary to a Contract No. dated
(Hereinafter called the Contract) and made between the GUARANTOR ON THE ONE PART AND the
Government on the other part whereby the contractor inter alia undertook to render the work in the said
contract structurally stable, workmanship, finishing and use of sound materials.

AND WHEREAS THE GUARANTOR agreed to give a guarantee to the effect that the said work will
remain structurally stable and guaranteed against faulty workmanship, finishing and materials for **five 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 defect free for minimum period of **5 (five) years** to be reckoned from the date after the expiry of
maintenance period prescribed in the contract.

During this period of guarantee, the guarantor shall make good all defects to the satisfaction of 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 the defects, commits breach there under, 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 damage and or cost incurred by the
Government, the decision of the Engineer-in-Charge will be final and binding on both the parties.

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

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

1. 2.

Signed for and Behalf of the President of India by in the presence of:

1. 2.

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

This agreement made this..... day of Two Thousand between M/s(hereinafter called the GUARANTOR on the one part) and the PRESIDENT OF INDIA (hereinafter called the Government on the other part)

WHEREAS THIS agreement is supplementary to a Contract No. dated (Hereinafter called the Contract) and made between the GUARANTOR on the one part and the Government on the other part whereby the contractor inter alia undertook to render the building and structures in the said contract completely water and leak-proof.

AND WHEREAS THE GUARANTOR agreed to give a guarantee to the effect that the said work will remain water and leak proof, for **10 (Ten) Years** from the date of completion of the work under the contract.

NOW THE GUARANTOR hereby guarantee that work executed by him will render the structures completely leak proof and the minimum life of such water proofing treatment shall be **05 (Five) Years** to be reckoned from the date of completion of the work under 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 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 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 being found render the building water proof to the satisfaction of 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 execute the water proofing or commits breach there under, 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 damage and or cost incurred by the Government, the decision of the Engineer-in-Charge will be final and binding on both the parties.

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

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

1. 2.

Signed for and Behalf of the President of India by in the presence of:

1. 2.

केन्द्रीय लोक निर्माण विभाग

कार्यालय झापन

No. DG/CON/ Maintenance 2023/18

ISSUED BY AUTHORITY OF DIRECTOR GENERAL, CPWD

VIDYUT BHAWAN, NEW DELHI

Dated: 27.02.2026

Subject: Modifications in General Rules & Directions, Clause 1 and Schedule E of GCC 2023 Maintenance Works

The following modifications are made in the General Rules & Directions, Clause 1 and Schedule E of GCC 2023 Maintenance Works.

Existing provision	Modified provision
General Rules & Directions 11 (i) The Contractor whose tender is accepted, will be required to furnish performance guarantee at specified percentage of the tendered amount as mentioned in Schedule 'E' and within the period specified in Schedule F.	General Rules & Directions 11 (i) The Contractor whose tender is accepted, will be required to furnish performance guarantee as mentioned in Schedule 'E' and within the period specified in Schedule F.
Clause 1 Performance Guarantee (i) The contractor shall submit an irrevocable Performance Guarantee at specified percentage of the tendered amount as mentioned in Schedule 'E', in addition to other deposits mentioned elsewhere in the contract for his proper performance of the contract agreement, (not withstanding and/or without prejudice to any other provisions in the contract) within period specified in Schedule 'F' from the date of issue of letter of acceptance.	Clause 1 Performance Guarantee (i) The contractor shall submit an irrevocable Performance Guarantee as mentioned in Schedule 'E', in addition to other deposits mentioned elsewhere in the contract for his proper performance of the contract agreement, (not withstanding and/or without prejudice to any other provisions in the contract) within period specified in Schedule 'F' from the date of issue of letter of acceptance.
Sl. No. (ii) to (v)	No change
SCHEDULE 'E' Reference to General Conditions of contract Sl. No. (i)	SCHEDULE 'E' Reference to General Conditions of contract No change


 D.P. Jindal
 EE (Contract)

LIST OF PREFERRED MAKES FOR CIVIL WORK

Approved makes of materials to be used in the work are as given in the table below. In case of non-availability of these makes, the Engineer-in-charge may allow use of alternative makes after seeking approval of TS authority. Only BIS marked materials shall be generally used in the work. Non-BIS marked materials may be permitted by the Engineer-in-charge only when BIS marked materials are not manufactured.

S. No.	Material	Preferred Make
1.0	Concrete Work	
(i)	Ordinary Portland Cement / Portland Pozzolana Cement.	ACC, Ultratech, Ambuja, Birla, J K Lakshmi,
(ii)	White Cement	Birla White, J K White, Ultratech
(iii)	Construction Chemicals / Admixtures / Plasticizers / Super Plasticizers	BASF, FOSROC, Pidilite, Ardex Endura, Mapei, MC Bauchemie, Weber (Saint Gobain), Sika, MYK, Asianpaints, Ferrouscrete, Berger
(iv)	Concrete Curing Compounds.	FOSROC, Sika, BASF, Pidilite, CICO, Weber (Saint Gobain), MC Bauchemie, Mapei, Ferrouscrete, Berger
(v)	Precast Cover Blocks	ACC, Nuvoco, Ultratech, Modi Cover blocks, Steelmax
2.0	Reinforced Cement Concrete	
(i)	Steel TMT Reinforcement Bars	SAIL, Tata Tiscon, RINL, JSPL and JSW
(ii)	Mechanical Couplers for Reinforcement	Dextra India, Halfen, Sanfield,
(iii)	Anchor fastener, Rebar chemical/Mechanical Fastener, Core Cutting, Expandable Fastener	Hilti, Fisher, Bosch, Wurth, Canon, Trixell, 3M India
(iv)	Ready Mix Concrete Plants	ACC, Ultratech, JK, Prism RMC Plant, RDC or own Batch Mix Plant with appropriate capacity to be set up by contractor at or away from the site
(v)	Aluminium customized Shuttering	S-Form, MFE, Eins Technik Pvt. Ltd. ALFOAC, MFS
3.0	Water Proofing	
(i)	Crystalline Water Proofing Compound	Penetron, Kryton, Xypex, Ferrouscrete, MC Bauchemie, Velosit, Weber (Saint Gobain) (Dosage as per manufacturer specification or that required to achieve performance criteria of DSR item 22.22 i.e. more than 90% permeability reduction and resistance to hydrostatic pressure up to 16 bar, whichever is more)
(ii)	Water Proofing swellable bar/ Liquid membrane/ single component applied (spray applied for deck water	Ardex Endura, MYK Laticrete, Pidilite, BASF, Fosroc, Sika, MC Bauchemie, Kryton, Mapei, Asianpaints, Penetron, Ferrouscrete, Velosit, Weber (Saint Gobain)

	proofing/ Elastomeric acrylic UV resistant liquid applied coating	
(iii)	Waterproofing PU / Polyurea/ Acrylic / Elastomeric Cementitious / SRI Coating/	BASF, Fosroc, Pidilite, Penetron, Sika, Asianpaints, Weber (Saint Gobain), Mapei, MYK, Ferrouscrete, MC Bauchemie, Velosit
(iv)	Polysulphide Sealant for Joints	Fosroc, Pidilite, Sika, Dow Corning, Wacker, Penetron, Asianpaints, Ferrouscrete, MC Bauchemie, Weber (Saint Gobain),
(v)	Water proofing membrane HDPE /TPO based waterproofing	Fosroc, Pidilite, BASF, Sika, Asianpaints, Weber (Saint Gobain), Mapei, MYK, Ferrouscrete, MC Bauchemie.
(vi)	Water proofing compound	BASF, Fosroc, Pidilite, Penetron, Sika, Mapei, Asianpaints, MC Bauchemie, MYK, Ferrouscrete, Weber (Saint Gobain), United, Velosit
(vii)	Polyurethane over deck insulation foam	BASF, Fosroc, Pidilite, Penetron, Sika, Mapei, MYK, MC-bauchemie, Asianpaints, Weber (Saint Gobain), Ferrouscrete, Berger, Velosit
(viii)	Food Grade Coating for Water Tanks	BASF, Fosroc, Pidilite, Penetron, Sika, Mapei, MYK, Weber (Saint Gobain), Asianpaints, MC Bauchemie, Berger
4.0	Masonry Work	
(i)	AAC Blocks	ACC, Tata Tiscobuild, Ultratech, Ferrouscrete, Magicrete
(ii)	AAC Block adhesive	Ultratech, Ardex Endura, Ferrouscrete, Weber (Saint Gobain), Asianpaints, Berger
5.0	Steel Work	
(i)	Structural Steel Sections / Tubular Sections	SAIL, Tata Steel, RINL, JSPL and JSW, APL Apollo
(ii)	Dash / Anchor Fasteners, Rawl Plug	HILTI, Fischer, Bosch, Wurth, Canon
(iii)	EPDMGasket	Schuco, Hanu, Raven, Anand
(iv)	Metal deck profile sheet	Ezydeck of TATA / Lloyd Superdeck, JSW
(v)	Roofing Steel Sheet (Precoated)	Tata Bluescope Steel Ltd., Jindal Steel, JSW Steel
(vi)	Polycarbonate Sheet	GE-LEXAN, Polygal, Tuflite Dalphalon, Coxwell
6.0	Aluminium Work	
(i)	Aluminium Extrusions	Hindalco, Jindal, NALCO
(ii)	Anodised Aluminium Hardware (HeavyDuty)	HARDIMA, EVERITE, Alu Alpha, Hindalco, Pulse of LGF Sysmac
(iii)	Alluminium Door & Window Systems	Schuco, Technal, Eternia-Hindalco, AIS Windows, Alupure, Axsys, A2Z Infra Solutions, Pabros

(iv)	Aluminium Glass Facade & Structural Glazing Systems	Schuco, Technal, Eternia-Hindalco, Dow, Lindner AG, Art N Glass, AIS Window system, A2Z Infra Solutions, Pabros
(v)	Aluminium Composite Panels / Honeycomb Composite Panels / Aluminium-HPL Panels	Allucobond, Alstone, Aludecor, Kalco, Reynoarch, Alutech, Virgo, Crossbond
(vi)	Metal (Aluminium) Facade Panels	Hunter Douglas, Dwall Metallic, Lindner AG, Anakon, Hindalco
(vii)	Silicone Sealant / Weather Sealant / Fire Sealant / Polysulphide Sealant	Alstone, Sika, Dow, Choksey, Hilti, Wuerth (Promat), GE Plastics, Pidilite, FOSROC, BASF
7.0	Flooring	
(i)	Glazed, Ceramic & Vitrified wall / floor Tiles (Antiskid / Matt / Glossy)	Kajaria, Johnson, Somany, RAK, Vermora, Restile, Sunheart, AGL, Hindware (Manufactured in own mother plant only)
(ii)	Epoxy Grouts / Tile adhesive / Polymer modified cementitious grouts/	Ardex Endura, Ferrouscrete, MYK Schomburg, Pidilite, FOSROC, Sika, Weber (Saint Gobain), Asianpaints, Berger, J.K Maxx Paint
(iii)	Epoxy flooring	MYK Schomburg, BASF, Flowcrete, Ardex Endura, FOSROC, Sika, MC Bauchemie, Weber (Saint Gobain), Ferrouscrete, Asianpaints
(iv)	Wooden Laminated Flooring	Vista, Action Tesa, Pergo, Apex, Lamiwood, Kronotex, Greenply, Floormax, Kahrs Enginner Wood product
(v)	PVC Flooring	Armstrong, Unitex, LG, Responsive Industries, Tarkett, Tremco
(vi)	Vinyl Flooring	LG, 3M, Responsive Industries, Wonderfloor, Tarkett, Armstrong, Tremco
(vii)	Floor hardener	Ardex Endura, Weber (Saint Gobain), MC Bauchemie, Ferrouscrete
(viii)	Carpet Flooring	Interface, Shaw, Welspun, CCIL, Milicon, Flotex
(ix)	Marble/Stone flooring	Continental marble, Stonex, A Class Marble
(x)	Rubberized Flooring	Ebaco, Wonderfloor, Rayzon
8.0	Roofing / False Ceiling / Partition EPF	
(i)	GRG (Glass Fibre Reinforced Gypsum) false ceiling with GI grid system	Diamond ceilings, Saint Gobain, Armstrong, Hunter Douglas
(ii)	Grid Suspension system for False ceiling	Diamond ceilings, Saint Gobain, Armstrong, Hunter Douglas, METAPRO
(iii)	Calcium Silicate / Mineral Fiber False Ceiling Tiles and frame work	Saint Gobain, Aerolite, Ramco Hilux, USG Knauf, Dexune

(iv)	Gypsum Board False Ceiling/Partition and frame work	Saint Gobain Gyproc, Dexune, USG Knauf
(v)	Metal false ceiling i/c framework	Diamond ceilings, Hunter Douglas, Lindner AG, Hi-Steel, USG Knauf
(vi)	U-Baffle / Open Cell / Wooden Laminated false ceiling i/c framework	Diamond ceilings, Hunter Douglas, Lindner AG, Anakon, Hi-Steel, Techno ceiling
(vii)	Rock Wool / Glass Wool	UP Twiga, Roxul (Rockwool), Rockloyd (Lloyd Insulations), Dhanbad Rockwool, Dexune, Rockfon, Techno ceiling
(viii)	Fiber cement board	HIL (Birla Aerocon), Bison (NCL), RAMCO Hicem, Everest, Visaka Industries, Dexune
(ix)	Extruded Polystyrene Insulation Board	Du Pont, Dow Corning, Supreme, Texas, Analco, Unitech-ikk, Sika, Berger
(x)	Heat Resistant Tiles	Kajaria, Somany, Johnson
9.0	Doors / Windows / Wood work / Furniture	
(i)	Automatic sliding Glass doors with complete mechanism	AutoIngress, Godrej, Dorma, Ozone
(ii)	Flush Door Shutter	Century, Greenply, Duro, NAVAIR, KITPLY, Crossbond
(iii)	Ply Wood / Block Board	Century, Greenply, Merino, KITPLY
(iv)	Laminated Particle Board / veneered Particle Board	Greenlam, Century, Archidply, Merino, KITPLY, Crossbond
(v)	Laminates/Veneers	Greenlam, Century, Archidply, Merino, Splice, Virgo, KITPLY, Crossbond
(vi)	Acrylic sheet/Acrylic laminate	Rehau, Opulux, Treelam, Praveedh Décor, EGR, Virgo
(vii)	Wood Plastic Composite (WPC) Board/Door Shutter/Door Frame	Century, Greenlam, Floresta, Rajshree, Alstone
(viii)	Factory made wooden Door Frames & Shutter	Jain wood Industries, D S Doors, Duro, Ambika Wood, Shreeji Woodcraft, SM Corporation,
(ix)	Factory made kitchen cabinets, wardrobes etc.	Evoke, Godrej, Brown Crust, Splice, Sleek
(x)	UPVC Doors & Windows	Fenesta, VEKA, Saint Gobain, Duroplast, GB
(xi)	G.I. Steel Door Frame	Kutty Doors, Shakti Metdoor, NAVAIR, Bhawani Fire, Synergy Thrislington, ASES
(xii)	Fire Rated Metal/Wooden/Acoustic Doors (Glazed/Unglazed/sliding)	Shakti-met, Pacific, Navair, Pyrotech, GMP, Sukriti, Bhawani Fire, ASES
(xiii)	Fire Rated Glass	Shakti-met, Navair, Pyrotech, GMP

(xiv)	Hardware for Fire Check Doors	Dorma, Pacific, Assa Abloy, Geze, Hormann, Dorset, Becker FS, Kich
(xv)	S.S. Hardware, Door & Window Fittings, Hinges	Dorma, Godrej, Hafle, Dorset, AutoIngress, Becker FS, Kich
(xvi)	Brass Hardware	Magnum (Mukund Overseas), Artistick's (Artistic Art Forum), EPPW, Décor, Palladium
(xvii)	Friction StayHinges	Hettich, Kich, Hafle
(xviii)	FloorSpring / Door Closer	Godrej, Dorma, AutoIngress, Hafele, GEZE, Assa Abloy, Dorset, Becker FS, Kich
(xix)	Modular Work Stations	Godrej, HNI, Fuego, Steelcase
(xx)	Modular Office & Home Furniture – Table, Chair, Sofa, Bed, Dining Table/Chairs etc.	Godrej, HNI, Fuego, Steelcase, Integrity, Featherlite, Rockworth
(xxi)	Storage - Compactors, Metal Almirah etc.	Godrej, Compress, HNI, Integrity
(xxii)	Aluminum/U-PVC Doors & Windows Hardware	Rotto, Mccoy 8M, Oben
(xxiii)	Aluminum Glazed Partition System	Kubik, Jeb, Lycos, AutoIngress
(xxiv)	Window Blinds, blackouts, curtains, etc.	Vista, Deck, Hunter Douglas, Marvel
(xxv)	Window Roller/Zebra Blind/Curtains	Aerolux, Hunter Douglas, Deck, D'Decor
(xxvi)	Cubicle Track & Curtain System	Toso, Forest, Deck, Hunter Douglas,
(xxv)	Lead lined doors	Tata Pravesh, Shakti-met, Pacific, Navair, Sukriti, Bhawani, ASES
10.0	Finishing Works	
(i)	Ready Mix cement Plaster	Ardex Endura, Ferrouscrete, MYK Schmburg, Ultratech
(ii)	Gypsum Plaster / Polymer modified self-curing Mortar	Saint Gobain (Elite 90), Ardex Endura, Pidilite, FOSROC, Ferrous Crete, Berger, Weber (Saint Gobain)
(iii)	Cement Primer	Nerolac, Berger, BP White (Berger), Decoprime WT(Asian), White primer (ICI), Acro paints
(iv)	Cement Based & Acrylic Wall putty	Birla, JK White, Asianpaints, Ferrous Crete, Acro Paints, Magicrete, United, Weber (Saint Gobain), J.K Maxx Paint
(v)	Oil Bound Washable Distemper	Asianpaints, Nerolac, Berger, Dulux ICI, British Paints, J.K Maxx Paint
(vi)	Dry Distemper	Asianpaints (Professional Acrylic Distemper), Nerolac: (Beauty Acrylic Distemper), Berger (Bison Acrylic Distemper), Dulux ICI (Maxilite), British Paints

(vii)	Acrylic Distemper (washable/ Real mix/ Low VOC)	Asianpaints (Tractor Aqua Lock Paint), Berger (Commando) Acro Paints (Aqualin AWD) or equivalent paints of Nerolac or ICI-Dulux, British Paints, J.K Maxx Paint
(viii)	Acrylic Emulsion Paints	Asianpaints (Professional Premium Interior Emulsion Paint), Nerolac (Beauty Gold), Berger (Rangoli total care), ICI-Dulux (Super Cover), Acro Paints (Acropearl), British Paints (Singar smart), J.K Maxx Paint
(ix)	Texture Finish	Asianpaints, Bakelite & Hylam, Spectrum, Heritage, Ultratech Texture Paints, Berger, J.K Maxx Paint
	Exposed Concrete Texture Finish	Ultratech Texture Paints, Armourcoat, Oikos, Heritage, Spectrum, Berger
(x)	Steel Primer (Red Oxide Zine Chromate Primer)	Asianpaints, Nerolac, Berger, ICI-Dulux, Acropaints, Berger, British Paints
(xi)	Synthetic Enamel Paint	Asian (Apolite Premium gloss enamel), Nerolac (Synthetic Hi gloss), Berger (Luxol Hi gloss), ICI- Dulux (Gloss Synthetic Enamel), Acro paints (Acrogold), British Paints (Glo), J.K Maxx Paint
(xii)	Paint- Texture Concept Paints (Interior)	Asianpaints, Ultratech Texture Paints, Berger, acro paints
(xiii)	Paint- Anti carbonation paint	Fosroc, Pidilite, BASF, Asianpants, Sika, Berger
(ix)	Wood Primer	Asianpaints, Berger, ICI-Dulux, Nerolac, British Paints
(xv)	Melamine Polish for wood work	Asian Paints Melamine Gold, Wudfin of Pidilite, Timbertone of ICI-Dulux, MRF, British Paints
(xvi)	PU Polish for wood work	ICA, MRF, Asian, Berger
(xvii)	Epoxy Paint	Asian, Nerolac, Berger, ICI, Kansai Akzo Nobel, Weber (Saint Gobain)
(xviii)	Fire Resistant Paint	Asianpaints, Akzo Nobel Coatings India Ltd., Viper
11.0	Water Supply & Sanitary Works	
(i)	Stainless Steel pipe & Fittings	SAIL (Salem Steel), Jindal, J-Press, Primegold, Alfa Press
(ii)	G.I. Pipe	Tata Steel, Jindal Pipes, Surya Roshni
(iii)	GI Pipe Fittings	Unik, Zoloto, Surya, Jinda Pipesl, Tata Steel
(iv)	U-PVC pipe and Fittings	Supreme, Finolex, Astral, Prince, AKG, Birla HIL
(v)	C-PVC pipe and Fittings	Supreme, Finolex, Astral, Prince, AKG, Ashirwad, Oriplast, Birla HIL
(vi)	M.S. Black Pipes	Tata, Jindal, SAIL, Surya

(vii)	CP Fittings (Premium range)	Kohler, Jaquar, Grohe, Roca, Cera, Euronics, Somany
(viii)	Sanitary ware / Fixtures / Fittings (Premium range)	Kohler, Grohe, Hindware, Jaquar, Cera, Euronics, Somany
(ix)	Urinal Frosted Glass partition	Greenlam, Jaquar, Merino, Fundermax, Cera
(x)	Sensor Operated Urinal	Jaquar, Hindware, Roca, Kohlar
(xi)	Glass Mirror	Saint Gobain, Modi Guard, Atul, Pilkington, Cera
(xii)	Specially abled Fitting	Pressalit, Hindustan, Cardin
(xiii)	Gun Metal Valves/Sluice Valves/ Air Release Valves	Zoloto, Audco (L&T), Castle, Leader Valves, SKS
(xiv)	Sluice Valve / Pressure Reducing valve / non-return valve / check valve / Butter fly valve / ball valve	Zoloto, Kirloskar, Leader Valves, Zoloto, SKS, Castle, Audco (L&T)
(xv)	Toilet Cubicles	Merino (Titan Series), Greenlam (Sturdo Classic), Trespa (premium series), Dorma (premium Series)
(xvi)	Glass Shower Partition	Dormakaba, Kich, Hafelle, Jaquar, Kohler, Kerovit
(xvii)	Insulation for external / exposed hot water pipes	KAIFLEX, ARMAFLEX, CAREFLEX
(xviii)	Pipe protection for external water supply pipes	PYPKOTE, ARMAFLEX, AKPOLYKOTE
(xix)	Water Meter	Prima, Kranti, Leader, Zoloto, Dashmesh
(xx)	Brass stop & Bib Cock	Zoloto, Sant, L&K, Leader,
(xxi)	Brass Ferrules	Dhawan Sanitary Udyog (PRIMA), Annapurna, Kalsi
(xxii)	Hand Drier	Roca, Hagar, Jaquar, Kohler
12.0	Drainage	
(i)	Soil Waste / Vent Pipes and Fittings:	
	a) Hubless Centrifugally Cast Spun Iron Pipe and fittings	NECO, SKF, Hepco, Saint Gobain,
	b) Centrifugally (Spun) CI Pipes Class 'LA' / Ductile Iron Pipe	Kesoram, Electro Steel Castings Ltd., NECO
(ii)	C.I. Manhole covers, frames & GI Gratings	NECO, BIC, RIF, SKF, Hepco, Kapilansh,
(iii)	Unplasticized Non-Pressure Polyvinyl Chloride (PVC-U) Pipes underground conforming to IS: 15328-2003 & Fittings	Supreme, Astral, Finolex, Ashirvad

(iv)	Low noise system rain water pipes and fittings made of mineral reinforced Poly Propylene	Supreme, Astral, Finolex, Ashirvad
(v)	Drainage AC/HDPE Pipes	Jain Pipes, Oriplast, Reliance, MAZZA AC Pipes, Supreme
(vi)	DI Pipes & Fittings	Supreme, Electrosteel, Jindal, TATADUCTURA, Kesoram
(vii)	SFRC Manhole covers & gratings	KK, JAIN, PARGATI
(viii)	FRP Manhole Covers, Gratings, Drain Cover	Dudhi, Neco, HP, Indogyp
13.0	Stainless Steel & Glass Works	
(i)	Modular SS-304/316 Grade / Glass Railing with SS-304/316 grade Hardware	Dorma, Jindal, GEZE, Q-Rail, Technorail, Kich, Koncept
(ii)	Stainless Steel Sink (Out of Salemsteel)	Neelkanth, Niralli, Jayna, Silver shine
(iii)	Float Glass	Saint Gobain Glass India Ltd., Emirates Glass LLC, AIS Glass Solutions Ltd., Pilkington, Modi Guard,
(iv)	High Performance Glass	Saint Gobain Glass, Pilkington, Guardian, Emirates Glass LLC, AIS Glass.
(v)	Lacquered Glass	Saint Gobain Glass, AIS Glass, Art N Glass, Guardian
(vi)	Glass Processor for making DGU/Toughening	Art N Glass, Shankar Tuff, Sheeshmahal, Shivshakti, GSC, Kaimapnat Glass, SK Tuff, AIS Glass
14.0	Miscellaneous	
(i)	Terracotta Cladding Tiles	Clayton, Wienerberger India, Unistone
(ii)	SS Dry Cladding Anchor with SS Clamp	Hilti, Fisher, Wuerth, Trixel
(iii)	Solid Acrylic Surface Boards	Dupont, LG Himacs, Neonnex, Hanex, GMGR India
(iv)	Modular Expansion / Seismic Joint System	Herculus, Sanfield, Vexcolt, MigUA, Katanaflex, Inprocorp, Bizzar
(v)	Solid Surface (Corian)	Dupont, Neonnax, LG, Samsung
(vi)	Window Blinds	Vista, Deck, Huntar Douglas
(vii)	Fire Sealant	Hilti, Wuerth, Fischer
(viii)	Modular Rainwater Harvesting system	Retas Enviro Solutions Pvt Ltd, Bantair Pvt Ltd, Adwyn Impex Pvt Ltd, Life green system Ltd
(ix)	Precast GRC / Sand Stone Jali (Screen)	Unistone, Dalal, Birla GRC, Sanderson

(x)	Wall Paper	D'décor, Lifencolours, India Circus, Ego, Vescom, Nilaya by Asian Paints, Muraspec, Marshalls
(xi)	XPS Board/ Dimple board	Supreme, Insuboard, Soprema, Own corning, Shalimar, Technonicol, Pidilite
(xii)	Wall Guard/Column Guard/Corner guard	Wallpro, C/S Group, SPM International
(xiii)	Expansion filler board	Supreme, Insuboard, Soprema, Shalimar, Own corning, Technonicol
(xiv)	Concrete / HDPE/Grass grid pavers	Ovilite Industries, Eco Vision Industries, Dalal, Unistone
(xv)	Drain board	Ovidrain, Tikidan, Technonicol, Virendra textile, Soprema
(xvi)	Expansion Joint filler / Joint covers	Vexcolt International Ltd, Construction Specialities, Sainfield, Hercules, MIGUA, Mapei, Balco India, Z-tech, Inprocorp
(xvii)	Poly-sulphide Sealant for Joints joint width up to 25 mm	Pidilite, Sika, Wacker, Ferrouscrete

SCHEDULE OF QUANTITY

(MAJOR COMPONENT: CIVIL WORKS)

Name of Work : Up-gradation of Officer's Messes of various Units at NSG Manesar, Gurugram. SH: Renovation and upgradation of Officer's mess of Training centre, 11 SRG and 51 SAG at NSG Manesar camp. Manesar, Gurgaon - Civil and Electrical works.

S.No	Description	Qty	Unit	Rate	Amount
1	Supplying chemical emulsion in sealed containers including delivery as specified.				
1.1	Chlorpyriphos/ Lindane emulsifiable concentrate of 20%	91.00	litre	234.75	21362.00
2	Diluting and injecting chemical emulsion for POST-CONSTRUCTIONAL anti-termite treatment (excluding the cost of chemical emulsion) :				
2.1	Treatment of existing masonry using chemical emulsion @ one litre per hole at 300 mm interval including drilling holes at 45 degree and plugging them with cement mortar 1:2 (1 cement : 2 coarse sand) to the full depth of the hole :				
2.1.1	With Chlorpyriphos/Lindane E.C. 20% with 1% concentration	537.00	metre	43.00	23091.00
3	Earth work in excavation by mechanical means (Hydraulic excavator)/ manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excavated earth lead upto 50 m and for all lift, as directed by Engineer-in-charge.				
3.1	All kinds of soil	6.00	cum	177.50	1065.00
4	Providing and laying in position excluding cement concrete of level: specified grade the cost of centering and shuttering - All work up to plinth				
4.1	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)	7.00	cum	8340.85	58386.00
4.2	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)	8.00	cum	7878.50	63028.00

4.3	1:5:10 (1 cement : 5 coarse sand (zone-III) derived from natural sources : 10 graded stone aggregate 40 mm nominal size derived from natural sources)	150.00	cum	6518.60	977790.00
5	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:				
5.1	1:1½:3 (1 cement : 1½ coarse sand (zone-III) derived from natural sources : 3 graded stone aggregate 20 mm nominal size derived from natural sources).	30.00	cum	10357.55	310727.00
6	Making plinth protection 50 mm 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 75 mm 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.	268.00	sqm	749.30	200812.00
7	Brick work with common burnt clay F.P.S. (non modular) bricks of class designation 7.5 in foundation and plinth in:				
7.1	Cement mortar 1:6(1 cement :6 coarse sand)	45.00	cum	7132.25	320951.00
8	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 :				
8.1	Cement mortar 1:6(1 cement : 6 coarse sand)	52.00	cum	9105.95	473509.00
9	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.				
9.1	Cement mortar 1:4(1 cement :4 coarse sand)	87.00	sqm	1123.80	97771.00
10	Extra for providing and placing in position 2 Nos 6 mm dia. M.S. bars at every third course of half brick masonry.	87.00	sqm	104.80	9118.00

11	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.				
11.1	Granite stone slab of colour black, Cherry/Ruby red				
11.1.1	Area of slab upto 0.50 sqnn	242.00	sqm	5413.50	1310067.00
11.1.2	Area of slab over 0.50 sqm	216.00	sqm	5136.30	1109441.00
12	Mirror polishing on marble work/Granite work/stone work where ever required to give high gloss finish complete.	440.00	Sqm	506.70	222948.00
13	Providing and fixing stone slab with table rubbed, edges rounded and polished, of size 75x50 cm deep and 1.8 cm thick, fixed in urinal partitions by cutting a chase of appropriate width with chase cutter and embedding the stone in the chase with epoxy grout or with cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 6 mm nominal size) as per direction of Engineer-in-charge and finished smooth.				
13.1	Granite Stone of approved shade	7.00	sqm	4051.85	28363.00
14	Providing and fixing 1st quality ceramic glazed wall tiles conforming to IS: 15622 (thickness to be specified by the manufacturer), of approved make, in all colours, shades except burgundy, bottle green, black of any size as approved by Engineer-in-Charge, in skirting, risers of steps and dados, over 12 mm thick bed of cement mortar 1:3(1 cement : 3 coarse sand) and jointing with grey cement slurry @ 3.3kg per sqm, including pointing in white cement mixed with pigment of matching shade complete.	403.00	sqm	1267.95	510984.00

15	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/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				
15.1	Fixed window/ ventilator without mullion /transom.				
15.1.1	Using R1 series with frame (33 mm & above) x (35 mm & above). (Height upto 0.90 metre)	70.00	sqm	8247.25	577308.00
15.2	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.				

15.2.1	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).	57.00	sqm	10874.20	619829.00
15.2.2	Using R4 series with frame (115mm & above) x (45mm & above) & both glazed and fly screen sash (44mm & above) x (55mm & above) with zinc alloy (zamak) powder coated handle on every glazed panel along with multi-point locking system. (Height above 1.8m)	186.00	sqm	12372.25	2301239.00
16	Providing and fixing bright /matt finished Stainless Steel handles of approved quality & make with necessary screws etc all complete.				
16.1	125mm	296.00	Each	119.20	35283.00
17	Providing and fixing stainless steel fancy handle of approved make fixed with SS screws etc. complete as per direction of Engineer-in-charge.				
17.1	200 mm	181.00	each	186.65	33784.00
18	Providing and fixing stainless steel soft closing spring hinges at 0 degree hinges (hydraulic type) of approved make/brand to cupboard shutters with full threaded steel screws including making necessary recess in board and finished etc. complete as per direction of Engineer-in-charge.	596.00	each	272.00	162112.00
19	Providing and fixing stainless steel soft closing heavy type telescopic drawer channels of approved make 500 mm long with screws etc. complete as per directions of Engineer- in-charge.	240.00	one set	885.10	212424.00
20	Structural steel work riveted, bolted or welded in built up sections, trusses and framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete.	369.00	kg	133.70	49335.00
21	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.				

21.1	Hot finished welded type tubes	3440.00	kg	194.40	668736.00
22	Chequerred precast cement concrete tiles 22 mm thick in footpath & courtyard, jointed with neat cement slurry mixed with pigment to match the shade of tiles, including rubbing and cleaning etc. complete, on 20 mm thick bed of cement mortar 1:4 (1 cement: 4 coarse sand).				
22.1	Light shade pigment using white cement	270.00	Sqm	1402.00	378540.00
23	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) :				
23.1	25 mm thick	122.00	Sqm	1948.25	237687.00
24	Providing and laying Vitrified tiles in floor in diferent sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS:15622, of approved brand & manufacturer, in all colours and shade, laid on 20 mm thick cement mortar 1:4 (1 cement: 4 coarse sand) jointing with grey cement slurry @3.3 kg/sqm including grouting the joints with white cement and matching pigments etc. The tiles must be cut with the zero chipping diamond cutter only . Laying of tiles will be done with the notch trowel, plier, wedge, clips of required thickness, leveling system and rubber mallet for placing the tiles gently and easily.				
24.1	Glazed vitrified floor tiles polished finish of size				
24.1.1	Size of Tile 800 x 1200 mm	1298.00	sqm	2056.90	2669856.00
25	Providing and laying Vitrified tiles in floor in diferent sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS:15622, of approved brand & manufacturer, in all colours and shade, laid on 20 mm thick cement mortar 1:4 (1 cement: 4 coarse sand) jointing with grey cement slurry @3.3 kg/sqm including grouting the joints with white cement and matching pigments etc. The tiles must be cut with the zero chipping diamond cutter only . Laying of tiles will be done with the notch trowel, plier, wedge, clips of required thickness, leveling system and rubber mallet for placing the tiles gently and easily.				

25.1	Glazed Vitrified tiles Matt/Antiskid finish of size				
25.1.1	Size of Tile 600 x 600 mm	447.00	sqm	1464.85	654788.00
26	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/sqm, 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.				
26.1	18 mm thick Italian Marble stone slab, Perlato, Rosso verona, Fire Red or Dark Emperadore etc.	646.00	sqm	6927.35	4475068.00
27	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.				
27.1	110 mm diameter	563.00	metre	377.40	212476.00
28	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.				
28.1	Coupler				
28.1.1	110 mm	90.00	each	136.15	12254.00
28.2	Single tee with door				
28.2.1	110x110x110 mm	32.00	each	234.15	7493.00
28.3	Single tee without door				
28.3.1	110x110x110 mm	70.00	each	221.35	15495.00
28.4	Bend 87.5°				
28.4.1	110 mm bend	70.00	each	150.35	10525.00

28.5	Shoe (Plain)				
28.5.1	110 mm Shoe	90.00	each	131.85	11867.00
29	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.				
29.1	110 mm	420.00	each	371.30	155946.00
30	Providing and fixing to the inlet mouth of rain water pipe cast iron grating 15 cm diameter and weighing not less than 440 grams.	96.00	each	54.70	5251.00
31	Providing and fixing false ceiling at all height including providing and fixing of frame work made of special sections, power pressed from M.S. sheets and galvanized with zinc coating of 120 gms/sqm (both side inclusive) as per IS : 277 and consisting of angle cleats of size 25 mm wide x 1.6 mm thick with flanges of 27 mm and 37mm, at 1200 mm centre to centre, one flange fixed to the ceiling with dash fastener 12.5 mm dia x 50mm long with 6mm dia bolts, other flange 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 :				
31.1	12.5 mm thick tapered edge gypsum plain board conforming to IS: 2095- (Part I) :2011 (Board with BIS certification marks)	331.00	Sqm	1355.80	448770.00
32	Providing and fixing precoated galvanised iron profile sheets (size, shape and pitch of corrugation as approved by Engineer-in-Charge) of total coated thickness 0.50 mm (base metal of minimum 0.45 mm thickness with total coating thickness of 0.05mm) with zinc coating 120 grams per sqm as per IS: 277, in 240 mpa steel grade, 5-7 microns epoxy primer on both side of the sheet and polyester top coat 15-18 microns. Sheet should have protective guard film of 25 microns minimum to avoid scratches during transportation and should be supplied in single length upto 12 metre or as desired by Engineer-in-charge. The sheet shall be fixed using self drilling /self tapping screws of size (5.5x 55 mm) with EPDM seal, complete upto any pitch in horizontal/ vertical or curved surfaces, excluding the cost of purlins, rafters and trusses and including cutting to size and shape wherever required.	255.00	sqm	738.65	188356.00
33	Providing and fixing precoated galvanised steel sheet roofing accessories of total coated thickness 0.50 mm (base metal of minimum 0.45 mm thickness with total coating thickness of 0.05 mm) with Zinc coating 120 gram per sqm as per IS: 277, in 240 mpa steel grade, 5-7 microns epoxy primer on both side of the sheet and polyester top coat 15-18 microns using self drilling/ self tapping screws complete :				
33.1	Flashings/ Aprons.(Upto 600 mm)	40.00	metre	485.60	19424.00

34	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 having 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 IS14434:2023 and confirm either flame retardancy of class UL-94HB/94V-0 category as per IS14434:2023 or category V0 & HB as per ASTM D635-18 or BS1D0 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 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 1 mm thick having minimum bottom width 35mm and top width 50mm or any other shape and size as per design requirement and manufacturer specification, cleat fixed with 2 or more stainless steel screws of 5 mm diameter with 25mm 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 in respective item for separately. Note:- The fixing arrangement using cleat shall be designed separately for coastal areas for cyclonic wind speed.				
34.1	12 mm thick, 1000 (±10%) wide panel with U value not more than 2.50 W/m ² K and weight not less than 2.25 kg/sqm.	168.00	sqm	3108.15	522169.00

35	Painting with synthetic enamel paint of approved brand and manufacture to give an even shade :				
35.1	Two or more coats on new work	994.00	sqm	155.90	154965.00
36	Providing and applying 12 mm thick (average) premixed formulated one coat gypsum lightweight plaster having additives and light weight aggregates as vermiculite/ perlite respectively conforming to IS: 2547 (Part - 1 & II) 1976, applied on hacked / uneven background such as bare brick/ block/ RCC work on walls & ceiling at all floors and locations, finished in smooth line and level etc. complete.	2369.00	sqm	468.90	1110824.00
37	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.	4281.00	sqm	156.05	668050.00
38	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.				
38.1	Two coats	6650.00	sqm	181.25	1205313.00
39	Applying priming coats with primer of approved brand and manufacture, having low VOC (Volatile Organic Compound) content.				
39.1	With water thinnable cement primer on wall surface having VOC content less than 50 grams/litre	2369.00	sqm	73.95	175188.00
40	Removing dry or oil bound distemper, water proofing cement paint and the like by scrapping, sand papering and preparing the surface smooth including necessary repairs to scratches etc. complete.	3879.00	sqm	25.15	97557.00
41	Repairs to plaster of thickness 12 mm to 20 mm in patches of area 2.5 sq.meters and under, including cutting the patch in proper shape, raking out joints and preparing and plastering the surface of the walls complete, including disposal of rubbish to the dumping ground, all complete as per direction of Engineer-in-Charge.				
41.1	With cement mortar 1:4 (1cement: 4 coarse sand)	99.00	sqm	560.50	55490.00

42	Providing and fixing 150 mm bright finished floor brass door stopper with rubber cushion, necessary brass screws etc. to suit shutter thickness complete	170.00	each	271.45	46147.00
43	Cleaning of choked sewer line by diesel running vehicle mounting hydraulic operated high pressure suction cum jetting sewer cleaning machine fitted with pump having 4000 litres suction capacity and 6000 litres water jetting tank capacity including skilled operator, supervising engineer etc. for cleaning and partial desilting of manholes and dechocking of sewer lines. Dechocking and flushing of sewer line from one manhole to another by high pressure jetting system of 2200 PSI for sewer line from 150mm dia upto 300mm	150.00	mtr	340.75	51113.00
44	Disconnecting damaged overhead/terrace PVC water storage tank of any size from water supply line and removing from the terrace including shifting at ground level as per direction of Engineer-in-charge.	32.00	each	433.75	13880.00
45	Dismantling W.C. Pan of all sizes including disposal of dismantled materials including malba all complete as per directions of Engineer-in-Charge.	70.00	each	134.10	9387.00
46	Demolishing cement concrete manually/ by mechanical means including disposal of material within 50 metres lead as per direction of Engineer - in - charge.				
46.1	Nominal concrete 1:4:8 or leaner mix (including equivalent design mix)	123.00	cum	1503.60	184943.00
47	Demolishing R.C.C. work manually/ by mechanical means including stacking of steel bars and disposal of unserviceable material within 50 metres lead as per direction of Engineer - in- charge.	2.00	cum	3551.25	7103.00
48	Demolishing brick work manually/ by mechanical means including stacking of serviceable material and disposal of unserviceable material within 50 metres lead as per direction of Engineer-in-charge.				
48.1	In cement mortar	2.00	cum	2060.20	4120.00

49	Dismantling doors, windows and clerestory windows (steel or wood) shutter including chowkhats, architrave, holdfasts etc. complete and stacking within 50 metres lead :				
49.1	Of area 3 sq. metres and below	120.00	each	367.20	44064.00
50	Dismantling tile work in floors and roofs laid in cement mortar including stacking material within 50 metres lead.				
50.1	For thickness of tiles 10 mm to 25 mm	3527.00	sqm	73.40	258882.00
51	Dismantling stone slab flooring laid in cement mortar including stacking of serviceable material and disposal of unserviceable material within 50 metres lead.	768.00	sqm	266.45	204634.00
52	Demolishing brick tile covering in terracing including stacking of serviceable material and disposal of unserviceable material within 50 metres lead.	2481.00	sqm	105.35	261373.00
53	Demolishing mud phaska in terracing and disposal of material within 50 metres lead.	373.00	cum	914.30	341034.00
54	Dismantling C.I. or asbestos rain water pipe with fittings and clamps including stacking the material within 50 metres lead :				
54.1	100 mm dia pipe	276.00	metre	78.00	21528.00
55	Dismantling old plaster or skirting raking out joints and cleaning the surface for plaster including disposal of rubbish to the dumping ground within 50 metres lead.	6126.00	sqm	54.65	334786.00
56	Dismantling aluminium/ Gypsum partitions, doors, windows, fixed glazing and false ceiling including disposal of unserviceable material and stacking of serviceable material with in 50 meters lead as directed by Engineer-in-charge.	616.00	sqm	56.35	34712.00
57	Providing and fixing 600x450 mm beveled edge mirror of superior glass (of approved quality) complete with 6 mm thick hard board ground fixed to wooden cleats with C.P. brass screws and washers complete.	70.00	each	1607.95	112557.00

58	Providing and fixing mirror of superior glass (of approved quality) and of required shape and size with plastic moulded frame of approved make and shade with 6 mm thick hard board backing :				
58.1	Rectangular shape 1500x450 mm	10.00	each	2093.00	20930.00
59	Providing and fixing white vitreous china battery based infrared sensor operated urinal of approx. size 610 x 390 x 370 mm having pre & post flushing with water (250 ml & 500 ml consumption), having water inlet from back side, including fixing to wall with suitable brackets all as per manufacturers specification and direction of Engineer-in-charge.	8.00	each	7979.20	63834.00
60	Providing and fixing floor mounted, white vitreous china single piece, double traps syphonic water closet of approved brand/make, shape, size and pattern including integrated white vitreous china cistern of capacity 10 litres with dual flushing system, including all fittings and fixtures with seat cover, cistern fittings, 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.	70.00	each	18212.90	1274903.00
61	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.				
61.1	20 mm nominal dia Pipes	700.00	metre	537.60	376320.00
61.2	25 mm nominal dia Pipes	315.00	metre	627.25	197584.00
62	Providing and fixing G.I. pipes complete with G.I. fittings and clamps, including cutting and making good the walls etc. Internal work - Exposed on wall				
62.1	20 mm dia nominal bore	716.00	metre	437.30	313107.00
62.2	25 mm dia nominal bore	221.00	metre	551.70	121926.00
63	Providing and fixing uplasticised PVC connection pipe with brass unions :				

63.1	45 cm length				
63.2	15 mm nominal bore	70.00	each	97.75	6843.00
64	Providing and fixing G.I. Union in G.I. pipe including cutting and threading the pipe and making long screws etc. complete (New work) :				
64.1	20 mm nominal bore	10.00	each	346.80	3468.00
64.2	25 mm nominal bore	10.00	each	439.25	4393.00
65	Providing and placing on terrace (at all floor levels) polyethylene water storage tank, IS : 12701 marked, with cover and suitable locking arrangement and making necessary holes for inlet, outlet and overflow pipes but without fittings and the base support for tank.	32000.00	ltr	11.00	352000.00
66	Providing and fixing C.P. brass bib cock of approved quality conforming to IS:8931 :				
66.1	15 mm nominal bore	70.00	each	506.80	35476.00
67	Providing and fixing C.P. brass long body bib cock of approved quality conforming to IS standards and weighing not less than 690 gms.				
67.1	15 mm nominal bore	140.00	each	798.95	111853.00
68	Providing and fixing C.P. brass stop cock (concealed) of standard design and of approved make conforming to IS:8931.				
68.1	15 mm nominal bore	70.00	each	670.45	46932.00
69	Providing and fixing C.P. brass angle valve for basin mixer and geyser points of approved quality conforming to IS:8931				
69.1	15 mm nominal bore	280.00	each	574.30	160804.00
70	Providing and fixing C.P. Brass extension nipple (size 15 mm x 50 mm) of approved make and quality as per direction of Engineer-in-charge.	210.00	each	74.80	15708.00
71	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:				

71.1	100x100 mm size P type				
71.1.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	10.00	each	2707.65	27077.00
72	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 :				
72.1	250 mm dia. R.C.C. pipe	50.00	metre	899.80	44990.00
73	Constructing brick masonry manhole in cement mortar 1:4 (1 cement : 4 coarse sand) with R.C.C. top slab with 1:1.5:3 mix (1 cement : 1.5 coarse sand (zone-III) : 3 graded stone aggregate 20 mm nominal size), foundation concrete 1:4:8 mix (1 cement : 4 coarse sand (zone-III) : 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 :				
73.1	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) :				
73.1.1	With common burnt clay F.P.S. (non modular) bricks of class designation 7.5	5.00	each	12770.55	63853.00
74	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):				
74.1	With float glass panes of 5 mm thickness (weight not less than 12.50 kg/sqm)	262.00	sqm	1505.25	394376.00

75	Providing and fixing 12 mm thick frameless toughened glass door shutter of approved brand and manufacture, including providing and fixing top & bottom pivot & double acting hydraulic floor spring type fixing arrangement and making necessary holes etc. for fixing required door fittings, all complete as per direction of Engineer-in-charge (Door handle, lock and stopper etc.to be paid separately).	70.00	sqm	5325.90	372813.00
76	Providing and laying integral cement based water proofing treatment including preparation of surface as required for treatment of roofs, balconies, terraces etc consisting of following operations: (a) Applying a slurry coat of neat cement using 2.75 kg/sqm of cement admixed with water proofing compound conforming to IS. 2645 and approved by Engineer-in-charge over the RCC slab including adjoining walls upto 300 mm height including cleaning the surface before treatment. (b) Laying brick bats with mortar using broken bricks/brick bats 25 mm to 115 mm size with 50% of cement mortar 1:5 (1 cement : 5 coarse sand) admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge over 20 mm thick layer of cement mortar of mix 1:5 (1 cement :5 coarse sand) admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge to required slope and treating similarly the adjoining walls upto 300 mm height including rounding of junctions of walls and slabs. (c) After two days of proper curing applying a second coat of cement slurry using 2.75 kg/ sqm of cement admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge. (d) Finishing the surface with 20 mm thick jointless cement mortar of mix 1:4 (1 cement :4 coarse sand) admixed with water proofing compound conforming to IS : 2645 and approved by Engineer-in-charge including laying glass fibre cloth of approved quality in top layer of plaster and finally finishing the surface with trowel with neat cement slurry and making pattern of 300x300 mm square 3 mm deep. (e) The whole terrace so finished shall be flooded with water for a minimum period of two weeks for curing and for final test. "All above operations to be done in order and as directed and specified by the Engineer-in-Charge":				
76.1	With average thickness of 120 mm and minimum thickness at khurra as 65 mm.	2120.00	sqm	1684.60	3571352.00

77	Chipping of unsound/weak concrete material from slabs, beams, columns etc. with manual Chisel and/ or by standard power driven percussion type or of approved make including tapering of all edges, making square shoulders of cavities including cleaning the exposed concrete surface and reinforcement with wire brushes etc. and disposal of debris for all lead and lifts all complete as per direction of Engineer-In-Charge				
77.1	25 mm average thickness	303.00	Sqm	126.75	38405.00
78	Providing, mixing and applying SBR polymer (of approved make) modified Cement mortar in proportion of 1:4 (1 cement: 4 graded coarse sand with polymer minimum 2% by wt. of cement used) as per specifications and directions of Engineer-in-charge. Note: Measurement and payment: The pre-measurement of thickness shall be done just after the surface preparation is completed and Payment under this item shall be made only after proper wet curing has been done and surface has been satisfactorily evaluated by sounding / tapping with a blunt metal instrument and/or the 75 mm size cube crushing strength at the end of 28 days to be not less than 30 N/Sqmm2).				
78.1	12 mm average thickness.	303.00	sqm	388.65	117761.00
79	Providing and fixing factory made single extruded WPC (Wood Polymer Composite) solid door/window/Clerestory windows & other Frames/ Chowkhat comprising of virgin PVC polymer of K value 58-60 (Suspension Grade), calcium carbonate and natural fibers (wood powder/ rice husk/ wheat husk) and non toxic additives (maximum toxicity index of 12 for 100 gms) fabricated with miter joints after applying PVC solvent cement and screwed with full body threaded star headed SS screws having minimum frame density of 750 kg/cum, screw withdrawal strength of 2200 N (Face) & 1100 N (Edge), minimum compressive strength of 58 N/mm2, modulus of elasticity 900 N/mm2 and resistance to spread of flame of Class A category with property of being termite/borer proof, water/moisture proof and fire retardant and fixed in position with M.S hold fast/lugs/SS dash fasteners of required dia and length complete as per direction of Engineer-In- Charge. (M.S hold fast/lugs or SS dash fasteners shall be paid				

	for separately). Note: For WPC solid door/window frames, minus 5 mm tolerance in dimensions i.e depth and width of profile shall be acceptable. Variation in profile dimensions on plus side shall be acceptable but no extra payment on this account shall be made.				
79.1	Frame size 50 x 100 mm	342.00	metre	947.70	324113.00
79.2	Frame size 65 x 150 mm	364.00	metre	1637.65	596105.00
80	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/mm ² , modulus of elasticity 850 N/mm ² and resistance to 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)				
80.1	30 mm thick	101.00	sqm	4764.20	481184.00
80.2	35 mm thick	135.00	sqm	5432.85	733435.00
				Total	35694623.00
	Modified cost after DSR Modification Factor 0.973			Total A	34730868.00
81	Providing and fixing stainless steel 304 grade OPL-1E lock in frameless toughened glass door with nuts and screws etc. complete as per direction of Engineer-in charge:	16.00	Each	2381.70	38107.00
82	Providing and fixing stainless steel 304 grade H shape Handle pair of size 450mm length and 25mm dia. in frameless toughened glass door with nuts and screws etc. complete as per direction of Engineer-in charge:	16.00	Each	2022.15	32354.00

83	Providing and fixing Premium quality Glazed vitrified wall tiles polished finish of size (GVT) size not less than 600x1200 with water absorption less than 0.08% and conforming to IS:15622, of approved brand & manufacturer, in all colours and shade, laid over 12 mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand) and jointing with grey cement slurry @ 3.3kg per sqm, including pointing in white cement mixed with pigment of matching shade complete.	1379.00	Sqm	1970.90	2717871.00
84	Providing and fixing Table Top wash basin, dimension (Length 500mm, Width 385mm, Depth 145mm) of Euronics (Model no. C005-WB) or premium quality of somany and jaquor equivalent make rectangular shape white colour with 32 mm C.P. brass waste of standard pattern all complete as per direction of Engineer-in-charge.	70.00	Each	4455.75	311903.00
85	Providing and fixing 15mm nominal dia basin pillar cock of Jaquor (Model no. VGP-81001) or premium quality of somany and Euronics equivalent make etc. complete as per direction of Engineer-in-Charge.	70.00	Each	2853.75	199763.00
86	Providing and fixing wire gauge shutters using Stainless steel wire gauge of average width of aperture 1.4 mm in both directions with wire of dia 0.50 mm, for doors, windows and clerestory windows with hinges and necessary screws :				
86.1	30 mm thick shutters				
86.1.1	with ISI marked S.S. pressed butt hinges bright finished of required size				
86.1.1.1	WPC (Wood Polymer Composite)	135.00	Sqm	5491.55	741359.00

87	Providing & fixing 6mm thick High Pressure interior compact laminate made out of thermo setting resin treated kraft as core material and design paper as a finish surface. Compact laminates should be resistant to water immersion through permissible increase on thickness and mass <0.60% and board should have density >1.35 kg/cm ³ . Compact should be flame retardant fulfilled the criteria of under BS 476/97 and EN438-6 with classification of BS1DO standard property with anti-Viral. Anti-Bacterial, Anti-termit (under JIS Z2801:2000 certification), Chemical resistant, Scratch resistant, flame resistant, weather and climatic shock resistant (the manufacture should provide 10 years warranty certification on any manufacturing and moisture related defect) and fulfilled the criteria of green Guard Gold certification and manufactured under EN438-2&3:2005 standard. Compact laminates should be installed on 38mm x 25mm aluminium section in 16 gauge or as recommended by department. This aluminium box section should vertically at 400mm c/c under desirable height and fixed through company recommended adhesive or same compact colour rivets as per direction of Engineer in Charge.	347.00	Sqm	7962.97	2763151.00
88	Providing and fixing C.P. Brass wall mounted single lever high flow diverter with provision of mixing hot and cold water for overhead shower as well as wall mounted tap of Euronics (Model no. AL005D) or premium quality of somany and jaquor equivalent make. The item includes concealed part of the diverter and CP Brass wall tap/spout with all accessories etc. complete of approved make weight not less than 2.0 kg as per direction of Engineer-in-Charge.				
88.1	15 mm nominal dia	70.00	Each	5081.75	355723.00
89	Providing and fixing Hand shower (Health faucet) of Jaquor (Model no. ALD-587) or premium quality of somany and Euronics equivalent make having 8mm dia 1.0 metre long Spirochrome flex tube & Wall Hook , all complete as per direction of Engineer-in-Charge.	70.00	Each	1315.55	92089.00

90	Providing and fixing Overhead Shower 200X200mm Square Shape Single Flow (ABS Body Chrome Plated with Gray Face Plate) with Rubit Cleaning System with shower rod of Jaquor (Model no. OHS-CHR-35497) or premium quality of somany and Euronics equivalent make all complete, as per direction of engineer in charge	70.00	Each	3897.20	272804.00
91	Providing and fixing Soap Dispenser with stainless steel 304 grade Bottle of min. capacity 190ML with push button system & fixing to wall accessories all complete of Euronics (Model no. ES11) or premium quality of somany and jaquor equivalent make as per direction of Engineer-in-Charge.	70.00	Each	2127.40	148918.00
92	Providing and fixing stainless steel 304 grade Soap dish holder tray of min. size 117x97mm & fixing to wall accessories all complete of Euronics (Model no. ACC01 or premium quality of somany and jaquor equivalent make as per direction of Engineer-in-Charge.	70.00	Each	667.20	46704.00
93	Providing and fixing Toilet Roll Holder with Stainless Steel Flap of Jaquor (Model no. CAN-1153S) or premium quality of somany and Euronics equivalent make all complete, as per direction of engineer in charge.	70.00	Each	1616.70	113169.00
94	Providing and fixing Stainless steel 304 grade Towel rack of min. size 621x223mm with 4 number of rods & 1 number of flap hangers at 90mm from top etc.complete of Euronics (Model no. ACC06 or premium quality of somany and jaquor equivalent make as per direction of Engineer-in-Charge.	70.00	Each	2659.80	186186.00
95	Providing and fixing Stainless steel 304 grade sliding door bolt, ISI marked, with necessary nut & bolts etc. complete as per the directions of engineer-in-charge.				
95.1	200x16 mm	250.00	Each	252.60	63150.00
96	Providing and fixing Stainless steel 304 grade tower bolts, ISI marked, with necessary screws etc. complete as per the directions of engineer-in-charge. 200x10 mm	500.00	Each	171.45	85725.00

97	15mm cement plaster on external wall surface of single or half brick wall of polymer modified ready mixed plaster of fine grade Portland, graded sand polymers with water soluble additives as per manufacturer specification of approved make and as per directions of Engineer- in charge.	3757.00	Sqm	400.30	1503927.00
98	Textured finish by providing Rustic Textured exterior plaster (Asian paints Apex Duracast Swirltex or equivalent) of thickness 1.50-2.0 mm applied over old surface prepared by scrapping and applying wall putty and primer etc. and finishing with two or more coats of Acrylic Weather Proof exterior emulsion paint with silicon additive of required shade on the surface. The rates shall include all materials and labour etc. for all heights complete and as per direction of Engineer-in-charge. This item includes the following operations:				
	(i) Applying one coat of Rustic Textured Exterior plaster of synthetic intermediate finish designed with high quality exterior durable acrylic modified resin and special quality quartz (Asian paints Apex Duracast Swirltex or equivalent) using steel trowel finished to generate texture pattern as approved by Engineer-in-charge (Consumption of material shall not be less than 2.69 kg/sqm or as per manufactured specification whichever is more).				
	(ii) Applying exterior wall primer over Rustic Textured Plaster as prepared in Step-1 (Consumption of material shall not be less than 0.10 litre/sqm or as per manufacturer specification whichever is more).				
	(iii) Applying two or more coats of Premium Acrylic Weather Proof Exterior Emulsion Paint with silicone additive over Rustic Textured Plaster as prepared in Step-1 as mentioned above in required colour and shade as approved by Engineer-in-charge. (Consumption of material shall not less than 0.167 litre/sqm or as per manufacturer specification whichever is more)	3757.00	sqm	381.65	1433859.00

99	BAFFLE Metal False Ceiling:Supply of baffle ceiling system comprises of 50 mm x 100 mm (50 mm width & 100 mm Height) U shape panels of wood grain/approved finish. Panels shall be made of 0.5 mm thick GI sheet after powder coating, length upto 2500 mm. Panel shall be high corrosion resistance and good color stability, centre to centre panel gap will be 150 mm (clear 100 mm gap). Panels are fixed on to roll formed carriers 32 mm width x 40 mm deep out of 0.80 mm G.I. Sheet powder coated color with cutouts to hold the panels in module of 40 mm at maximum 1200 m c/c. Carriers are suspended from the roof or truss by 4 mm dia. galvanized steel wire rod hanger with special height adjustment suspension clip at max. 1200 mm c/c. Hangers are fixed to the roof by "J" hooks or ceiling brackets and nylon inserts. Paners are factory cut in length upto maximum 2.5 m or as per required size to suit site dimensions or shop drawings. Top cap and side cap are used to cover the edges of the panel as per direction of Engineer-in-Charge. (The Supplier Company Should be OEM and OEM MTC will be required) Make : Gyptech/ Hunter Douglas/ Armstrong/ USG Boral/ Durlum/ Saint Gobain/Knouff	285.00	sqm	6645.00	1893825.00
100	Providing and fixing fly proof stainless steel grade 304 wire gauge, to uPVC windows and clerestory windows using wire gauge with average width of aperture 1.4 mm in both directions with wire of dia. 0.50 mm all complete as per direction of Engineer-in-Charge..	314.00	sqm	1174.50	368793.00
101	Providing and fixing 16.75 mm thick both side balancing lamination factory pressed High Density High Moisture Resistant (HDHMR) Board of approved brand boxes, shelves, racks, almirah, cupboard and drawer etc. including necessary nails,screws etc. complete as per direction of Engineerincharge.	316.00	Sqm	1827.10	577364.00
102	Providing and fixing 5.50 mm thick both side balancing lamination factory pressed High Density High Moisture Resistant (HDHMR) Board of approved brand boxes, shelves, racks, almirah, cupboard and drawer etc. including necessary nails,screws etc. complete as per direction of Engineer-incharge.	269.00	Sqm	1087.75	292605.00

103	Providing and fixing factory made cupboard shutter with 18mm thick one side decorative and other side balancing lamination (1mm minimum thickness) factory pressed High Density High Moisture Resistant (HDHMR) Board including 2mm thick PVC edge banding tape with hot glue by edge bending machine etc. with auto closing spring loaded hinges (hydraulic type) etc. complete of approved make as per direction of Engineer-in-charge. (Payment of providing and fixing auto closing hinges shall be paid separately)	269.00	Sqm	2803.35	754101.00
104	Credit for Wooden Door, Window, cupboard shutter of different sizes.	3000.00	Kg	-14.00	-42000.00
105	Credit for Aluminium Door, Window shutter of different sizes.	1250.00	KG	-190.00	-237500.00
106	Credit for Old C.I. Pipe	2500.00	Kg	-32.00	-80000.00
107	Credit for MS section like angle, tee, flats, grill etc.	3164.00	Kg	-32.00	-101248.00
108	Credit for brick tiles obtained from demolishing of brick tile from roof area.	45899.00	each	-3.00	-137697.00
				Total B	14395005.00
	Grand Total		(A+B)		49125873.00

Executive Engineer
Manesar Dn., CPWD
NSG Camp, Manesar

PART - C

MINOR COMPONENT (E&M WORK)

1.0 CONDITIONS FOR ASSOCIATE AGENCY FOR E&M WORKS:

- 1.1 Specialized items of E&M work shall be got executed only through eligible associated specialized agencies currently actively engaged in execution of the said specialized items and fulfil eligibility criteria prescribed in the agreement.
- 1.2 Also, unless the main contractor himself meets the eligibility conditions for execution of E&M works (Normal items), he will have to associate with agencies, fulfilling the eligibility requirements prescribed in the tender document.
- 1.3 In the event of the associated E&M agency not performing satisfactorily or failure of associate agency to complete the E&M work, the main contractor on written directions of the department shall remove the Associate agency deployed on the work and shall submit proposal for approval of new associate agency without any loss of time or variation in cost to the department. Such new associate agency shall also give an undertaking along with the main tenderer that both of them shall guarantee for the equipment already supplied for which payment has been released by the department in part. If any equipment supplied for the work, during the currency of the earlier associate agency and paid partly by the department, becomes redundant /not in a position to be installed and commissioned and put to beneficial use due to change in agency for execution of E&M work, the main contractor shall be liable for replacement of the equipment(s) at no cost to the department. No change of associate agency will be allowed without prior approval of the Engineer-in-charge of the work.
- 1.4 The main contractor shall be responsible and liable for proper and complete execution of the E&M works despite having engaged associated agencies and ensure coordination and completion of all E&M works.
- 1.5 The Composite Contractor and the associated specialized agencies shall give required affidavit to confirm their association.
- 1.6 The associate contractor shall attend the inspection of the work by the Engineer-in-charge of E&M works as and when required.

2.0 ELIGIBILITY CRITERIA FOR ASSOCIATED AGENCY FOR E&M WORKS:

- 2.1 The tenderer(s) must associate eligible agencies to execute components of E&M Works who fulfil the prescribed eligibility criteria. However, the contractor shall also be eligible to carry out himself any or all the components of E&M Works 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 get it installed from authorized agency/service provider of the manufacturer or specialized agency as per the eligibility criteria mentioned below:
- 2.2 **ELIGIBILITY CRITERIA:** Eligibility criteria for various components E&M Works (Normal and Specialized) shall be as below:
 - (a) **For Normal E&M Works e.g. Internal Electrical Installations, External Lighting/Cabling/Earthing & Service Connection etc.:**

The associate agency shall be registered/enlisted in CPWD in Building & Roads category inappropriate class and should have a valid electrical license.
 - (b) **For items of E&M work except Sub-stations, DG sets, HVAC.**

The contractor shall Associate and sign MoU with Authorised Channel Partner of OEM or Associate specialized agency having valid electrical license and experience of having successfully completed “ Similar Works” during last 7 (Seven) years from date of submission of proposals for approval of Associate Specialized Agency as under:

- i. Three Similar completed works each of value not less than 40% of Estimated cost of relevant specialized E&M Work.
Or
- (ii) Two Similar completed works each of value not less than 60% of Estimated cost of relevant specialized E&M Work.
or
- (iii) One Similar completed work each of value not less than 80% of Estimated cost of relevant specialized E&M Work.

Similar work shall mean "SITC of relevant specialized E&M Work".

(c) For works of DG Sets, HVAC, Sub-Station works:

The Associate agency must have valid electrical license and should have successfully completed "Similar Works" during last 7 years ending previous day of last date of submission of tender asunder:

- (i) Three Similar completed works each of value not less than 40% of Estimated cost of relevant component of work of DG Sets / HVAC / Sub-Station with capacity of individual DG Set/Chiller plant/Transformer not less than 80% of individual capacity (rounded off to next available higher capacity) of the transformer proposed in the work.
or
- (ii) Two Similar completed works each of value not less than 60% of Estimated cost of relevant component of work of DG Sets / HVAC / Sub-Station with capacity of individual DG Set / Chiller plant / Transformer not less than 80% of individual capacity (rounded off to next available higher capacity) of the transformer proposed in the work.
or
- (iii) One Similar completed work each of value not less than 80% of Estimated cost of relevant component of work of DG Sets / HVAC / Sub-Station with capacity of individual DG Set/Chiller plant/Transformer not less than 80% of individual capacity (rounded off to next available higher capacity) of the transformer proposed in the work. Similar work shall mean "SITC of relevant specialized E&M Work e.g. DG Sets / HVAC / Sub-Station".

(d) SITC of E&M Works of STP/WTP/ETP :

The Associate agency must have valid electrical license and should have successfully completed "Similar Works" during last 7 years ending previous day of last date of submission of tender as under:

- (i) Three Similar completed works each (i) of value not less than 40% of cost of E&M component of STP/WTP work or (ii) with design capacity of the STP/WTP/ETP plant not less than 40% of the capacity of proposed plant to be installed.
or
- (ii) Two Similar completed works each (i) of value not less than 60% of cost of E&M component of STP/WTP work or (ii) with design capacity of the STP/WTP/ETP plant not less than 60% of the capacity of proposed plant to be installed.
or
- (iii) One Similar completed work (i) of value not less than 80% of cost of E&M component of STP/WTP work or (ii) with design capacity of the STP/WTP/ETP plant not less than 80% of the capacity of proposed plant to be installed.

Similar work shall mean "SITC of E&M Works of STP/WTP/ETP Plants".

3.0 SUBMISSION OF PROPOSAL FOR APPROVAL OF ASSOCIATED AGENCY:

- 3.1 The Contractor(s) shall submit his proposal for the approval of the Engineer-in-Charge, the names of associate agencies of repute along with verifiable completion certificates of similar work experience, valid

Electrical Contractor's license, self-attested GST registration and other documents in respect of the associated agencies, duly attested by both associated agency and the main contractor.

- 3.2 The proposal shall be submitted as early as possible but not later than one month before proposed date of start of execution of such components of E&M work as per approved work programme.
- 3.3 In case the main contractor is himself eligible (as per eligibility criteria) for executing all or some components of E&M work and intends doing job himself, the main contractor must submit the documents as per eligibility criteria mentioned for associated agency of individual E&M component(s) for approval of Engineer-in-charge.
- 3.4 Proposal for associating agency for components of E&M work shall be submitted, as per proforma given in this tender document, from each of proposed associate independently for all E&M component in prescribed Proforma given herein.

ADDITIONAL CONDITIONS FOR ELECTRICAL WORK

1. CPWD General Specifications for Electrical Works (Part I for Internal)-2023, (Part II for External)-2023, (Part III for Lift & Escalators) - 2003, (Part IV for Sub Station) - 2013, (Part V for Wet Riser & Sprinkler System) - 2020, (Part VI for Fire Detection & Alarm System) - 2018, (Part VII for DG Sets) - 2013, (Part VIII for Gas Based Fire Extinguishing System) - 2013 and CPWD General Specifications for HVAC Works – 2024 or latest version of above specifications as issued / amended up to date (hereinafter to be collectively referred to as '**CPWD Specifications**') and should also comply with relevant provisions of the Indian Electricity Rules and Acts as applicable. Wherever CPWD Specifications are silent, the latest BIS Codes/Specifications, National Building Code or any other specification shall be followed.
2. The order of preference in case of any discrepancy as indicated in condition No. 8.1 under "Conditions of Contract" given in standard CPWD Contract form may be read as the following:
 - a) Nomenclature of item as per Schedule of Quantities.
 - b) General/Additional/Special, particular specifications for Electrical Works.
 - c) Contract Clauses of Standard General Conditions of Contract
 - d) CPWD specifications for electrical works as applicable.
 - e) Architectural/structural drawings and specifications mentioned in drawings.
 - f) Indian standard specifications of BIS.
 - g) Sound engineering practice as per directions of the Engineer-in-charge.
 - h) Manufacturers specifications.
3. A reference made to any Indian Standard Specifications in these documents, shall imply reference to the latest version of that standard, including such revisions/amendments as issued by the Bureau of Indian Standards up to last date of receipt of tenders. The contractor shall keep at his own cost all such publications of relevant Indian Standards applicable to the work at site.
4. The main contractor shall engage appropriate OEM of approved make for specialized works of Digital PA system, stage lighting, video system and Lifts for electrical work. The main contractor shall not indulge in procurement of electrical items and getting the work done on labour contract with the OEM/electrical contractor. The whole electrical component shall be executed by the eligible electrical contractor/ OEM on a turnkey basis i.e. procurement of material & engaging labour. The associate electrical contractor shall submit the completion certificate of electrical work executed by him along with necessary test reports, completion plan etc.
5. The contractor shall take all safety precautions to avoid accidents by exhibiting caution boards, red flags, red lights and by providing necessary barriers and all other measures required from time to time. The contractor shall be responsible for all damages and accidents due to negligence on his part.
6. The contractor shall give due notices to Municipality, Police and/or other authorities that may be required under the law/rules under force and obtain all requisite permissions/licenses for temporary obstructions/enclosures and pay all charges which may be liable on account of his execution of the work under the agreement. Nothing extra shall be payable on this account.
7. The contractor shall leave such recesses, holes, openings, etc., as may be required for the electric, air-conditioning and other related works. (For this purpose, any required inserts, sleeves, brackets,

conduits, base plates, insert plates, clamps etc. shall be arranged by the contractor and fix the same at the time of casting of concrete, stone work & brick work, if required, and nothing extra shall be payable on this account.

8. The contractor shall give a trial run of the equipment and machinery for establishing its capability to achieve the specifications within laid down tolerances to the satisfaction of the Engineer-in-charge before commencement of work.
9. The work will be carried out in close coordination with the building work and other agencies. Conduits will be laid in the slab within the specified time and it will have to be ensured that the casting of slabs is not delayed for want of laying of conduits. The conduits will also be laid in walls before the Plaster work is undertaken so as to avoid breaking cutting of plaster while making chase for laying of conduits subsequently. The contractor will have to employ adequate labour for carrying out the work. No claim regarding the idle labour for any reason will be entertained by the Department.
10. No tools and plants including special T&P etc. shall be supplied by the department and the contractor will have to make his own arrangements at his expenses.
11. All tools, plant and machinery provided by the contractor shall, when brought at the site, be deemed to be exclusively intended for the construction and completion of this work and the contractor shall not remove the same or any part thereof (save for the purpose of moving it from one part of the site to another) without the consent of the Engineer-in-charge.
12. All materials shall be got checked & approved by the Engineer-in-charge on receipt of the same at site before use and rejected material is to be removed from the site immediately.
13. No foreign exchange shall be made available by the department for the purchase of equipment, plants, machinery, materials of any kind or any other items required to be carried out in execution of work.
14. The contractor shall carry out his work, so as not to interfere with or hinder the progress or completion of the work being performed by other contractor (s) or by the Engineer-in-charge and shall as far as possible arrange his work and shall place and dispose of the materials being used or removed, so as not to interfere with the operations of other contractors, 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 entire satisfaction of Engineer-in-charge.
15. All items which are not covered while carrying out electrical work shall be removed and shall be cleared by the contractors as soon as the work is completed.
16. The contractor shall give the Engineer-in-charge in every fortnight, a progress report of the work done during the previous fortnight. The progress of work will be reviewed periodically by the Engineer-in-charge with the contractor and shortfalls, if any, sorted out. The contractor shall thereupon take such action as may be necessary to bring back his work to schedule without any additional cost to the department.
17. It shall be responsibility of the main contractor to sort out any dispute involved with the associated contractor without any time and cost overrun to the department. The main contractor shall be solely responsible for settling the dispute/litigation arising out of his agreement with the associate contractor. The contractor shall ensure that the work shall not suffer on this account.
18. The contractor shall quote his rates considering the specifications, terms & conditions and particular specifications and special conditions etc. and nothing extra shall be payable whatsoever unless otherwise specified.

19. The main contractor shall be responsible for coordinating the activities of all works and essential progress of works as per milestone and laid down program.
20. The contractor shall be responsible for the watch and ward of the site/property/material provided by him and materials issued by the department against pilferage and breakage during the period of execution and thereafter till the work is completed and physically handed over to the department.
21. Samples of all materials, fittings and other materials/articles required for execution of the work shall be got approved from the Engineer-in-charge. Materials/articles manufactured by the firms of repute as indicated in tender documents and approved by the Engineer-in-charge shall only be used.
22. The contractor shall ensure quality construction in a planned and time bound manner. Any sub-standard material or work beyond set out tolerance limits shall be summarily rejected by the Engineer-in-charge.
23. The contractor shall be required to make a sample flat for each type at the earliest opportunity using all approved materials for approval of Engineer in charge before mass scale finishing works are taken up.
24. Even ISI marked materials 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/material. Whenever ISI marked materials are brought to the site of work; the contractor shall, if required by the Engineer-in-charge, furnish manufacturers test certificates to establish that the materials procured by the contractor for incorporation in the work satisfy the provisions of IS codes relevant to the material and/or the work done.
25. The contractor shall have to engage well experienced skilled labour and deploy modern T&P and other equipment to execute the work.
26. The contractor will have to ensure that the skilled labour i.e. wireman etc., Engaged in the execution of the work must possess valid electrical license, otherwise he will not be permitted to execute the work.
27. ***The firm shall use only electrically operated chase cutting machine for cutting the chases in the wall for recessed conduit wiring.***
28. The contractor will have to make his own arrangement for storage of materials. No storage space shall be provided by department.
29. The contractor will have to make his own arrangement for water and power supply for execution of works.
30. The associate contractors executing the electrical works must possess the valid electrical contractor license otherwise they will not be permitted to execute the electrical works.
31. The contractor shall be responsible for removal of all defects in the work during the guarantee/warranty period. The department shall carry out routine maintenance only. However, if any failure is noticed during this period which is attributable to poor quality of material and bad workmanship, the contractor will be required to rectify the same at his own cost, failure of which the department will be at liberty to get the defects rectified at the risk & cost of the contractor. The contractor will also be required to carry out his own inspection/testing during the guarantee/warranty period and attend to any defect taking place during this period.
32. Priority to arrange the material shall be decided by the department. However, material required for the work shall be brought at site only at the appropriate time keeping in view the progress of building

works as well as Electrical & Mechanical works. Decision of Engineer-in -charge in this regard shall be final.

33. The contractor has to intimate his authorized representative, who will be receiving instructions in his absence. The contractor /his authorized representative is bound to sign the site order book as and when required by the Engineer-in-charge and to comply with the instructions therein.
34. Suitable back plates providing for fixing the wall brackets and ceiling flush fittings shall be supplied by the contractor free of cost.
35. It shall be responsibility of contractor to provide polythene/PVC plastic cover for all SDBs/meter boards/feeder pillars/panels etc. so as to protect them from wear & tear/damage during execution stage. Contractor shall provide the covers for the materials if any being supplied departmentally also. Nothing extra shall be paid on this account.
36. Contractor is fully responsible for any kind of damage to the LT/HT cable during execution of work. No joints shall be allowed if the cable is damaged. Contractor has to replace the full length at his own cost.
37. A suitable brass/tinned copper neutral link shall be fixed at suitable place in the Metallic outlet boxes of all sizes to terminate neutral wire properly. Nothing extra shall be paid on this account.
38. Colour coding shall have to be adopted in the wiring system as per specification.
39. Suitable crimping tools shall be used for crimping the lugs/thimbles/ferrules. Nothing extra shall be paid on this account. The lugs/thimbles/ferrules pressed by conventional/ordinary pliers shall not be accepted.
40. A suitable brass/tinned copper neutral link shall be fixed at suitable place in the Metallic outlet boxes of all sizes to terminate neutral wire properly. Nothing extra shall be paid on this account.
41. An earth termination with earth stud of brass/tinned copper i/c 2 No. metallic washers or suitable earth bar of Brass/tinned copper with tinned copper thimbles/ferrules/lugs should be suitably fixed at suitable place in the Metallic outlet box for termination of protective earth conductor. Nothing extra shall be paid on this account.
42. In the outlet boxes, phase from one switch to other switch shall be looped with suitable size of solid copper conductor. Nothing extra shall be paid on this account. Stranded conductor shall not be accepted.
43. Only required number of knockouts should be removed from Metallic outlet boxes for entry of conduits. If more than required number of knockouts are removed, the Metallic outlet box shall not be accepted.
44. Separate G.I. boxes shall be used for staircase light switches and bell push. Nothing extra shall be paid on this account.
45. Metal sheath of Co-axial T.V. cable shall be terminated using 'U' shape thimble/lugs/ferrules. Nothing extra shall be paid on this account.
46. To facilitate drawing of wires 16/18 SWG GI fish wire be provided along with laying of recessed conduit. Nothing extra shall be paid on this account.
47. Cable connection to switch gear is deemed to be included in the item of end termination. No extra payment shall be made for that.
48. The contractor is advised to visit the site of work to have an idea of the execution of the work; failure to do so shall not absolve their responsibility to do the work as specified in agreement.

49. The overall system shall be designed in such that if any monitoring system fails Data Centre shall still be functional.
50. A continuous cooling system to be designed to provide a stable thermal environment for the critical IT equipment's without any interruption meeting ASHRAE standards.
51. The design of the system should be such that it should be fault tolerant site infrastructure covering dual power for all IT equipment's, complimentary system and distribution paths must be physically isolated from each other.
52. **Rates:**
 - 52.1. The work shall be treated as on works contract basis and the rates tendered shall be for complete items of work (except the materials, if any, stipulated for supply by the department) inclusive of all taxes (including works contract tax, if any), duties, and levies etc. and all charges for items contingent to the work, such as packing, forwarding, insurance, freight and delivery at site for the materials to be supplied by the contractor, watch and ward of all materials (including those supplied by the department, if any) for the work at site etc.
53. **Taxes and Duties:**
 - 53.1. Rates are inclusive of GST and all other Taxes, duties, levies and royalties and nothing extra shall be payable to the contractor on account of this.
 - 53.2. The GST shall be deducted from the bills of the contractor as applicable in at the time of payments.
54. **Completeness of Tender:**
 - 54.1. All sundry fittings, assemblies, accessories, hardware items, foundation bolts, termination lugs for electrical connections as required, and all other sundry items which are useful and necessary for proper assembly and efficient working of the various components of the work shall be deemed to have been included in the tender, whether such items are specifically mentioned in the tender documents or not.
 - 54.2. Minor building works necessary for installation of equipment, foundation, making of opening in walls or in floors and restoring to their original condition, finish and necessary grouting etc. as required, shall be executed with in the quoted rates.
55. **Works to be done by the contractor:**

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

 - (i) Foundations for equipment and components where required, including foundations bolts.
 - (ii) Cutting and making good all damages caused during installation and restoring the same to their original finish.
 - (iii) Sealing of all floor openings provided by him for pipes and cables, from fire safety point of view, after laying of the same.
 - (iv) Painting at site of all exposed metal surfaces of the installation other than pre-painted items like fittings, fans, switchgear/distribution gear items, cubical switchboard etc. Damages to finished surfaces of these items while handling and erection, shall however be rectified to the satisfaction of the Engineer-in-Charge.
 - (v) Testing and commissioning of completed installation.

(vi) Storage space for all equipment, components and materials for the work

56. **Storage and Custody of Materials:**

56.1. The contractor has to make his own arrangement for the storage of the material at site & necessary watch and ward of the electrical installation during the execution of work till the same is handed over to the department. No extra payment will be made on this account. The storage space shall however be arranged by the department at site, if available.

56.2. The main contractor shall arrange for proper storage of the electrical fans and fittings at site and that double lock system shall be arranged for the fans and fittings after receipt at site until the time they are taken for installation. The contractor shall however be responsible for proper storage and safe custody of the same till their installation and handing over to the department.

57. **Electric Power Supply and Water Supply:**

Power and water supply will be arranged by the contractor at the site for installation purpose. However, for final testing purpose after complete installation of the electrical items, electricity supply will be made available free of cost to the contractor. Contractor will take due care to ensure safety of electrical installation during execution of work.

58. **Tools for handling and Erecting:**

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

59. **Payment Terms:**

Running bill Payments for work done shall be made as per the relevant clauses of contract. However, for items involving SITC of equipment, part payments may be all allowed by the Engineer-in-charge as below:

- a) After initial inspection and delivery of equipment/ material at site in good condition on pro rata basis @ 75%
- b) On completion of installation pro-rata basis @ 15%
- c) On commissioning and completion of successful running in period @ 10%

60. **Co-ordination with other agencies:**

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

61. **Care of buildings:**

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

62. **Structural Alterations to Buildings:**

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

- (ii) Structural provisions like openings, cutouts, if any, provided by the department for the work, shall be used. Where these required modifications, or fresh provisions are required to be made, such contingent works shall be carried out by the contractor at his cost.
- (iii) All such openings in floors provided by the department shall be closed by the contractor after installing the cables/conduits/rising mains etc. as the case may be, by any suitable means as approved by the Engineer-in-charge without any extra payment.
- (iv) All chases required in connection with the electrical works shall be provided and filled by the contractor at his own cost to the original architectural finish of the buildings.

63. Addition to an installation:

Any addition, temporary or permanent, to the existing/ Proposed electrical installation shall not be made without a properly worked out scheme/design by a qualified Electrical Engineer to ensure that such addition does not lead to overloading, safety violation of the existing/ Proposed system.

64. Work in occupied buildings:

- (i) When work is executed in occupied buildings, there would be minimum of inconvenience to the occupants. The work shall be programmed in consultation with the Engineer-in-charge and the occupying department. If so required, the work may have to be done even before and after the office hours.
- (ii) The contractor shall be responsible to abide by the regulations or restrictions set in regard to entry into, and movement within the premises.
- (iii) The contractor shall not tamper with any of the existing installations including their switching operations or connections there to without specific approval from the Engineer-in-charge.

65. Drawings:

- (i) The work shall be carried out in accordance with the drawings and the tender documents and also in accordance with modification thereto from time to time as approved by the Engineer-in-charge.
- (ii) All wiring diagrams shall be deemed to be 'Drawings' within the meaning of the term as used in Clause 11 of the General Conditions of Contract (PWD 7/8). They shall indicate the main switch board, the distribution boards (with circuit numbers controlled by them), the runs of various mains and sub mains and the position of all points with their controls.
- (iii) After award of the work, the firm will be required to submit detailed drawings for the proposed work including layout plan, conduit routes showing location of points and height etc. Work will be carried out as per the approved drawings before start of work.

66. Conformity to IE Act, IE Rules, and standards:

- 66.1. All electrical works shall be carried out in accordance with the provisions of Indian Electricity Act, 1910 and Indian Electricity Rules, 1956 amended up to date (Date of call of tender unless specified otherwise). List of rules of particular importance to electrical installations under these General Specifications is given in Appendix C for reference.

67. General requirements of components:

- 67.1. **Quality of material:** All materials and equipment supplied by the contractor shall be new. They shall be of such design, size and materials as to satisfactorily function under the rated conditions of operation and to withstand the environmental conditions at site.

68. Inspection of materials and equipment:

68.1. Materials and equipment to be used in the work shall be inspected by the departmental officers. Such inspection will be of following categories:

- (i) Inspection of materials / equipment to be witnessed at the Manufacturer's premises in accordance with relevant BIS /Agreement Inspection Procedure.
- (ii) To receive materials at site with Manufacturer's Test Certificate(s)
- (iii) To inspect materials at the authorized dealer's, go downs to ensure delivery of genuine materials at site.
- (iv) To receive materials after physical inspection at site.

68.2. 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:

- (i) Material will be ordered & delivered at site only with the prior approval of the department to ensure timely delivery.
- (ii) As and when the order is placed for the fittings/ fixtures, cables, switchgears, poles, rising main, other main items etc., its copy shall be endorsed to the CPWD Engineer-in-charge.
- (iii) The firm will be required to procure material like exhaust fans, MCB's & DB's, switches & sockets, wires & cables, conduits and switchgears etc directly from the manufacturer/ authorized dealers to ensure genuineness & quality and as per the approved makes only. Proof in this regard shall be submitted by the contractor before installation at site to the department.
- (iv) Inspection at factory or at godown of the manufacturer, as required, shall be arranged by the firm for a mutually agreed date. Certificate for genuineness of the fittings shall have to provided duly signed by the manufacturer's officer not below the rank of Regional Manager.
- (v) Delivery of material shall be taken up only with the consent of department, after clearance of the material.
- (vi) Department shall reserve the right to waive inspection in lieu of suitable test certificate, at its discretion.

68.3. Similarly, for fabricated equipment, the contractor will first submit dimensional detailed drawings for approval before fabrication is taken up in the factory. Suitable stage inspection at factory also will be made to ensure proper use of materials, workmanship and quality control.

69. Ratings of components:

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

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

70. Conformity to standards:

70.1. All components shall conform to relevant Indian Standard Specifications wherever existing. Materials with ISI certification mark shall be preferred.

- 70.2. Relevant Indian Standards including amendments or revisions thereof up to the date of tender acceptance shall be applicable in the respective contracts for respective items, firm to ensure its compliance.
71. **Interchangeability:**
- Similar parts of all switches, lamp holders, distribution fuse boards, Switch gears, ceiling roses, brackets, pendants, fans and all other fittings of the same type shall be interchangeable in each installation.
72. **Workmanship:**
- 72.1. Good workmanship is an essential requirement to be complied with. The entire work of manufacture/fabrication, assembly and installation shall conform to sound engineering practice.
- 72.2. Proper supervision/skilled workmen: The contractor shall be a licensed electrical contractor of appropriate class suitable for execution of the electrical work. He shall engage suitably skilled/licensed workmen of various categories for execution of work supervised by supervisors / Engineer of appropriate qualification and experience to ensure proper execution of work. They will carry out instruction of Engineer-in-charge and other senior officers of the Department during the progress of work.
- 72.3. Use of quality materials: Only quality materials of reputed make as specified in the tender will be used in work.
- 72.4. Fabrication in reputed workshop: Switch boards and LT panels shall be fabricated in a factory/workshop having modern facilities like quality fabrication, seven tank process, powder/epoxy paint plant, proper testing facilities, manned by qualified technical personnel. These shall be as per make / item approved.
73. **Testing:**
- 73.1. All tests prescribed in the Specification, to be done before, during and after installation, shall be carried out, and the test results shall be submitted to the Engineer-in-charge in prescribed Performa, forming part of the Completion Certificate.
- 73.2. All incidental expenditure to be incurred for testing of samples e.g. Packaging, sealing, transportation, loading, unloading etc. and testing charges for conducting tests as per specification, shall be borne by the contractor.
74. **Commissioning on completion:**
- 74.1. After the work is completed, it shall be ensured that the installation is tested and commissioned.
- 74.2. The contractor shall furnish copy of detailed instructions and manuals of manufacturers for all items of equipments regarding installation, adjustments, operations and maintenance including preventive maintenance and troubleshooting together with all relevant data sheets, spare parts catalogue and workshop procedure for repairs, assembly and adjustment etc. all in triplicate. It can be one original copy & the other two may be the photocopy of the original
75. **Completion plan and completion certificate:**
- 75.1. For all works completion certificate after completion of work shall be submitted to the Engineer-in-charge.
- 75.2. Completion plan drawn to a suitable scale in A2 Sheet (It shall be laminated if desired by the Site- in-Charge) indicating the following, and three copies of the same shall also be submitted.

- (i) General layout of the building.
- (ii) Locations of main switchboard and distribution boards, indicating the circuit numbers controlled by them.
- (iii) Position of all points and their controls.
- (iv) Types of fittings, viz. fluorescent, pendants, brackets, bulk head, fans, exhaust fans etc.
- (v) Name of work, job number, tender reference, actual date of completion, names of Division/ Sub-division and name of the firm who executed the work with their signature.
- (vi) Cable layout showing general distribution diagram along with position of cable joints, if any.

76. Guarantees:

- 76.1. The installation will be handed over to the department after necessary testing and commissioning. The installation will be guaranteed against any defective design/workmanship/performance. Similarly, the materials supplied by the contractor will be guaranteed against any manufacturing defect, inferior quality. The guarantee period will be for a period of **5 years** for all LED fittings and **36 months** for other equipments counted from the date of completion of work. Contractor has to submit warrantee certificate from manufacturer/OEM.
- 76.2. Installation / equipment or components thereof shall be rectified/ repaired to the satisfaction of the Engineer-in-charge. Sufficient trained and experienced staff shall be made available to meet any exigency of work during the guarantee period.
- 76.3. The routine as well as preventive maintenance for one year by manufacturer shall be carried out from the date of taking over the installation by department. Including attending all call back of break down round the clock, 365 days in a year in guarantee period.
- 76.4. 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.

77. 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 and 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 there from during the period of erection, construction and putting into operation the equipments and ancillary equipments under the supervision of the successful tenderer in so far as the latter is responsible. The successful tenderer shall also provide all insurance including third party insurance as may be necessary to cover the risk. No extra payment would be made to the tenderer due to the above

TECHNICAL SPECIFICATIONS FOR E&M WORKS

1.0 GENERAL:

- 1.1. Except for the items, for which Particular Specifications are given herein or where it is specifically mentioned otherwise in this bid document, the work shall generally be carried out in accordance with the "CPWD Specifications. Wherever CPWD Specifications are silent, the latest BIS Codes/Specifications, National Building Code-2016, Manufacturers Specifications, Sound Engineering practices or well-established local construction practices as decided by the Engineer-in-charge shall be followed.
- 1.2. A reference made to any Indian Standard Specifications in the document, shall imply to the latest version of that standard, including such revisions / amendments as issued by the Bureau of Indian Standards up to 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.
- 1.3. All hardware items such as screws, thimbles, connectors, earth/neutral terminals, wires etc. which are essentially required for completing any item as per specifications will be deemed to have been included in the item even when the same have not been specifically mentioned.
- 1.4. All hardware material such as nuts/bolts/screws/washers etc. to be used in the work shall be zinc/cadmium plated iron. The galvanized boxes of modular switch/sockets etc. shall be of the same make as of switch/socket etc.
- 1.5. While laying conduit, suitable minimum number of junction boxes shall be left for pulling the wires. These shall be placed in such a way that the same do not remain noticeable.
- 1.6. Any conduit which is not 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.
- 1.7. Multi stranded FRLS PVC insulated copper conductor wires are to be used in the work. Termination of multi-stranded conductors shall be done using crimping type copper thimbles at both the ends. Nothing extra shall be paid for the same.
- 1.8. The contractor shall follow the shortest route for circuits, submain, point wiring etc.
- 1.9. The connections of switches, sensors, earthing conductors & interconnections cables shall be made by adequate rating thimbles of approved standard makes only and nothing extra on this account shall be paid.
- 1.10. Check nuts shall be provided while terminating the M.S. conduits in switch board boxes for which nothing extra shall be paid.
- 1.11. All distribution boards shall be marked with circuits controlling the rooms/area/SDB controlled
- 1.12. Material to be used in the work shall be ISI marked. The makes of materials have been indicated in the list of acceptable makes. No other make will be acceptable. The material 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
- 1.13. While deciding the size of switch boxes for light points/fan point, exhaust fan point items, extra two modules will be provided for each fan point for fixing of regulator(s) (fan regulator is to be provided under different item). Wherever extra modules are available, the same shall be provided with blanking plates without any extra cost.

- 1.14. Modular type switches/sockets/telephone outlets/TV sockets are to be provided wherever indicated in the items. The same shall be of only one make. The modular plates of switches, sockets, telephone & TV sockets etc. shall be in two parts i.e. plates with frames with in quoted rates.
- 1.15. The building shall be provided with false ceiling in various areas. In order to avoid maintenance problem, the contractor will not provide any ceiling rose/connector/looping box etc. above the false ceiling. The point wiring in that case will be extended up to the fitting/fan etc. directly without provisions of any termination arrangement in between. The wire from the end point up to the fixture shall be considered to be included in the point wiring. Nothing extra shall be paid for the same.
- 1.16. Wherever it is not possible to provide rigid conduits, flexible conduit pipe shall be provided for drawing/running the wires. However, such arrangement has to be kept to the barest minimum and only with the prior approval of Engineer-in-charge.
- 1.17. Earthing and all hidden items of work shall be carried out in the presence of the Engineer-in-charge or his authorized representative.
- 1.18. The fan box cover shall be made from 3mm thick phenolic laminated sheet as per CPWD specification.
- 1.19. The contractor shall provide only metallic junction boxes/looping boxes with cover of required sizes even in PVC conduiting and such boxes shall be measured as a part of conduit/wiring without any extra payment.
- 1.20. The metallic junction boxes & looping boxes shall be covered with approved makes of phenolic laminated sheet. For telephone, television & fire alarm system shall be provided at all the floors within scope of work without any extra cost as per requirement & layout approved by Engineer-in-charge.
- 1.21. The firm has to go through the site order book kept with the Junior Engineer (E) regularly and has to sign the same and carryout the instructions recorded therein by various officers of the department.
- 1.22. The quantities of various items may vary from the quantities given in schedule of work. The agency shall bring the various items & materials as per actual requirement at site at the time of execution of work. Excess quantities shall not be accepted & paid by the department.
- 1.23. The ceiling roses wherever required to be provided are included in the scope of work without extra payment and the same shall also be of modular type & of the same make as that of switches & sockets along with earthing provision.
- 1.24. The MCB should be of same make as that of MCB DBs.
- 1.25. The MCB distribution boards shall be factory fabricated in the works of the manufacturer of the MCB's of any of the makes specified and the same shall be duly pre-wired in the works. The board shall be brought to site in ready for installation condition. The MCBs and the MCB distribution board shall be of the same make.
- 1.26. Microprocessor type MCCB should have centrally adjustable overload setting & short circuit setting as per OEM standards. All MCCB should be ICS=ICU.
- 1.27. Suitable crimping tools shall be used for crimping the lugs/thimbles/ferrules. Nothing extra shall be paid on this account. The lugs/thimbles/ferrules pressed by conventional/ordinary pliers shall not be accepted.
- 1.28. All chases in wall shall be made through electrically operated chase cutting machine.

GENERAL ADDITIONAL CONDITIONS AND SPECIFICATIONS: -

- 1) Work shall be carried out strictly in accordance with CPWD General Specification for electrical works Part I Internal 2023 as amended up to date. CPWD general specification for electrical works Part II External 2023 as amended up to date. CPWD general specification for electrical works Part IV Sub Station 2013 as amended up to date. Indian Electricity Act 2003 amended up to date. National Electrical Code 2023 amended up to date. Indian Electricity Rule 2020 amended up to date. NBCS – 2026 as amended up to date, 5 star GRIHA rating / Super Green GHAR rating of CPWD (Green Habitat Accomplished Rating) and Barrier Free and

Accessibility norms. Wherever appropriate Indian Standards are not available, relevant British and/or IEC Standards shall be applicable.

- 2) All internal electrical works shall be carried out with Heavy gauge PVC conduit except for fire alarm system. All switches, sockets, IP Phone socket, Data sockets, TV sockets, bell push and accessories along with matching mounting boxes shall be of modular type. All modular switches, sockets, plates, other accessories shall be of same make and model.
- 3) After completing the work, necessary test results as envisaged in CPWD General Specifications Part-I (Internal)-2023 and CPWD General Specifications Part-II (External)-2023 shall be recorded and submitted to the department. The results shall be within the permissible limits.
- 4) Materials to be used in work are to be ISI marked. The make of the materials have been indicated in the list of preferred makes. No other makes will be acceptable. The materials to be used in the work shall be got approved by the Engineer in Charge/his representative before its procurement and use at site. The E-in-C shall reserve the right to instruct the contractor to remove the material which, in his opinion, is not acceptable.
- 5) Minimum size of copper conductor for power wiring/light plug wiring shall be 4 sq mm PVC insulated multi strand with FRLSH copper conductor cable and for light/fan points/exhaust fan/call bell point - wiring shall be done with 1.5 sq mm PVC insulated multi strand FRLSH copper conductor cable. Other wire sizes as per the SLD/ shop drawings.
- 6) To facilitate drawing of wires, 18 SWG GI fish wire shall be provided in recessed conduit. Conduits laid for other services, like fire alarm, PA system etc., where wiring is not done along IEI works, fish wire shall be invariably drawn.
- 7) All cable/wire termination shall be made with suitable size of thimble/lug/ferules.
- 8) The Make of MCB, RCCB, MCCB etc. shall be of the same as that of DB.
- 9) All TTA Electrical panels 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. The switchboard shall be factory manufactured by OEM or manufactured by authorized Franchisee of OEM based on design given by OEM. Contractor shall make complete protection curves and discrimination chart for relay settings and shall adjust all these readings at site.
- 10) All Electrical panels (other than TTA panels) shall be fabricated from preferred make list of panel manufacturer and strictly as per CPWD specifications. The approval for GA drawings of panel boards must be obtained from Engineer – in – charge before fabrication work. The panel board shall be adopted with 100% neutral Busbar.
- 11) Any Cable end Box, looping/Connection Box, Loose wire box above DB's required for termination of cable is to be provided by the agency.
- 12) All the switch boxes, MCB DBs are to be covered with plastic sheet / petroleum jelly when installed in brick work till the plastering / painting is done to avoid sticking of cement plaster/ splashes of the

paint. Cement plaster / paint are to be cleaned immediately after plaster to avoid rusting of switch boxes and MCB DBs. The plastic sheet is to be removed at the time of handing over. Nothing extra shall be payable on this account.

- 13) All PVC conduits accessories shall be of the same make as conduits. The Conduits shall be terminated at switch boxes/metallic junction boxes with suitable PVC glands/check nuts/bush adaptor.

14) The cables for distribution of electric power to landscaping area and all external lighting shall be laid direct in DWC pipe which shall be laid underground at depth with top of the pipe not less than 75 cm from finished level or as recommended by OEM of DWC pipes whichever is more. The excavation, refilling, compaction and restoring the site to its original condition for trenching and laying of DWC pipe is included in the scope of contractor. The pipes shall be compatible with IS code as applicable. Tagging of cables on both ends of each circuit shall be done.

- 15) Cable Work: -LT Cable Carrier System: In general cable installation works shall be carried out in accordance with IS 1255, latest version. At road crossings, the depth of the pipe shall be minimum 1m.

All cables shall be either laid by excavation or through horizontal directional drilling (HDD) or micro-tunnelling. The top of the pipe shall be at least 750mm below the finished ground level. RCC pipe NP2 class of required size shall be considered for road crossing.

16) The energy meters/MFM of each panel shall be looped with RS 485 ports, and the communication shall be done by laying CAT 6A cables which will be terminating to the GATEWAY required for wireless/wired communication. Near every panel where communication via RS 485 is required, a LAN port in modular box shall be provided for ethernet connectivity to gateways. LAN cabling shall be done upto the LV/communication room as per the shop drawings.

17) The material required to be used in the work shall be approved from the Engineer-in-charge before its procurement and 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. The materials, planning and workmanship shall satisfy the specifications contained herein and codes referred to. Where the technical specifications stipulate the requirement in addition to those contained in the Standard Codes and specifications those additional requirements shall also be satisfied. In the absence of any Standard / Specifications covering any part of the work covered in this tender document, the instructions / directions of engineer-in-charge will be binding on the contractor.

18) All Electrical installations shall be of high quality, complete and duly operational including all necessary items and accessories whether or not specified herein. All Electrical work shall be completed in accordance with the regulations and standard to the satisfaction of the Engineer-in-charge.

19) The warranty/guarantee for LED fittings shall be submitted from the manufacturer in addition to the warranty/guarantee from the contractor. The manufacturer shall give undertaking that in case of discontinuation of model and non-availability of spares, they have to replace the fittings with equivalent/ high end model in case of manufacturing defect during the warranty/guarantee period of 5 years. Contractor has to provide certificate from the manufacturer to attend the complaints for repairing / replacement directly from IISc of all LED fittings on the basis of complaints of defective LED fittings.

20) Before completion of defect liability period of Two years, the main contractor has to submit security deposit (in addition to 2.5%) of 5% of 80% of the price of LED fittings items for the remaining 3 years warranty/guarantee period for LED fittings in acceptable form i.e. FDR/ Bank guarantee, to concerned Executive Engineer (E). The Security Deposit deducted from the bills of contractor shall be

refunded to the main contractor only after submission of above security deposit for LED fittings by main contractor, failing which this LED security deposit shall be deducted from Security Deposit deducted for total work and balance amount only will be refunded after completion of defect liability period. The LED Security Deposit will be released after completion of warranty/guarantee period of 5 years to the main contractor.

21) Completion plan and completion certificate shall be submitted as per General Specifications for Electrical work Part – I Internal 2023

DISTRIBUTION BOARDS

1) SCOPE

This section covers specification of Distribution Boards (DBs) suitable for operation on 240/415 V Single and Three Phase 50 Hz supply required as per the shop drawings.

2) STANDARDS AND CODES

Prevailing Indian Standard Specifications and Codes of Practice as applicable will apply to the equipment and the work covered by the scope of this contract. In addition, the relevant clauses of the Indian Electricity Act 2003, Indian Electricity Rules 1956, National Building Code 1997, National Electric Code 1985, Code of Practice for Fire Safety of Building (general): General Principal and Fire Grading – IS 1641 - 1988 as amended up to date shall also apply. Wherever appropriate Indian Standards are not available, relevant British and/or IEC Standards shall be applicable.

3) **MINIATURE CIRCUIT BREAKERS:** - The MCB's shall be of the completely moulded design suitable for operation at 240/415 Volts 50 Hz system. The MCB's shall have a minimum rupturing capacity of 10 KA lcs. Type test certificates from independent authorities shall be submitted with the tender or before approval.

4) **RESIDUAL CURRENT CIRCUIT BREAKERS (RCCB):**- RCCBs shall comply to IS 12640 – 1988 and shall be of the current operated type. The RCCB shall be of 2 pole construction for single phase and 4 pole construction for 3 phase. All RCCB shall be complete with test buttons. RCCB shall have a minimum life expectancy of 10,000 operations.

5) DBs shall be wall mounting, recessed type, totally enclosed, 1.6 mm thick dust and vermin proof and shall comprise of miniature circuit breakers, earth leakage circuit breakers, busbars, neutral link etc as required, of ratings detailed in the schedule of quantities.

6) DBs shall be double door type. Access to the wiring shall not be possible without removing the outer hinged door and inner bolted door. The door shall be earthed with insulated copper braided flexible wires.

7) Components forming a part of the DBs shall comply to the relevant Standards and Codes of the Bureau of Indian Standards.

8) DBs shall be supplied and fixed with loose wire box and other accessories.

LT SWITCHBOARDS/PANEL (Non TTA panel)

1) All incoming and outgoing switchgears, busbar rating and other panel items shall be as per the SLD, shop drawings and prevailing standards.

2) The fabrication of distribution panel shall be as per the CPWD standards and specifications having inhouse 7 tank process.

4) **CPRI TESTING:** - Switchboard manufacturers should have CPRI tested certificate. Copies of the CPRI test certificates shall be submitted before execution.

5) **TESTING AT WORKS:** - Copies of type test carried out at ACB/MCCB manufacturers works and routine tests carried out at the switchboard fabricators shop shall be furnished along with the delivery of the switchboards. Engineer in charge reserves the right to get the switchboard inspected by their representative at fabricators works prior to dispatch to site to witness the routine tests

6) **TESTING AT SITE:** - Pre-commissioning tests as required shall be carried out on each switchboard at site before energizing the switchboards including but not restricted to the following.

- i. Physical checking of the switchboards including checking alignment of panels, interconnection of Bus bars, tightness of bolts/connections and evidence of damage/cracks in any components.
- ii. Physical checking and inspections of Inter panel wiring
- iii. Checking free movement of ACBs/MCCBs/SFUs etc.
- iv. Checking of operation of breakers
- v. Insulation tests of bus bar supports and control wiring etc. with 1.1 kV megger.

7) The contractor shall consider the following details for LT panels wherever required:

- i. Supporting rigid steel framework of min 3 MM thick for LT panel.
- ii. Complete with inter connections and distribution busbars.
- iii. Any conflict in rating / size / type / specification etc mentioned, the more stringent condition shall be applicable.
- iv. Painting / lettering on Breakers and distribution boards, the location they serve, providing on each panel its circuit diagram.
- v. Providing cable clamps / supports within distribution boards cable alley.
- vi. All MCB's shall be of minimum 10 kA breaking capacity.
- vii. All motor feeders MCCBs shall be of motor duty.
- viii. All panels shall be powder coated with siemens gray paint of approved shade.
- ix. Degree of protection for following type of distribution panel enclosure shall be as per IS as applicable.

• IP 42 for indoor LT panels.

• IP 55 for outdoor LT panels with double door enclosure with canopy.

x. All MCCB's shall be provided with operating mechanism for door interlock.

xi. Current Density: - Bus bars shall be of sufficient cross-section so that a current density of 130A/sq.cm (800A/sq. inch) is not exceeded at nominal current rating for aluminium bus bars, and 160A/sq.cm (1000A/sq. inch) for copper bus bars. The minimum sizes of sections of bus bars are given in Table VI of CPWD specification for internal works.

8) Panel Earthing: - 2 Nos. earthing strip for LT panel shall be fixed all around the panel strips connected to incoming earth conductors. **(Typical Cubicle Panel is explained in CPWD specifications for Internal Works)**

9) All MCB's used for protection shall be of type "C" characteristic.

10) The Panel fabricator shall provide Al. and Copper Bus-bars link of similar rating from Breakers.

11) Entire work shall be completed in compliance with prevailing standards such as IS / IEC / international rule and mandatory statutory / local bodies.

12) All control & protection wire shall be FRLSH colour code wire and not less than of 2.5 MM SQ in size.

13) Removable Gland Plate shall be of CRCA not less than 3 MM Thick.

14) For interconnections of the switchgears upto 63 Amp, FRLSH colour code copper wire of suitable size to be used and above 63 Amp bus bar to be used.

15) Panel shall be painted in approved shade with powder coating minimum 7 Tank Process.

16) Bus bars shall be insulated by colour coded PVC heat shrinkable sleeves & clip on shrouds for joints.

17) The panel shall have provision for entry of all cables from bottom and top as per site suitability.

18) All fault level breaking capacity indicates I.C.S. value at 415 volts. (ICS = ICU = ICW = 100%) for 1 sec.

19) All ACB's shall have inbuilt microprocessor-based release as specified.

20) Each Panel shall be provided SPDs as per prevailing standards.

LT SWITCHBOARDS/PANEL (TTA panel)

1) All incoming and outgoing switchgears, busbar rating and other panel items shall be as per the SLD, shop drawings and prevailing standards.

2) Panel shall be complete in all respect and shall be mounted on the MS frame as per CPWD general specifications.

3) Main LT panels shall be TTA / Design verified as per IEC 61439 Part-1 & 2.

4) The Main LT panel shall be completely modular and compartmentalized with **Form 4B** Separation.

5) Main Distribution Board shall be indoor type of metal clad construction, partly draw out type having self-aligning type auxiliary contacts for circuit breakers and draw out modules.

6) 4 pole Bus bars and air circuit breakers shall have short circuit withstand capacity of 50 KA for 1 second duration. Air circuit breakers of main LT panel and bus coupler shall be of **electrically operated type** with all related accessories and necessary protections as per CPWD specifications. **L**

T CABLES – 1.1 KV GRADE

1) GENERAL

The cables shall be supplied, inspected, laid, tested and commissioned as per schedule of quantities in accordance with prevailing CPWD specifications and standards.

2) MATERIAL

Material shall be 1.1 KV grade Multicore XLPE insulated, PVC sheathed Aluminium conductor armoured power cables and copper power cables shall be as per prevailing IS codes as applicable.

3) **TRENCHING & CABLE LAYING:** - The minimum width of trench shall be 45 cm and depth shall be 75 cm for laying of cable. Where more than one cable is to be laid in the same trench in horizontal formation, the width of trench shall be increased such that the minimum gap between the cables is one diameter of the cable unless specified otherwise.

4) **Laying of Cable on surface:** - Wherever required, as per SLD and shop drawings cable laying shall be done on surface also, as per the guidelines mentioned in the CPWD general Specifications for Internal and External Works.

5) GI CABLE TRAY

i. Cable trays shall be complete with bends, joints, coupler plates and accessories as may be required for joining the cable trays.

ii. Cable trays shall be perforated type as per shop drawings prepared by the contractor and after obtaining the APPROVAL for the same.

Note: Supports shall be considered to be included in the Scope of GI cable tray.

6) TESTING OF CABLES

i. All the cables shall be supplied with testing certificates from the O.E.M.

Test shall also be conducted at site for insulation between phases and between phase and earth for each length of cable, before and after laying.

All tests shall be carried out in accordance with relevant Standard Code of Practice and Electricity Rules. The Contractor shall provide necessary instruments, equipment and labour for conducting the above tests and shall bear all expenses in connection with such tests.

EARTHING: -

Earthing work shall be carried out strictly in accordance with CPWD General Specification for electrical works Part I Internal 2023 as amended up to date. CPWD general specification for electrical works Part II External 2023 as amended up to date. CPWD general specification for electrical works Part IV Sub Station 2013 as amended up to date. Indian Electricity Act 2003 amended up to date. National Electrical Code 2023 amended up to date. Indian Electricity Rule 2020 amended up to date. NBCS - 2026as amended up to date

Lightning Protection System as per IS / IEC 62305-3

1) Lightning Protection System shall be as per LPL-IV in accordance with IS / IEC 62305-3, IEC 62561& IS 3043. Layout shall be as per the drawings prepared and signed by OEM of the lightning protection system.

2) Work shall be carried out strictly in accordance with CPWD General Specification for electrical works Part-I Internal 2023 as amended up to date. CPWD general specification for electrical works Part II External 2023 as amended up to date. CPWD general specification for electrical works Part IV Sub Station 2013 as amended up to date. Indian Electricity Act 2003 amended up to date. National Electrical Code 2023 amended up to date. Indian Electricity Rule 2020 amended up to date. NBCS - 2026as amended up to date.

Lighting Automation: -

1. Occupancy sensors with bypass switchboard arrangements shall be provided in all wash rooms / Toilets areas, corridors and lift lobby (sensor should sense movement and occupancy both). All these sensors should have facility to program the day light lux level and delay time of minimum 20 Minutes.

GENERAL TERMS AND CONDITION FOR SOLAR POWER GENERATION

a) Inspection & Testing

The vendor shall submit quality plan/ test procedures for all the items to be supplied which will be approved by consultants before dispatch. Vendor shall also provide procedure for installation, commissioning and testing.

b) Taking over

The system shall be handed over to the Owner after successful completion of installation and commissioning, trial operation and performance guarantee test.

c) Insurance

The vendor shall arrange to take appropriate insurance in the name of NSG Manesar, Haryana for full value of System to protect from all risks such as loss or damage in transit, storage, Installation, testing & commissioning, theft, pilferage, riot, civil commotion, weather conditions of all kinds, fire, etc.

d) Any claim on loss or damage to the equipment and materials during handling, transportation, storage, installation or otherwise at any stage, till the System is taken Over by the Owner, shall be the responsibility of the vendor/contractor. The vendor shall be liable to replace the lost or damaged System/sub-system without any extra cost.

Further the vendor is to take all required insurance coverage in respect of all its personnel who shall be working on this engagement and for third party claims, if any.

e) The proposal shall include the list of tools and accessories that shall be supplied with the equipment.

f) The vendor must visit the proposed site for assessment of Roof top area availability, Cable laying route, installation of mounting structure, installation of equipment panel, MCB's/MCCB's etc

g) Module Junction box shall be FRP, IP 65 protection class with UV resistant neoprene/nitrile rubber gasket (weather resistant) shall be designed for long life out door operation in harsh environment.

h) Efficiency of solar PV system shall be guaranteed to 90% for up to 10 years & 80% for up to 25 years.

i) The PV module shall be equipped with bypass diode to minimize power drop caused by shades.

j) Modules shall be provided with locking type connectors.

k) The vendor shall provide the sample solar PV module electrical characteristics namely current-voltage (I-V) & power-voltage (P-V) performance curves at various temperatures and irradiance levels and also the temperature coefficients of power, open circuit voltage and short circuit current.

l) 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 more than 1.5% from the respective arithmetic means for all modules and/or for all module strings, as the case may be.

FIRE ALARM AND PUBLIC ADDRESS SYSTEM

SCOPE OF WORK AND GENERAL SPECIFICATIONS:

1. Supply, installation, testing and commissioning of Automatic Intelligent Addressable Fire alarm system and Public Address System complete in all respect. Scope of work also includes SITC & integration of Fire alarm system with Smoke Extraction System, Pressurization system, Fire Fighting System, AHUs, Ventilation system, Public Address system etc, as per NBC 2016 etc.

2. The system shall be as per CPWD GENERAL SPECIFICATIONS FOR ELECTRICAL WORKS PART-VI FIRE DETECTION AND ALARM SYSTEM 2018, NBC-2016, NFPA-72, BS EN 54 and Local by laws as per shop drawing prepared by the agency.

3. Preparation of shop drawing and as built drawings for the work of Fire Alarm and PA system is included in above scope of work. Shop drawings shall contain detailed scheme of fire alarm & PA system mentioning the main panels, repeater panels, detectors, MCP, horn cum strobes, fire fighter's telephone jack, response indicators, fault isolators, different modules, voice alarm controller, microphone for PA, paging station, Panel for PA system and all other accessories required for proper functioning of above system complete in all respect.

4. Contractor shall execute the work based on the shop drawings prepared by him after getting APPROVAL from the Engineer in Charge.

5. Scope of work includes wiring for the whole fire alarm and PA system in recessed/ surface M S conduits with necessary arrangements for fixing of conduits, devices, cables, drawing of wires, connections etc. complete for the system.

6. SITC of Response indicator to be used to locate a fire alarm if the detector's LED cannot be seen (i.e. it is hidden by false floors, false ceilings, ducts etc.) and as per the shop drawings.

7. An Addressable Fire Alarm System (AFAS) shall be able to provide total control over the life safety services required in the building. The AFAS shall be of the digital, distributed processing, real time, multi-tasking, multi-user and multi-location type.

a) The AFAS provided shall be able to tie-up the following Mechanical, Electrical & Low Voltage Services into an integrated system: Public address system.

b) Lifts

c) Fire-fighting system

d) HVAC and Mechanical Ventilation system / Pressurisation System / Smoke extraction System

e) Gas based flooding system in Server Room, Sub Station & HT/LT Panels. Etc.

8. Fire alarm system and PA system shall be product of a single manufacturer as per the list of preferred makes and shall conform to the requirement of all the relevant

ADDITIONAL SPECIFICATIONS

1.0 Public Address System

1.1 Scope of work:- Supplying, installation, testing and commissioning of public address system for building evacuation or announcements for the areas like corridors, common areas, reception, Lift lobbies, fire tower, refuge areas, lecture halls, seminar halls, labs, library or any other area as per NBC 2016. Each zone of fire alarm system shall be in sync with each zone of PA system. Integration of system shall be done accordingly, and all hardware and software components required for the same shall be included in the scope of contractor.

Contractor shall prepare the shop drawings for the complete PA system from the details given in the drawings, shall get the approval from the Engineer in Charge, and execute the work in all respect.

1.1.1 Control Panel: The control Panel shall have features like voice alarm controller with USB, MP3 player with Rack Mounted. The require zones can be integrated with the same panel and all hardware and software components required for the same are included in the scope. The voice alarm controller should be able to connect directly over Ethernet having seamless integration facility with main fire alarm panel for voice evacuation complete as required.

1.1.2 Amplifier: The amplifiers shall be of as per schedule of quantities and should have inbuilt feature like protection against re-settable overcurrent, overload, overheating, overvoltage, under-voltage and DC protection and should have 100V/70 Output, with 100 - 240 VAC input and backup power supply unit complete etc. as required.

1.1.3 Paging Station: The paging station shall be IP based with appropriate size and not less than 7-inch Networkable touch screen for selection of zones. It should be having inbuilt features like supervision of system status, setting of scheduled broadcasts with the minimum features of Built-in monitoring loudspeaker, Detachable goose-neck microphone, LCD touchscreen display with up to 2000 zones complete etc. as required.

1.1.4 Speakers: The speakers required for PA system shall be as per the shop drawings with recess and surface mounted provision with metal box in ceiling/wall with minimum power rating of 6W and shall be tapped to 3W/1.5W as per the requirement of the system.

1.1.5 The components of PA system shall be neatly installed in network rack assembly of 24U made of heavy duty extruded aluminium frame & channels, side & rear panels made up of 16 SWG powder coated steel sheet, front transparent door, bearing with rails & rollers, 2 fans at the top for ventilation. The ventilation requirement shall be varied with the size of rack used. The rack assembly shall be so designed for proper mounting of amplifiers, system controller & all accessories etc. as required.

1.1.6 The wiring of PA system shall be done with suitable grade FRLS PVC insulated twin core, shielded, copper conductor flexible cable in the recessed MS (mild steel) conduit laid in wall/ slab including connections and interconnections etc. as required.

FIRE FIGHTING SYSTEM

SCOPE OF WORK

1. The scope of work includes Supply, installation, testing and commissioning, handing over of firefighting system with wet riser and sprinkler system specified in schedule of quantities and as per shop drawings prepared by the agency in compliance of local byelaws, NBC 2016 and CPWD General Specifications for Electrical Works Part-V (Wet Riser & Sprinkler Systems) 2020 with any amendments up to date and relevant IS codes.

(a) The firefighting system shall include the following systems and all the required ancillary equipment and electrical installations required for fully reliable and safe operation of System: Fire Fighting system with Wet riser, sprinkler, peripheral hydrants, electric & diesel fire pump, internal & external fire hydrants, hose reel system and all the relevant components as per the requirement of NBC 2016

(b) Portable fire extinguishers and Sand buckets etc.

2. Preparation of shop drawing and as built drawings is included in above scope of work. Shop drawings shall contain detailed scheme of firefighting system as per the scope of work such as internal and external hydrants, sprinkler system complete with all related accessories, first aid hose reels, hose cabinets, all type of valves & pressure switches required, integration of firefighting system with fire alarm system, fire fighting power supply panels, earthing system, exhaust hood for diesel engine main fire pump as per the relevant guidelines, pipe and all other accessories required for proper functioning of above system complete in all respect.

3. Contractor shall execute the work based on the shop drawings prepared by him after getting approval from the Engineer in Charge.

4. All the equipment shall be as per the prevailing standards applicable for the respective equipment.

5. After completion of work getting fire clearance from Local bodies if any as per NBC-2016 as applicable.

6. Ring main shall be provided around the building with G.I. pipe with red colour, of diameter not less than 150 mm with necessary NRV / sluice valve / butter fly valve as per drawing approved by Engineer – in – charge as FIRE FIGHTING RING MAIN WATER LINE. The fire pump house shall be constructed and fire fighting equipments shall be Supplied, Installed, tested and commissioned by the contractor as per the approved drawing and design. Fire brigade inlet connections with suitable size NRVs,

7. All the Sprinkler pipes shall be of G.I. pipes with primer and minimum two coat of red colour. Pendent, Upright sprinkler on ceiling as per NBC 2016/Fire Services of Haryana Govt. norms.

8. The agency must study specifications, provision for fire-fighting system for various buildings, NBC code – 2016, local byelaws and additional conditions carefully. The work shall be executed in close co-ordination with the progress of building work.

9. Contractor shall provide all tools, equipment, metering and testing devices required for the purpose. On award of work, Contractor shall submit a detailed proposal giving methods of testing and gauging the performance of the equipment to be supplied and installed under this Contract.

10. All tests shall be made in the presence of the Engineer-in-charge or his representative or any inspecting authority and results recorded. At least five working days' notice in writing shall be given to the inspecting parties before performing any test.

11. Water flow rate of all equipment and in pipe lines through valves shall be adjusted to design conditions. Complete results of adjustments shall be recorded and submitted.

12. Contractor shall ensure proper balancing of the hydraulic system and for the pipes / valves installed in his scope of work by regulating the flow rates in the pipe line by valve operation. The contractor shall also provide permanent Tee connection (plug) in water supply lines for ease of installing pressure gauge & rotameters. Contractor shall also supply all required pressure gauge & rota meter for system commissioning and balancing. The balancing shall be to the satisfaction of Engineer in charge.

13. Orifice plates made of minimum 6 mm thick SS sheet with suitable hole to regulate the pressure shall be provided with all hydrant valves in the system.

14. Three copies of all test results shall be submitted to the Engineer in A4 size sheet paper in two weeks after completion of the tests

15. GI pipe with red colour coating shall be used for all the buildings. Sprinkler system shall be provided with 2 pipe systems (One for Sprinkler Riser and one for Sprinkler drain pipe).

16. Pumps shall be installed in positive suction only as per NBC 2016.

17. All the firefighting pipes laid underground shall be wrapped with appropriate thickness of not less than 4 mm bituminous compound/coal tar/asphalt tape coating.

18. Ring main(s) shall be provided in the periphery of the building for firefighting system. Also, Ring main(s) shall be provide at terrace connecting the wet risers.

Specification and standards

The works shall be executed as per CPWD's General specification for Electrical Works, Part-I (Internal-2023); Part-II (External)-2023; Part-V (Wet Riser and Sprinkler System for Fire Fighting Installation)-2020, IE Rules, provision laid down in NBC – 2016, ECBC 2017 as amended up to date and latest building byelaws of local body / Local Municipal Corporation and various prevailing Indian Standards as *applicable amended up to date, and as per direction of Engineer-in-Charge. The additional specifications are to be read above and in case of any variations; specifications given along the tender shall apply.*

TECHNICAL SPECIFICATIONS

Firefighting works Work under this section shall consist of furnishing all labour, materials, equipment and appliances necessary and required to completely install electrically operated and diesel driven fire pumps, wet riser, fire hydrant system/fire extinguishing as required as per CPWD specifications and requirement of Fire department and as specified hereinafter or given in the Bill of Quantities.

Without restricting to the generality of the foregoing, the work shall include but not limited to the following: -
1.2.1 Fire Pumps, Motor, Engine and Accessories: Electrically operated and diesel driven firefighting pumps with motors, base plate and accessories.

Pressure gauge with isolation valves.

Galvanized Pipes, fittings, valves, suction strainers, suction & delivery headers & accessories.

Foundations, vibration eliminator pads and foundation bolts.

Pressure vessel, pressure switches etc.

1.2.2 Fire Hydrant System: Piping for wet riser/hydrant systems.

Fire Hydrant valves, canvas hose pipes, hose reels, hose cabinets, connections to fire mains.

Isolation & non-return valves, pipe supports/welding/Fire Brigade inlet, Siamese connection and accessories.

1.2.3 Fire Sprinkler System:

1.2.4 Piping for sprinkler systems.

1.2.5 Fire Alarm control valves/Installation Control Valve (ICV)

1.2.6 Sprinkler heads, Spare Sprinkler.

1.2.7 Inspection & Testing assemblies.

1.2.8 Hand Appliances /Fire Extinguishers:

1.2.9 Supply and installation of fully charged and tested fire extinguishers hand appliances ABC stored pressure type, CO2 gas cartridge type as required as per by these specification and drawings.

1.2.10 Instrumentation: The diesel engine shall be provided with instrumentation as under: - Engine Starting System:

It shall be with lead acid batteries heavy duty of minimum 180 AH capacity, higher if so required by the engine manufacturer, 2 Nos. and self-starter switch.

HVAC AND PRESSURIZATION SYSTEM SCOPE OF WORK

The scope of work involves designing, supply, installation, testing and commissioning of VRF air conditioning system for functional requirement, mechanical ventilation system, smoke extraction system, pressurization system, normal ventilation system and specific exhaust requirement of labs, toilets etc. as per guidelines issued by ASHRAE/ISHRAE, BIS, CPWD specifications for Heating, Ventilation & Air Conditioning (HVAC) – 2024, NBC 2016 and additional specifications applicable. VRF system functional including indicating and protection equipment, related civil and E&M works are included in the scope of the work.

Contractor shall execute the work based on the shop drawings prepared by him after getting approval from the Engineer in Charge.

1. Brief details of air-conditioning Work: -

1.1 The VRV/VRF system is to be designed for the indoor temperature of 23 to 25 degree C shall be maintained in normal conditions) with the air changes as per provisions contained in ASHRAE, BIS, CPWD specifications, NBC 2016 and additional specifications

1.2 Air Conditioning system with Air-cooled Variable Refrigerant flow (VRF System) with Inverter based D.C Twin Rotary / Scroll modular compressor with R-410/R-32/R-132a/R-600a/R-290 refrigerant or any other eco-friendly refrigerant. The make of compressor shall be of same make as OEM. The VRF units shall be able to deliver 100% capacities at AHRI conditions till ambient temperature of 39 deg C.

1.3. For improvement in efficiency other than ISEER value, the VRF units will with minimum COP of 3.7 at 100% load and minimum 7.1 at 50% load in cooling mode at AHRI conditions. The capacity of outdoor unit at 100% load and 50% load at AHRI conditions should be NABL accredited/certified or equivalent lab certified.

1.4. The VRF outdoor unit shall have operating range from 5 deg C to 50 deg C in cooling mode and the OEM shall submit catalogue for VRF unit, mentioning the same.

1.5. The VRF system shall maintain normal cooling operation at all IDUs in auto mode, while anyone IDU is powered down for service When power is restored to the IDU serviced, normal operation shall be restored without any system shutdown, interruption, reset or power cycling of outdoor unit.

1.6. All standard VRF units will have high lift drain pump to lift the condensate water properly.

1.7. Insulated Refrigerant piping network, refnet joints, insulation, communication kits (wherever required) & expansion valves will be provided complete in all respect. The soft/hard drawn copper refrigerant piping shall be used for the designing installation testing and commissioning of VRF system. Thickness of piping will be as per Manufacturer recommendation. Closed cell Nitrile rubber insulation of required thickness will be provided.

Suitable size insulated drain pipe will be provided in proper slope.

Intelligent centralized controller compatible with BMS for complete VRF system will be provided for controlling (ON/OFF, scheduling, lock/ unlock, swing control, temperature setting, error detection) all indoor units and monitoring of corresponding outdoor units from one central location.

Complete electrical work inclusive of panels, cables, cable tray etc.

Fresh air to conditioned spaces will be provided as per NBC / 5-star GRIHA rating / Super Green GHAR rating of CPWD requirement.

All modular DX AHU, if provided - will have two-stage filtration i.e. One set of 50mm thick prefilter section equivalent to MERV-8 & second set of high efficient Electronic Air cleaner/ Electrically charged filter section. Filter efficiency minimum equivalent to MERV-14 rating.

For VRF standard duct able units, micro electrostatic filter (EAC) to be provided.

Duct shall be fabricated from galvanized steel sheets of various thickness according to duct sizes and in accordance with CPWD Specifications. Site fabricated ducts shall be provided for critical pieces like connection pieces, collar pieces, reducers, offset pieces etc. (Applicable for both AC & ventilation duct work) All types of Air terminal like Grilles/Diffusers/ VCD/ drum louvers etc. shall be provided.

Fire dampers with actuators as per requirements shall be provided and will be hooked up to fire alarm system. The thermal insulation shall be provided over all air-conditioned duct-using mat finished AL foiled closed cell nitrile rubber.

ERV units, CAV boxes, VFD etc. shall be provided as per scope of work.

NOTE:

Ensure that all the refrigerant & insulation used in the building envelope and for HVAC systems are CFC and HCFC free.

VRF systems shall be designed with max. 115% diversity (IDU to ODU ratio).

List of Preferred Makes for E&M Works

Approved makes of materials to be used in the work are as given in the table below. Engineer-in-charge /NIT approving authority have right to change the make of any product for the smooth execution or timely completion of the work. Only BIS marked materials shall be generally used in the work. Non-BIS marked materials may be permitted by the Engineer-in-charge only when BIS marked materials are not manufactured. No border sharing neighbour country parts or product will be used for the execution for this work & preference to make in India product will be given.

The Contractor shall obtain prior approval from the Engineer-in-charge before placing order for any specific material or engaging any of the specialized agencies and the brand / make of the material as specified in the particular specifications and in the list of preferred makes of materials attached in the tender. The Contractor shall make a detailed submittal with catalogues and highlighted proposed specifications, as well as full details of the works proposed to be executed by the specialized agency.

Note: The makes are subject to the compliance of Make in India norms.

S. No.	Description of Item	Preferred Makes
I	INTERNAL ELECTRIFICATION AND STREET LIGHTING:	
1.	PVC Insulated FRLS/HFFR Copper Conductor Wires 1.1 kV Grade (ISI Marked)	Polycab/ Havells/ RR Kabel/ KEI/ Rallison/
2.	Modular Plate/Modular Switch & Socket/GI Boxes/ Fan Regulator/Telephone/ RJ-45/RJ-11Modular Socket /Bell	Schneider (Opel)/ Legrand (Myrius)/ ABB (Ivie)/ Honeywell (Blenze Pro)/ Panasonic (Europa)/ Lauritz Knudsen (Englaze) /Northwest (Venia)/ C&S
3.	MCB /DB/MCB /Isolator/DB/RCCB/ ELCB	Legrand /Schneider/ ABB/ Siemens / Lauritz Knudsen/ Havells/ C&S Electric/ HPL
4.	Decorative Pendant Luminaire/Surface Circular Downlighter/1200 mm LED batten/ LED Bulk Head/Decorative Post Top Lantern fitting/ flood light/Mirror Light/Strip /Light/ Street Light with sensos/wall washer/spot light	Philips/ Regent Lighting / Wipro/ Havells
5.	DALI & Non-DALI LED Lights (Recessed Panel Fitting/ Downlighter, COB, Suspended Linear LED /4 ft Up-down, Suspended Frame mounted/ Cylindrical Pendent fitting/ Façade Lights)	Philips/ Regent Lighting / Wipro/ Havells
6.	(i) BLDC Ceiling Fan	(a) BLDC Fans: Havells (Efficiencia DX)/ Crompton (Energion Cromair)/ Usha (Technix) / Orient (I-Facon)/ Atomberg (Rense Prime)/ Almonard (equivalent model)
	(ii) Exhaust Fan (ISI Marked)	Havells/ Crompton/ Usha/ Orient/ Atomberg/Almonard
7.	Telephone Cables / Wires (ISI Marked) / Co-Axial Tv Cables	Polycab/Havells/RR Kabel/ KEI/ Seimins/Agilon
8.	Cat-6A loaded jack panel, Cat-6A Patch cord, Optical Fibre Cable, Wire/Cables and other accessories	Systimex/ Beldon/ Molex/ Derwiser/ D-link/Agilon
9.	Telephone Tag Block DP Boxes	Krone (German)/ D Link/ ITL
10.	DWC HDPE Pipe (ISI Marked)	Rex /Duraline/ Trupati/ Gemini/ BEC

11.	1.1 KV XLPE (Alumium/Cu) Cable (ISI Marked)/11 kV HT cable	Polycab/ Havells/ RR Kabel/ KEI/ AKG/ Rallison
12.	Occupancy Sensor/lighting management system/ Software/Other accessories	Philips Dynalite/Lutron/Crestron/Helvar/Regent/ Havells/ Honeywell/ Trilux/ Panasonic/ Wipro
13.	TTA Panels (All Panels 400A and above incomer rating)	Seimens (Siepan)/ Schneider (Blokset)/ Lauritz Knudsen (Ti)/ ABB (ArTuK)/ C&S Electric (CX)/ Legrand (XL3 DO) /HPL Equivalent
14.	Non-TTA Panels (Only CPRI approved)	Sterling Wilson/ Tricolite/ Adlec/ Neptune/ Advance/ Pristine/ Milestone/ RP Control/ LS Power/ SPC Electro tech/ ESSWIN/ Precision / Advance/HPL Electric & Power Ltd./ Associated Switchgears & Projects Ltd.
15.	MCCBs	Siemens(3VA)/ Schneider (NSX)/Lauritz Knudsen (D-Sine)/ Legrand(DPX3)/ ABB (Tmax)/ C&S (WiN break)/ HPL Equivalent
16.	Data Rack & Accessories	Schneider/ Rittal/ Valrack
17.	Current Transformers & Potential Transformer	Automatic Electric/Kappa/Electro Control System/ Narayan Powertech/ C&S/ CG
18.	Digital Indicating Measuring Instruments/ Multifunction Meters/ Digital Energy Meter	Lauritz Knudsen/ Konzerv/ Automatic Electric/ABB/ Legrand/ C&S
19.	Selector Switch	Lauritz Knudsen/Kaycee/Siemens/ABB/Automatic Electric/ Kappa/ Schneider/ C&S
20.	Indication Lamp & Push Button/ Relay/Timer/ Contactor/	Lauritz Knudsen/Kaycee/Siemens/ABB/Automatic Electric/ Kappa/ Schneider/ C&S
21.	Cable Trays/ GI Raceway/ Floor Box/Junction Box & Accessories	Venus/ Slotco/ Pilco/ Reeco/ Rmcon/ Advance
22.	Capacitor (ISI Marked)	Neptune/ Siemens/ Lauritz Knudsen/ Schneider
23.	Cable Gland/ Lugs/Thimbles	Commet/ Dowells/ Raychem/ Grip well Jainson
24.	Emergency/Exit Lighting System and Components, Fixtures	Eaton/ ABB/ Hochiki/G-Tech/ARP
25.	SMF Batteries	Amaron/ Exide/ Amaraja/ Lumminous
26.	Heat Shrinkable HT Cable End Termination	Denson/ Raychem/ Capseal
27.	Fire Suppression system / Room Flooding System with clean agent / Kitchen-hood Fire Suppression System	Fire Trace/Trace fire/ Ceasefire/ Minimax/ Kalpex/ Firetrex/ ASES/Rainx/Fireframe/ Firetrex
28.	Drinking Water Pumps	Kirloskar/ Mather & Platt/ Grundfoss/ KSB/ Willo
29.	Rigid PVC Conduit Pipes & Accessories (ISI Marked)	Norpack/ Finolex/ Supreme/ Astral/ AKG
30.	G.I Pipe	Tata/ Jindal (Hisar)/ SAIL
31.	M.S. Conduit & Accessories (ISI Marked)	BEC/ AKG/ STEEL KRAFT/ NIC/ RMCON
32.	UPVC Trunking/ Pop Box:	Honeywell/ Legrand/ Hager/ Schneider/ C&S
II	FIRE FIGHTING SYSTEM i.e. WET-RISER, SPRINKLER & FIRE EXTINGUISHERS	
1.	Fire Pump	Kirloskar/ Mather & Platt/ Grundfoss/ KSB
2.	Electrical Motors	Kirloskar/ Siemens/ ABB/ Crompton / KSB
3.	Diesel Engine	Kirloskar/ Cummins/ ABB/ Crompton / KSB
4.	De-watering pump	Kirloskar/ KSB/ Grundfoss/ Mather & Platt
5.	Elect. Control Panel/Feeder Pillars/ MCCB/ISOLATOR/	As per IEI Works

	Ammeter/Voltmeter/CTs/Other accessories	
6.	Butterfly/Non-Return Valve/Sluice Valve /Dual Plate Check Valve /Y-Stainer	Kirloskar/ Audco/ Advance/ Zoloto/ Sant/ Castle / AIP
7.	Fire Hydrant Valves/Landing Valves/FBC/ Hose	Newage/ Firex/ Ceasefire/Kalpex/fire Trace/RAINX/Fireframe
8.	Couplings /Branch Pipe & Nozzles/ Fire ManAxe	Newage/ Firex/ Ceasefire/Kalpex/fire Trace/RAINX/Fireframe
9.	R.R.L Hose (ISI Mark)	Newage/ Firex/ Ceasefire/Kalpex/fire Trace/RAINX/Fireframe
10.	First Aid Hose Reel (Drum and Bracket)	Newage/ Firex/ Ceasefire/Kalpex/fire Trace/RAINX/Fireframe
11.	Thermo Plastic Textile Reinforced Water Hose (ISI Mark)	Kesara/ Mitraz/ Newage/ Kalpex/fire Trace/RAINX/Fireframe
12.	Gun Metal/Bronze Gate/Globe/ Check/Ball Valves/Control valve	Kirloskar/ Audco/ Advance/ Zoloto/ Sant/ AIP
13.	Vibration Eliminator Metallic Expansion Bellows Connectors	Resisto Flex/ Easy Flex/ D. Wren
14.	Pressure Switch	Indfoss / System Sensor/ Plotter Johson
15.	Sprinklers	HD/ Tyco/ Viking
16.	Weather Proof Hose Cabinet	Padmini/ Getech/ Omex/ Kelpex/Ranix/ Nerwage
17.	Contactors/ Starters/ Relay	Siemens/ Lauritz Knudsen/ Schneider/ ABB/ Legrand
18.	MS / GI Pipe (ISI Marked)	Tata/ Jindal (Hisar)/ Sail
19.	Deluge Valve	HD Fire/ Newage/Getech/Omex/Padmini
20.	XLPE Cable (ISI Marked)	As per IEI Work
21.	Water Curtion Nozzles/Sprinkler Heads	Padmini/ HD Fire/ Newage/ Lifeguard
22.	Cable Tray	As per IEI Work
23.	Pressure Gauge	Danfoss/ H-Guru/ Fiebig / Switzer / Plotter
24.	Flow Switches	System Sensor/ Plotter/ Jhonson Control /H-Guru
25.	Fire Extinguishers	Newage/ Firex/ Ceasefire/Kalpex/fire Trace/RAINX/Fireframe
26.	Air Vessel	Lifeguard/ Chawla/ Firex/ Getech/ Nerwage
27.	Single Phasing Preventor (Current Sensing)	Lauritz Knudsen/Siemens/ABB/Legrand/Schneider
28.	Battery	Amaron/ Exide/ Amaraja/ Luminous
29.	Enamel Paint	Asian/ Nerolac/ Berger
30.	Measuring Meter	Lauritz Knudsen/ Siemens/ AE/ Enercon/ C&S
31.	Paint Primers	Asian/ Nerolac/ Berger
32.	Pipe Hangers	Camry/ Chilly/ GMGR/ Fischer
33.	Air Release Valves	TBS/ SKG/ ARCO / AIP
34.	Cable Gland/End Termination Lugs/ Terminal Blocks	As per IEI Work
35.	Sprinkler flexible connection pipe	Newage/ Youngjin/ Flxhead/ Lifeguard
36.	Fire Curtain & Control Panel	Koneba (Spain)/Intisi (Spain)/Stobich(Germany)
III.	ADDRESSABLE FIRE ALARM & PA SYSTEM	
1.	Fire Alarm Control Panel/ SOFTWARE/ Digital Voice Evacuation System	Honeywell (Notifier)/ Johnson Control (IFC)/ Equivalent models in EDWARD/ Ansul-Tyco/ Eaton/ Siemens / Panasonic/ Bosch / Hamptons

2.	Multi Criteria Detector / Heat Detector/ Duct Detector / Fault Isolator/ MCP	Honeywell (Notifier)/ Johnson Control (IFC)/Equivalent models in EDWARD/ Ansul-Tyco/ Eaton/ Siemens / ASES / Hamptons/ Panasonic/Bosch
3.	Speakers	Honeywell/ Henrich / FBT/ Bosch /OSL/Yamaha/ Bosch/ Siemens
4.	Fire fighter Jack & Fire fighter Handset/ Interactive Fire Fighter Display	HONEYWELL(Notifier)/ JOHNSON CONTROL(IFC)/ Equivalent models in EDWARD/ Ansul- Tyco / EATON
5.	M.S Conduit & Accessories (ISI Marked)/Armoured Fire Survival Cable (LSZH)	As Per IEI Work
6.	Power Amplifier /Mixer Amplifier/ Controller Voltage VAS /Rated Power Volume Control /Musical Instrument	Honeywell/ Henrich / FBT/ Bosch /OSL / ASES / Hampton
7.	Digital Public Address and Emergency Sound System Controller	Honeywell/ Henrich / FBT/ Bosch /OSL / ASES / Hampton
8.	Announcement console / Digital Call Stations / Remote call station interface	Honeywell/ Henrich / FBT/ Bosch /OSL
9.	CD Player	PHILIPS/ SONY/ PANASONIC
10.	Fibre Optic Network Cable/Cat 6	As per IEI Work
11.	Two Core Twin Twisted Speaker Cable	Finolex/ Polycab/ Havells/ RR Kabel/ KEI
12.	Equipment rack	As per IEI Work
13.	Audio CD music source	Philips / Sony / Panasonic
IV	HVAC / VRF / VRV / SPLIT AIR-CONDITIONERS	
1.	VRV/VRF System (Outdoor & Indoor Unit)/central Console	Toshiba/ Mitsubishi Electric/ Hitachi/ Daikin/Carrier/ LG
2.	Copper Tubes/Pipe	Met-Tube/ Hindustan/ Rajco/ Total line/Mandav Tubes/ Jindal Refrigeration
3.	Treated Fresh Air Unit (TFA)	Zeco Aircon/ Carrier/ Blue Star/ Greenheck/ Flaktood/ Toshiba/ Edgetech
4.	Cooling coil	Zeco Aircon/ Edgetech /Carrier/ Blue Star/Voltas/MEI
5.	Propeller Fan	Kruger/ Greenheck/ Flaktwood/ Zeco LTI
6.	Inline Fan	Pineair/ Ostberg/Kruger/Greenheck/Lakt.0wood/ Zeco/ LTI / Air flow
7.	MS Pipe / G.I. Pipe	TATA / SAIL/Jindal (Hissar)
8.	PUF Pipe Support	Malanpur/ Lloyd/ Best Puf
9.	Thermometer / Pressure Gauge	Fiebig/ H-Guru/ Emerald/ Anergy
10.	Flexible pipe connection	Resitoflex/ Kanwal/ Dunlop/ Easyflex
11.	PID Control Valve h Actuator, motor and Thermostat	Danfoss/ Siemens/ Oventrop/ Castle
12.	Auto air vent stop valve	Rapid Cool/ Anergy/ AIP/ Emerald/ Fiebig/ Castle/ AIP
13.	Factory & Site Fabricated Rectangular Duct	Zeco Aircon/ Edgetech/ Rolastar/ Eco duct/Dustech/ Waves/ MEI/ Asawa
14.	G.I. Sheet	TATA/ SAIL/ Jindal (Hissar)
15.	Factory Fabricated Spiral Duct	GPSpiro/ Dustech/Zeco Aircon/Edgetech/Rolastar/ Eco duct/ Waves/ MEI/ Asawa
16.	Vibration isolator/Rubbed pad/Duct support Arrangement	Dunlop/ Esistoflex/ Emerald
17.	CO2 Sensor	Danfoss/ Honeywell/ Siemens
18.	Modulating Motor/Valve	Danfoss/ Honeywell/ Siemens/ Oventrop/ AIP

19.	Cable Tray & Accessories	As per IEI Works
20.	Volume Control Damper, Fresh/ Exhaust air louver	Conaire/ Pineair/ Caryaire/ Dynacraft/ System Air/ Waves/ MEI / Air flow
21.	Grille / Diffuser / Jet Nozzle	Conaire/ Pineair/ Caryaire/ Dynacraft/ System Air/ Waves/ MEI / Air flow
22.	Fire Damper	Conaire/ Pineair/ Caryaire/ Dynacraft/ System Air/ Ruskin/ Trox/ Waves/ MEI
23.	Actuator for fire damper	Siemens/ Honeywell/ Danfoss/ Waves/ MEI
24.	Nitrile Rubber Insulation	Armacell/ Eurobatex/ Vidoflex
25.	Acoustic Insulation for Duct	UP Twiga/ Owns Conning
26.	EPS	Beardcell/ Styrene Packaging/ P.R. Packaging
27.	Fastner	Hilti/ Wurth/ Fisher
28.	Wire Rope & zip clip	OBO/ Equivelent
29.	Electrical Panel/Feeder Pillar	As per IEI Work
30.	Motor for AHU Fan/Ventilation Fans/Starters	Siemens/ ABB/ Crompton/ Armstrong/ Grundfoss
31.	Current Transformer/Potential Transformer/ ACBs/ MCCBs/ MCBs/ Ammeter/ Voltmeter/ LED Indicating lamp/ Push Button/ Selector Switch	As per EI Work
32.	LT Cable	As per IEI Work
33.	Single Phase Preventor/Relay/ Timer/Contactor	Siemens/ ABB/ Schnieder/ Lauritz Knudsen/ Legrand/ C&S
34.	Paint	Nerolac/ Asian/ Berger
35.	Termination Kit/Perforated Cable Tray/Cable Gland	As per IEI Works
36.	Solder less Lug	Dowell /Schneider Electric
37.	Aluminum Sheet	Hindalco/Jindal/ TATA
38.	Pan Humidifier	KEPL/ Rapidcool/ Emerald/ Danfoss
39.	Humidistat/Airstat	Honey well/ Danfoss/ Jhonson/ Siemens
40.	Water Cooled Centrifugal Chillers/ Heat Pump	York/ Trane/ Carrier/ Daikin-Mcquay/Dunhambush
41.	AHU	Zeco/ Edgetech/ Systemaire/ Flaktwood/ Nutech/ York/ VTS/ Humidin/ Casilica/ Carrier/ Waves / MEI/ Aad Tech
42.	Cooling Tower	Bell/ Paharpur/ Advance/ Mihir/ Melfrank
43.	Centrifugal Pumps Fixed Speed/Variable Speed	Armstrong/ Grundfoss/ Tyco/ Willo/ Xylem
44.	Cooling / Heating Coils	Zeco/ Edgetech/ Systemaire/ Flaktwood/ Nutech/York/ VTS/ HuMidin/ Casilica
45.	Fan Coil Units (Low Static)	Zeco/ Edgetech/ Systemaire/ Flaktwood/ Nutech/York/ VTS/ Humidin/ Casilica/ Carrier/ Trane
46.	High Static Fan-Coil Units	Zeco/ Edgetech/ Systemaire/ Flaktwood/ Nutech/ York/ VTS/ Humidin/ Casilica/ Carrier/ Trane
47.	Air –Washer/Air –Scrubber	Zeco/Edgetech/Daikin /Flaktwood/Casvent Aircon
48.	Humidifier	Kepl/ Emerald/ Rapid Cool
49.	Air-Curtain	Beacon/Euronics Industries/Edutek Instrumentation, Ambala
50.	Air-Source Hot Water Generator	Daikin/ York/ Trane/ Carrier

51.	Centrifugal Fans for Ahus	Kruger/ Comefri/ Nicotra/ Humidin
52.	Ventilation Fan Sections (Sectionalized Construction As per Specifications)	Zeco/ Edgetech/ Systemaire/ Waves / Air flow
53.	Centrifugal Fans for Ventilation units	Kruger/ Comefri/ Nicotra/ Humidin / Air flow
54.	Duct Attenuators/ Acoustic Louvers	Aryaire/ Airflow/ Tristar/ Air Master/ Cosmos/ Dynacraft
55.	Air Filters	Zeco/ Ad Yne/ Klenzoid/ Spectrum/ Camfil/ Aaf/ Anfico/ Intelligreen/ Adair/ Edgetech/ Carrier Electronic Air Filters: Honeywell/ Mervex/ Thermadyne/ Pure Ovyon/ Intelligreen
56.	VFD	Siemens/ Schnieder/ Danfoss/ ABB/ Fuji/ Allen Bradly/ Lauritz Knudsen/ Yaskawa
57.	UVGI	Zeco/ Rucks/ Adair/ Edgetech/ Alfa UV Carrier
58.	Ultra Sonic Humidifier	Kepl / Emerald/ Rapid Cool
59.	Fire Sealant	Hilti /Birla / 3m/ Fischer / PPCPL
60.	Fresh/Exhaust Air Louvers with Bird Screen	Ruskin -Titus/ Systemaire/ Air-Master/ Cosmos/ Caryaire/ Dynacraft
61.	Canvass Connection	Resistoflex/ Easyflex
62.	VAV BOX	Johnson Control/ Honeywell/Train/ Waves / MEI
63.	GI SHEETS FOR AHUs	TATA/ SAIL/ JINDAL
64.	Fabric Duct	Prihoda/ Durkeesox Fabric Air
65.	Butterfly Valves (Water duty) (Gear Operated beyond 350mm Dia)	Ance/ Anergy / Audco/ Honeywell/ Kitz/ Castle/ AIP
66.	Check Valves (Water duty)	Advance / Leader/ Audco/ Kitz/ Anergy/ Castle/ AIP
67.	Ball Valves with or Without Strainer (Water duty)	Cim/ Zoloto/ Arco/ Kitz / Audco/ Castle/ AIP
68.	Suction guide	Anergy/ Rapid Control/ Emerald/ Castle/ AIP
69.	Manual Balancing Valves (Water duty)	Honeywell/ Anergy/ Audco/ Castle/ AIP
70.	Pressure Independent Control cum Balancing Valves	Sauter/ Azbil/ Belimo/ Castle/ AIP
71.	Flexible couplings for pipes	Resistoflex/ Kanwal
72.	Sensors & field devices	Greystone/Johnson/ Honeywell/ Siemens/ ACI/ Dwyer/ BEPL/ Sontay
73.	Current Relay for On/Off status	Kele/ Minilec/ Sontay
74.	Water Level Switches	Kele/ Sontay/ Sridhan/ Veksler/ ACI/ Dwyer
75.	Differential Pressure switch	Honeywell/ Siemens/ ACI/ Dwyer/ Greystone
76.	Temperature sensors	Greystone/ Siemens/ ACI/vBEPL/ Sontay/ Dwyer
77.	Flame proof Level Switch	Veksler/ Filpro/ Kele/ Sontay/ Greystone/ Dwyer
78.	DC Voltage Transducers for measuring DGSet battery voltage	ABB/ Lauritz Knudsen/ Rishabh/ Situ
79.	Pressure sensor for measuring line Pressure	ALC/ Honeywell/ Kele/ Siemens/ Sontay/ ACI/ Dwyer
80.	Building Management System//Mod Bus card/ CPM	Seimens/ Edward/ Honeywell/ TYCO/ Panasonic/ Phoenix
81.	DX split AC	O-general/ daikin/ hitachi/Carrier/Voltas
V	CCTV, LAN, IP BASED EPABX, WI-FI, ACCESS CONTROL & BOOM BARRIER SYSTEM	
1.	Cat-6A loaded jack panel, Cat-6A Patch cord, Optical Fibre Cable, Wire/Cables and other accessories	Panduit/ legrand / RNM/ commscope/D-link

2.	Network Switch/ SFP Modules	Cisco/ Extreme/ Aruba/Tejas/HFCL
3.	Wi-Fi Controller	Cisco/ Extreme/ Alcatel / Aruba/Ruckus/Cambium
4.	Wi-Fi access point	Cisco/ Extreme/ Alcatel / Aruba/ Ruckus/Cambium
5.	IP Based EPABX System	Cisco/ Extreme/ Alcatel / Avaya / NEC/Tadiran
6.	Digital Key Phone with LCD Display	Cisco/ Extreme/ Alcatel / Avaya / NEC/ Tadiran/Polycom/Aeonix
7.	Land line phone/Analog Phone	Cisco/ Extreme/ Alcatel / Avaya / NEC/ Tadiran/Polycom/ Aeonix/Arista
8.	Distribution (MDF) Box	Krone/ Hensel/ A K Electronics
9.	Equipment racks	Valrack / Netrack/ Rittal/any other OEM meeting & Tender specifications
10.	Distribution (MDF) Box	Krone /Hensel/A K Electronics
11.	Boom Barrier	Nice /SEA/ Dorma Kaba/ Came /Magnetic
12.	Projector	Panasonic/ Sony/ Hitachi/ LG / EPSON
13.	Mounting Kit	As per OEM
14.	White Board/Motorised Screen	Suvira/ Liberty/ Draper/ Dalite/ Ordain
15.	Speaker	Bose / Bosch/ Martin Audeo
16.	Audio Mixer/ Amplifier	Cisco/ Extreme/ Alcatel / Avaya / NEC
17.	DSP/ Switcher	Extron/ Crestron/ Sennheiser/ Xilica/ Audec
18.	Digital Podium	Ordain/ AHA/ Solvision
19.	21 inch interactive display	LG/ Samsung/ Sony/Panasonic
20.	HDMI Transmitter/Receiver	Kramer/ Extron/ Crestron
21.	98 inch Display/Video Wall	Panasonic/ Sony/ LG/ Samsung/ Delta
22.	Chairman/Delegate Discussion Unit & central Unit	Bose / Bosch/ Martin Audeo
23.	Wireless presentation Device	Extron/ Crestron/ Barco/ Kramer
24.	Wireless Gooseneck/Lapel/Handheld Microphone	Sennheiser/ Shure/ Audio technica
25.	PTZ Video Camera (Vedio Conference)	Panasonic/ Sony/ Bosch/Pelco/ Mobitix/ Axis/Avigilon/ Honeywell
26.	Speaker cable/ Microphone cable/ CVGA/HDMI/ Video Cable/USB Extender	Belden/ Audac/ Kramer/ Tasker
27.	Network management system/ Network Analyzer/ ITAM	Cisco/ Extreme/ Aruba/Motadata/Everest/HP
28.	Firewall	Cisco/ Palo-alto/Fortinet /Checkpoint
29.	Dome Camera/Bullet Camera/PTZ	Panasonic / Sony / Bosch / Mobotix / Impulse / Axis / Avigilon / Pelco / Honeywell and any other make having STQC certified upto the date of bid opening. Without STQC certification, CCTV camera will not be approved
VI	UPS	
1	UPS	Microtek/ V-Guard/luminous/Eaton/Schneider Electric/Vertiv/ Siemens/ Numeric

Assistant Engineer (E)-(P)
FED, CPWD, NH-IV,
Faridabad

Executive Engineer (E)
FED, CPWD, NH-IV,
Faridabad

SCHEDULE OF WORK

(MINOR COMPONENT: ELECTRICAL WORKS)

Name of work:- Up-gradation of Officer's Messes of various Units at NSG Manesar, Gurugram.

SH: Renovation and upgradation of Officer's mess of Training centre, 11 SRG and 51 SAG at NSG Manesar camp. Manesar, Gurgaon -Electrical works.

S.No.	Description of Item	Qty	Unit	Rate	Amount
	Electrical				
1	Wiring for twin control light point with 1.5 sq.mm FRLS/HFFR PVC insulated copper conductor single core cable in surface / recessed medium class PVC conduit, 2way 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.	140	Point	1803.00	252420.00
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 PVC conduit, and earthing the point with 1.5 sq. mm FRLS/HFFR PVC insulated copper conductor single core cable etc. as required.				
a)	Group B	70	Point	885.00	61950.00
3	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 medium class PVC 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 B	400	Point	1,362.00	544800.00
4	Rewiring 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 and 1.5 sq.mm FRLS/HFFR PVC insulated copper conductor single core cable as earth wire in existing surface/ recessed steel/PVC conduit including dismantling as required.				
a)	Group B	500	Point	752.00	376000.00
5	Wiring for circuit/ submain wiring along with earth wire with the following sizes of FRLS/HFFR PVC insulated copper conductor, single core cable in surface/ recessed medium class PVC conduit as required.				

a)	2 X 1.5sq.mm-+ 1X 1.5 sq. mm earth wire	600	metres	267.00	160200.00
b)	2 X 4sq.mm+ 1X4 sq. mm earth wire	1000	metres	373.00	373000.00
c)	4 X 4sq.mm +2 X 4 sq. mm earth wire	500	metres	587.00	293500.00
d)	2 X 6sq.mm+ 1X6 sq. mm earth wire	500	metres	482.00	241000.00
e)	4 X 6sq.mm+ 2X6 sq. mm earth wire	200	metres	813.00	162600.00
f)	2 X 10 sq. mm + 1 X 6 sq. mm earth wire	1500	Mtrs.	621.00	931500.00
g)	4 X 16 sq. mm + 2 X 6 sq. mm earth wire	600	metres	1454.00	872400.00
6	Supplying and drawing following sizes of FRLS/HFFR PVC insulated copper conductor, single core cable in the existing surface/ recessed steel/PVC conduit as required.				
a)	3 x 1.5 sq. mm	300	metres	104.00	31200.00
b)	3 x 4 sq. mm	300	metres	222.00	66600.00
c)	3 x 6 sq. mm	300	metres	326.00	97800.00
7	Supplying and fixing of following sizes of medium class PVC conduit along with accessories in surface/recess including cutting the wall and making good the same in case of recessed conduit as required.				
a)	20 mm	500	Metre	151.00	75500.00
b)	25 mm	500	Metre	168.00	84000.00
8	Supplying and drawing following pair 0.5 mm dia FRLS/HFFR PVC insulated annealed copper conductor, unarmored telephone cable in the existing surface/ recessed steel/ PVC conduit as required.				
a)	2 Pair	1500	Mtrs.	39.00	58500.00
9	Supplying and drawing co-axial TV cable RG-6 grade, 0.7 mm solid copper conductor PE insulated, shielded with fine tinned copper braid and protected with PVC sheath in the existing surface/ recessed steel/ PVC conduit as required.	1000	Mtrs.	54.00	54000.00
10	Supplying and fixing following modular switch/socket on the existing modular plate & switch box including connections but excluding modular plate etc. as required.				
a)	5/6 amps switch	500	Each	121.00	60500.00
b)	15/16 amps switch	70	Each	176.00	12320.00
c)	3 pin 5/6 amp socket outlet	70	Each	136.00	9520.00
d)	Telephone socket outlet	80	Each	168.00	13440.00
e)	TV antenna socket outlet	80	Each	168.00	13440.00
f)	Bell Push	70	Each	159.00	11130.00

11	Supplying and fixing two module stepped type electronic fan regulator on the existing modular plate switch box including connections but excluding modular plate etc. as required	170	Nos	402.00	68340.00
12	Supplying and fixing modular blanking plate on the existing modular plate & switch box excluding modular plate as required.	100	Nos	47.00	4700.00
13	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 (75mmX75mm)	250	Nos	354.00	88500.00
b)	3 Module (100mmX75mm)	50	Nos	384.00	19200.00
c)	4 Module (125mmX75mm)	100	Nos	401.00	40100.00
d)	6 Module (200mmX75mm)	80	Nos	462.00	36960.00
e)	8 Module (125mmX125mm)	10	Nos	517.00	5170.00
f)	12 Module (200mmX150mm)	10	Nos	614.00	6140.00
14	Supplying and fixing call bell/ buzzer suitable for single phase, 230 V, complete as required.	70	Nos.	112.00	7840.00
15	Supplying and fixing 3 pin, 5 A ceiling rose on the existing junction box/ wooden block including connections etc. as required.	20	Nos.	104.00	2080.00
16	Supplying and fixing suitable size GI box with modular plate and cover in front on surface or in recess, including providing and fixing 6 pin 5/6 & 15/16 A modular socket outlet and 15/16 A modular switch, connections etc. as required.	300	Nos.	659.00	197700.00
17	Supplying and fixing suitable size GI box with modular plate and cover in front on surface or in recess, including providing and fixing 3 pin 5/6 A modular socket outlet and 5/6 A modular switch, connections etc. as required.	300	Nos.	545.00	163500.00
18	Supplying and fixing suitable size GI box with modular plate and cover in front on surface or in recess, including providing and fixing 2 nos. 3 pin 5/6 A modular socket outlet and 2 nos. 5/6 A modular switch, connections etc. as required. (For light plugs to be used in non residential buildings).	100	Nos.	757.00	75700.00
19	Supplying & fixing suitable size GI box with modular plate and cover in front on surface or in recess including providing and fixing 25 A modular socket outlet and 25 A modular SP MCB, "C" curve including connections, painting etc. as required.	200	Each	807.00	161400.00

20	SITC of modular type 16A keycard in 2-module alongwith key-hob suitable for operation on 230V, 50Hz AC supply etc as required	70	Each	6751.00	472570.00
21	Supplying & Laying of one number PVC insulated and PVC sheathed/XLPE armoured power Aluminium cable of 1.1 KV grade of following size in the existing masonry open duct as required.				
a)	3.5 x 400 Sqmm	100	Mtr.	5,417.00	541700.00
22	Supplying & Laying of one number PVC insulated and PVC sheathed/XLPE armoured power Aluminium cable of 1.1 KV grade of following size in the existing RCC/HUME/METAL pipe as required.				
a)	3.5 x 50 Sqmm	1000	Mtr.	895.00	895000.00
23	Supplying and making end termination with brass compression gland and aluminium lugs for following size of PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 KV grade as required.				
a)	3.5 X 50 sq. mm (35mm)	50	Nos.	484.00	24200.00
b)	3.5 X 400 sq. mm (82mm)	8	Nos.	1,713.00	13704.00
24	Supplying and making straight through joint with heat shrinkable kit including ferrules and other jointing materials for following size of PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 KV grade as required.				
a)	3.5 X 400 sq. mm	6	Each	8,541.00	51246.00
b)	3.5 X 50 sq. mm	10	Each	2,698.00	26980.00
25	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)	100	Mtrs.	289.00	28900.00
b)	160 mm dia (OD-160 mm & ID-135 mm nominal)	80	Mtrs.	537.00	42960.00
26	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. in the existing trench, complete as required.				
a)	63 mm dia (OD-63 mm & ID-51 mm nominal)	30	Mtrs.	136.00	4080.00

b)	160 mm dia (OD-160 mm & ID-135 mm nominal)	30	Mtrs.	385.00	11550.00
27	The road crossings of power cable through trenchless boring. Trenchless horizontal boring using Manual/ Machine Moling technique at 0.75 metre below the ground level for following size pipes, including survey of under ground tilities, excavation of pits, moling with the hole size not exceeding 20% of the pipe dia, backfilling, compaction and restoration of the pits to original condition etc. as required. The rates for moling, as indicated are inclusive of xcavation of pits, backfilling, compaction and restoration of the pits to original condition. Any damages occurred to other utilities during the Moling operation shall be immediately notified and rectified by the contractor without any cost implication to the Department. The length of the Hole (excluding the sizes of the pits on both ends) shall be considered for the measurement of Moling length. However, intermediate pits will consider in the moling length.i) Upto 200 mm dia DWC HDPE / G.I. /PVC	50	Mtrs.	754.00	37700.00
28	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	70	Each	2773.00	194110.00
b)	16 way, Double door	10	Each	3367.00	33670.00
29	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 + 24), Double door	6	Each	6337.00	38022.00
30	Supplying and fixing of following ways surface/ recess mounting, vertical type, 415 V, TPN MCB distribution board of sheet steel, dust protected, duly powder painted, inclusive of 200 A tinned copper bus bar, common neutral link, earth bar, din bar for mounting MCBs (but without MCBs and incomer) as required . (Note : Vertical type MCB TPDB is normally used where 3 phase outlets are required.)				
a)	4 way (4 + 12), Double door	6	Nos.	7951.00	47706.00

31	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 Voltage 690V etc. as required.				
a)	100 A, 16 KA,TPMCCB	6	Each	4003.00	24018.00
32	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	544	Nos.	285.00	155040.00
b)	Triple pole	24	Each	1070.00	25680.00
33	Supplying and fixing following rating, double pole, 240 V, isolator in the existing MCB DB complete with connections, testing and commissioning etc. as required.				
a)	40 Amp	80	Each	472.00	37760.00
34	Supplying and fixing following rating, double pole, (single phase and neutral), 240 V, residual current circuit breaker (RCCB), having a sensitivity current 30 mA in the existing MCB DB complete with connections, testing and commissioning etc. as required.				
a)	40A	80	Each	2512.00	200960.00
35	Supplying and fixing following rating, four pole, 415 V, isolator in the existing MCB DB complete with connections, testing and commissioning etc. as required.				
a)	63 A	6	Each	1115.00	6690.00
36	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)	63 amps	6	Nos.	3597.00	21582.00
37	Supplying and fixing Cable End Box (Loose Wire Box) suitable for following single pole and neutral, sheet steel, MCB distribution board, 240 Volts, on surface/ recess, complete with testing and commissioning etc. as required.				
a)	For 14 way, Double door SPN MCBDB	80	Each	990.00	79200.00

38	Supplying and fixing Cable End Box (Loose Wire Box) suitable for following triple pole and neutral, sheet steel, MCB distribution board, 415 Volts, on surface/ recess, complete with testing and commissioning etc.as required.				
a)	For 8 way, Double door TPN MCBDB	12	Each	1448.00	17376.00
39	Earthing with G.I. earth pipe 4.5 Meter 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.	12	Set	7658.00	91896.00
40	Providing and fixing 25 mm X 5 mm G.I. strip on surface or in recess for connections etc. as required.	100	metres	287.00	28700.00
41	Providing and fixing 6 SWG dia G.I. wire on surface or in recess for loop earthing as required.	200	metres	84.00	16800.00
42	Supplying, installation, testing and commissioning of Astronomical time switch of following configuration to be mounted in feeder pillars / Lighting DBs for automatic switching On & OFF of street lights at sun set & sun rise or twilight (Auto ON, Auto OFF, Auto modes) with manual override facility with 12/24 hour display format with suitable battery and indication for relay status i/c programming at site complete as required.				
a)	1 output per phase and suitable for single phase supply	10	Nos.	4673.00	46730.00
43	Supplying, installation, testing and commissioning of Passive Infrared (PIR) technology based occupancy sensor having high performance, non regulating programmable type, suitable for connected load upto 10Amp, for mounting height up to 2.8 mtr and for 5 m diameter coverage area along with necessary fixing arrangements i/c programming at site etc. complete as required.	30	Nos.	4896.00	146880.00

44	Brush Less Direct Current (BLDC) Fan without Remote 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%, suitable for operation with regulator for speed control and all remaining accessories including safety pin, nut bolts, washers, temperature rise=75 0C (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 (Minimum)	170	Each	2695.00	458150.00
45	SITC of 250mm sweep plastic body fresh- air fan, single phase 220-250V, Air flow capacity 800 CMH or better,1310 rpm with 2 year warranty on the existing opening of wall/ window i/c making good the damage, connections etc. as reqd.	70	Nos.	2086.00	146020.00
46	Supplying, Installation, Testing & Commissioning of heavy duty 450 mm sweep, 6 pole, single phase, 900 rpm, propeller type ventilating exhaust fan on the existing ventilator/opening complete with connection, testing & commissioning etc. as required.	18	Nos.	6139.00	110502.00
47	Supplying, Installation, Testing & Commissioning of Wall mounted fan 400 mm sweep, single phase 240V 50 Hz, 2100 rpm, complete with connection, testing & commissioning etc. as required.	40	Nos.	2327.00	93080.00

48	LED Panel light 2x2 ft. (System lumen efficacy ≥ 105 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), 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) 1.20 mm)				
a)	40 watt	80	Nos.	2,681.00	2,14,480.00
49	SITC of single head wall bracket fitting made of SS with PC/glass diffuser of required shape complete with B22 holder with 9 watt LED lamp, complete including connection with 1.5 sqmm FRLS PVC insulated copper conductor single core cable etc as reqd.	80	Nos.	2184.00	174720.00
50	SITC of double head wall bracket fitting made of SS with PC/glass diffuser of required shape complete with B22 holder with 9 watt LED lamp, complete including connection with 1.5 sqmm FRLS PVC insulated copper conductor single core cable etc as reqd.	15	Nos.	2219.00	33285.00
51	Supply, installation, testing & commissioning of LED (Warm Light) Single Phase Track Mounted Light fixture , housing made up of Die-cast Aluminium with PC/Glass Diffuser delivering a minimum system lumens of 3000 lumens and minimum system luminous efficacy of 100 lm/w, average life L70B50: 50000 hours, THD $\leq 10\%$, suitable for operation on 140-270V, 1 Φ , 50Hz AC supply system, suitable for mounting on single phase 3 wire universal track system including connections and earthing etc. as required. The colour and beam angle of fixture will be as per directions of Engineer-in-charge. [Make - Lighting Technologies OR Phillips/Regent/Havells] etc. as required.	80	Nos.	4123.00	329840.00
52	Supply & fixing of 2 metre length 3-wire Single phase metallic track along with all accessories etc. as req. It should be of the same make and colour as of the track lights.	20	Nos	3754.00	75080.00

53	LED Batten light (System lumen efficacy ≥ 120 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, 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 3000°K / 4000°K / 5700°K /6500°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 ≥ 120 <135 lm/Watt output . LM79 & LM80 Test report and all testing required for LED fixtures as per BIS shall be submitted. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above 90°C).Powder coated die cast /Extruded aluminium Body (Thickness > 1.20 mm)				
a)	18-22 Watt	140	Nos.	734.00	102760.00
54	Supply, installation, testing, and commissioning of integrated LED Mirror light (Batten) luminaire, 600 mm (nominal size) with a minimum system lumen output of 1000 lumen and with a minimum system luminous efficacy of 100 lm/W,efficacy directly on wall including connection with 1.5 sqmm FRLS PVC insulated copper conductor single core cable, made of aluminium housing having a colour temperature 5500K-6500K, Average life L70B50: 50000 hours, suitable for operation on 140-270V, 1 Φ , 50Hz AC supply system, complete with all accessories, electronic driver, diffuser, directly on the ceiling/wall, including connections, earthing, etc. as required.	70	Nos.	762.00	53340.00

55	Supply, installation, testing and commissioning of LED Foot Step Light, 3 W, recessed wall mounted, pressure die-cast aluminium housing with recessed back box (CRCA) powder coating, polycarbonate diffuser, minimum 35 lm/W efficacy, colour temperature 3000K/4000K/6500K as approved, IP66 & IK06 protection, CRI ≥80, SDCM<5, suitable for operation on 140–270 V AC, 50 Hz, complete with inbuilt electronic driver, mounting box, connection with 1.5 sq.mm FRLS PVC insulated copper conductor cable, earthing and all accessories required for complete installation.	70	Nos.	804.00	56280.00
56	Supply, installation, testing, and commissioning of LED bulkhead fittings with IP 66 ingress protection, with a minimum system lumen output of 1000 lumens and a minimum system luminous efficacy of 100 lm/W, made of aluminium housing having a colour temperature of 5500K–6500 K, average life L70B50: 50000 hours, suitable for operation on 140-270V, 1Φ, 50Hz AC supply system, complete with all accessories, diffuser, electronic driver, etc. as required directly on the wall, including connections, etc. as required.	10	Each	1564.00	15640.00
57	Supplying, Installation, Testing & Commissioning of LED Recessed/ 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 - 50C to 400C, 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, Dri <3, 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 ≥105 and <120 lm/Watt output . LM79 & LM80 Test report and all testing required for LED fixtures as per BIS shall be submitted. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium				

a)	housing such that LED junction temperature shall not rise above 90°C) Powder coated die cast /Extruded aluminium Body including trim Powder coated die cast /Extruded aluminium Body including trim 18 watt	80	Each	920.00	73600.00
58	LED Flood Light, powder coated pressure die cast aluminium (System lumen efficacy ≥120 and 85%, Input voltage: Input voltage: 140-270 Volt AC, frequency 50/60 hz, Operating temp range -5 0C to 50 0C, internal surge protection 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, EMI-EMC as per CISPR-15, lenses for beam angle 30 deg-120deg as per the application and the project requirement, suitable tilt able fitting, 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 and <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).				
a)	100 Watt	3	Nos.	2,467.00	7401.00

59	PEL LED INFINITE SERIES LIGHT - Automatically Switches-ON mains power failure and ed duration, after which the batteryprovides illumination on battery source for speci gets automatically cut-off, to facilitate quick recharge on resumption of main supply. Once the battery is totally charged it automatically slides into trickle charge to constantly retain the charge and be ready for immediate use. Non Maintained. CONFORMS TO : IS - 10322, ingress protection : IP 20, 600 mm, Housing : Aluminium Extruded Flame Retardant, paint & Colour : Epoxy polyester powder coating, White in colour, Diffuser : Opal, Supply voltage : 230VAC, Supply current : 50mA max, LED Make : Edison. Wattage : 10W, Luminous flux : >190LM, Ambient temperature : 25°C-60°C, 180 Minute Battery Backup, Type : Non-Maintained, Automatic switching : Relay, Ra : > 40.	8	Nos	7245.00	57960.00
60	Supply of BIS Certified Self Contained Rechargeable Surface Mounted Emergency Egress Routes Lighting , Maintained Type , ingress protection IP 20 , Housing CRCA Sheet 22 SWG fabricated, Message printed on 2mm thick milky acrylic, Supply voltage 230VAC, Supply current 50mA max, Number of LEDs - 20 (0.2W), Viewing distance 24M, Ambient temperature -25°C to +60°C, , INDICATIONS Mains ON: Red LED ON, CIRCUIT POWER - Overall: 5W - On mains (LED): 3W - On battery (LED): 3W, PROTECTION - Protection class: Class I, Low battery cut-off: 2.4±0.1V ,Over charge cut-off: 4.2±0.1V , BATTERY - Charging method: Constant Voltage - Back-up duration: 120 minutes - Recharging period: 10-18 hours - Battery type: 3.7V lithium ion - Battery capacity: 2200mAH, Conforms to IS 10322, BIS Certified Part 5 / Sec - 8	8	Nos	7079.00	56632.00

61	Supply of BIS Certified Self Contained Rechargeable Surface mount Single sided, maintained 3 watt led, fire exit luminaries with left , right, straight directions and exit ,made with multiple LED. Made up of Cold Rolled Close Annealed Sheet 22 SWG fabricated, Message printed on 8mm clear polycarbonate diffuser. With Supply voltage 230VAC, Supply current 50mA max, Ambient temperature - 25°C to +60°C, , INDICATIONS Mains ON: Red LED ON, CIRCUIT POWER. Protection class: Class I, Low battery cut-off, Over charge cut-off short circuit and reverse polarity protection, BATTERY - Charging method: Constant Voltage - Back-up duration: 120 minutes - Recharging period: 10- 18 hours - Battery type: SMF compact rechargeable batteries, (Impact Test) IK 05 protection, with surge protection and high insulation resistance.BIS Certified as per IS 10322 Part 5 Section 8 : 2013 and IP 65 ingress protection.	8	Nos	5584.00	44672.00
62	Fabrication, Supplying, Installation, Testing of floor mounted dust & vermin proof with IP42 protection , front openable, compartmentised, cubical type meter board made out of 2 mm thick MS sheet of suitable size etc as req. Loose wire box on bottom of Meter Board of suitable size with 4 Strip 500 Amp. Al. bus bars complete with brass screws, PVC tapping etc. MCB, neutral link and Providing & fixing 6 mm thick bakelite sheet on the back, complete with hinged covers having locking arrangement, wire mesh screen for meter reading and with the following mounting i/c connection, inter connection with suitable size of copper conductor cable not less than 16 Sqmm. i/c testing, commissioning complete with power coating with following accessories etc. as required.				

	Incomer 400A TP 36KA MCCB with Microprocessor Base for O/L S/C Protection Release. - 1 Extended Rotatory Handle & Spreaders - 1 6A SP 10KA MCB - 3 Digital Amp Meter With Selector Switch- 1 Digital Volt Meter With Selector Switch - 1 R,Y,B Indication Lamps -3 CT's 400/5A 15VA Class-1.0 - 3 BUS BAR :- 500A TPN ALU BUS BAR Outgoing 250A TP 25KA MCCB with Thermal Magnetic Base for O/L S/C Protection Release -1 Extended Rotatory Handle & Spreaders-1 200A TP 25KA MCCB with Thermal Magnetic Base for O/L S/C Protection Release - 1 Extended Rotatory Handle & Spreaders - 1 160A TP 25KA MCCB with Thermal Magnetic Base for O/L S/C Protection Release - 2 Extended Rotatory Handle & Spreaders - 2 125A TP 25KA MCCB with Thermal Magnetic Base for O/L S/C Protection Release- 3 Extended Rotatory Handle & Spreaders - 3 100A TP 25KA MCCB with Thermal Magnetic Base for O/L S/C Protection Release - 3 Extended Rotatory Handle & Spreaders -3	3	Job	2,70,436.00	811308.00
	EPBAX				
63	Supplying, fixing, testing and commissioning of 64 Port SIP/ IP EPABX System expandble model with mother board and CPU card having all standard features of IP/SIP EPABX System complete as reqd. (Without Extension card) (Make NEC/Hindustan Communications/ Cisco) a) 19" 2U Chassis (Cabnet) - Model No. CHS2UG-EU 1 No.b) Main Processor Blade (CPU) - Model No. GCD-CP20 - 1 No. c) SD Card - Model No. SD-A1 OT. d) 19" Rack Mount kit for 2U Chassis	3	No	213092.00	639276.00
64	Supplying, Installation, Testing & Commissioning of Analog phones having standard feautres like 16 digit LCD display, 2 way speaker, caller ID and number storage facility etc. complete as required.	80	Nos.	1,544.00	123520.00

65	Supplying and drawing 20 Pair 0.5 mm dia FRLS PVC insulated annealed copper conductor, unarmored telephone cable in the existing surface/ recessed steel/ PVC Conduit etc. complete as required.	500	Mtr	344.00	172000.00
66	Supplying, Installation, Testing and commissioning of following CAT6A Patch Cord should have ETL/UL verification program certificate for compliance with ANSI/TIA-568.2-D etc. complete as required.				
(a)	Copper Patch Cords of length 1m (3ft)	80	Mtr	173.00	13840.00
67	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)	9U Rack	3	Nos.	8,960.00	26880.00
68	Supplying & fixing of 20 Pair Krone Box with locking arrangement on surface of wall with rawl plug and screw having inbuilt same no. of pair krone module i/c pairing of each cable, washing with petrol/thinner, feruling, punching, testing etc. complete as reqd.				
		6	Nos.	2,343.00	14058.00
69	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 Insulated Gate Bipolar Transistor (IGBT)'s both for the rectifier & inverter (3 Level) with PWM (Pulse Width Modulation). The quality of design, manufacturing and inspection process should confirm to the relevant 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(THD) on the input grid shall be < 5% at 50 %load. (The required LC (inductor (L) and a capacitor (C)) filters shall be included in UPS cost), extreme power factor kit to be included to limit the input power factor (PF) to 0.99 and output power factor shall be unity (i.e. kw rating of the UPS shall be kva rating x 1), however UPS shall be suitable to take load at 0.7 lagging to 0.7 leading power factor loads. UPS shall be suitable for incoming supply AC : 3Phase 400V +/-20%, 50 Hz +/-5 Hz, AC Output voltage: 3Phase 415 Volt, 50 Hz +/- 0.2Hz, Overload capacity of 120% for 10 mins, Sine wave output. Non condensing, noise level less than 60db at 1 meter distance, protections: Input Under voltage over voltage, abnormal out voltage, battery over charging, output over current, short circuit protection, battery deep discharge protection, 10KV surge. UPS must comply with low voltage electromagnetic compatibility (EMC) achieved as per EN 6204, EN6204 Part I and Part 2, it shall be a Voltage and Frequency Independent (VFI)-type UPS. Communication RS232/RS485/ SNMP port open protocol for BMS integration, all hardware & software for IoT Communication as per approved by Engineering in charge. Required battery racks and interconnecting				

	copper conductor cables of suitable size and connectors and all required accessories are inclusive of the cost). This system must provide a means for logging and alarming of all monitored points plus email notification. Forced air-cooling with integral inbuilt fans with redundancy (if one fan fail UPS should be able to handle at least 80% of the load, Noise Level 65 DB at 1 meter distance. The system shall be in compliance IEC 62040- 1,2 & 3, IS: 16242 and CPWD Specification. Display Panel (minimum) (In-build 5 inch or more LC Display /LED) to display : a) Input: Voltage, current, Frequency. b) Bypass: Voltage, Frequency. c) Output: Voltage, frequency, Current. d) Battery: Voltage, Capacity. e) Load: KVA, KW, Percentage. f) Temperature: STS, Inverter, PFC. g) Event Logging & Statistical Data (On LCD/LED): UPS should capture and display up to 3000 events like: Over temperature / DC Bus Fail / Fan Fail / Fuse Fail / Overload / Short-circuit / Device Fail / Inverter Fail / Rectifier Fail / Bypass Fail, etc. h) Statistical Data: No. of power failures / Transfers to Bypass /Total Running time, etc. i) Mains Mode of Operation /Battery Mode of Operation / Bypass feeding the load / UPS Fault /Battery charging and discharging, overload, battery voltage and battery capacity. j) Audible Alarms : Mains Failure, Battery Low Alarm, UPS Overload, Fault, Shutdown, Input Over, Under Voltage, Output Over, Under Voltage,				
	Battery Over, Under Voltage, Over Load and short circuit, Over Temperature. The UPS should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location etc				
(a)	10KVA (Each Power module shall be < 10 KVA)	3	Each	208893.00	626679.00
70	Fabricating and supplying of 18 guage powder coated stand with cross strips made out of ms sheet of suitable size for accommodating for above UPS system and fixing the same on surface of wall with screws,rawl plugs, dash fastners etc. as reqd.	3	No	2263.00	6789.00
	Air-conditioning				

71	Supply, Installation, Testing & Commissioning of Modular type Variable Refrigerant Flow/Variable Refrigerant Volume air cooled Outdoor units suitable for cooling/heating having 100% hermetically sealed inverter type twin Rotary/Scroll Compressor(s), minimum two compressors (with individual separate PCB) for above 14HP modules, microprocessor based Controller, top discharge type condensing unit(s), with R-410-A Refrigerant or equivalent, vibration Isolators with suitable foundation etc. complete as required. To have better efficiency condenser fan shall be capable to operate at different speed with respect to load. The unit shall deliver the rated capacity and in confirmation as per IS 18728:2024 and CPWD Specifications and work even at 50°C ambient temperature without tripping. The system shall be able to deliver 100% of the rated capacity upto 39 Degree Celcius. The unit shall be suitable to work on 400V +/- 10%, 3 Phase, 50Hz AC power supply and BMS compatible. The unit shall be filled with first charge of the refrigerant and ready for use as required. The condenser should be coated with a hydrophilic film to prevent water accumulation on the surface of the heat exchanger, enhance water dispersion, and reduce the risk of degradation, thereby improving overall performance and durability. The Indian Seasonal Energy Efficiency Ratio (ISEER) of the unit shall be as per Energy				
	Conservation and Sustainable Building Code (ECSBC) 2024 as below and complete as per CPWD specification, connections, inter connections etc. as required. (For capacity <40 kWr ISEER 6.4, Capacity > 40 and <70 ISEER 6.5, Capacity > 70 ISEER 6.6 for ECSBC+ Building) For Cooling or Heating or Both				
a)	10 HP to 12 HP	60	Per HP	21,422.00	1285320.00
b)	14 HP to 22 HP	80	Per HP	20,385.00	1630800.00

72	INDOOR UNIT Supplying, 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 $\pm$ 10%, 50Hz AC supply, complete, as required. The Indoor units must shut down upon receiving a signal from the BMS System/Fire Signals. The system shall be capable to adjust air flow as per room requirement in auto mode. The cooling capacity of indoor unit will be at air inlet conditions of 27 0C DB and 19 0C WB temperature. (Make will be same as of Outdoor)				
a)	2.0 TR	10	Each	39,734.00	397340.00
b)	4.1 TR	40	Each	45,781.00	1831240.00
73	Supplying, Installation, testing and commissioning including vaccumiazation 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)	9.5 mm dia (OD) (Soft drawn) with tube thickness 1.2 mm with 19 mm thick insulation	300	Mtr	346.00	103800.00
b)	12.7 mm dia (OD) (Soft drawn) with tube thickness 1.2 mm with 19 mm thick insulation	300	Mtr	487.00	146100.00
c)	15.86 mm dia (OD) (Soft drawn) with tube thickness 1.2 mm with 19 mm thick insulation	300	Mtr	615.00	184500.00
e)	22.2 mm dia (OD) (Hard drawn) with tube thickness 1.2 mm with 19 mm thick insulation	150	Mtr	904.00	135600.00
f)	25.4 mm dia (OD) (Hard drawn) with tube thickness 1.2 mm	150	Mtr	1068.00	160200.00
g)	28.58 mm dia (OD) (Hard drawn) with tube thickness 1.2 mm with 19 mm thick insulation	150	Mtr	1157.00	173550.00

h)	Supplying, Installation, Testing and Commissioning of Y/T/Multi Joints. Joints shall be of same Original Equipment Manufacturer (OEM) make as of ODUs and IDUs				
i)	Indoor Units	50	Each	4535.00	226750.00
74	Supplying, Laying and fixing of one number stranded copper conductor, XLPE Insulated, PVC sheathed, armoured power cable of 1.1 kV grade , confirming to IS : 7098 (Part-1) 1988 of following size in the existing PVC/ METAL pipe as required.				
a)	3Cx2.5 sq.mm (communication cable for ODU & IDU)	400	metres	413.00	165200.00
b)	4 c x 4.0 sq. mm (power cable IDU)	400	metres	732.00	292800.00
c)	4 c x 10.0 sq. mm (power cable ODU)	200	metres	1698.00	339600.00
d)	4 c x 16.0 sq. mm (power cable ODU)	200	metres	2483.00	496600.00
75	Supplying , Installation, Testing and Commissioning of Air Cooled Hi Wall split type Air conditioners complete with Indoor unit(IDU), Out door unit (ODU), surface / concealed copper Refrigerant piping with insulation (closed cell elastomeric nitrile rubber tubular pipe section) upto 3 Mtr (IDU to ODU), copper power cable upto 3.5 Mtr (IDU to ODU) i/c drain pipe R-32/R-410/ R-407 Green Refrigerant, wireless Remote control, suitable for working between 180 260V with low & high voltage cutoff and 50 hz ,1 phase AC supply capable of performing cooling, dehumidification, air circulation of following capacity with Scroll / rotary compressor. The system shall be able to deliver 100% of the rated capacity upto 42 0C. Min 5 year Original Equipment Manufacturer (OEM) warranty both compressor and Printed Circuit Board (PCB). Must comply : Electrical cable IS 694 or IS 9968 temperature sensing control IS /International Electrotechnical Commission (IEC) 60730, hermetic compressor IS 10617, heat exchanger IS 11329, capacitor IS 2993 and motor IS 12615. Complete as per CPWD specification and IS : 1391 Part II 2023. The system shall be able to operate up to 50 0C (out door ambient temperature). Inverter Type - Cooling only				
a)	2.0 TR with 5 Star BEE Rating	64	Each	57396.00	3673344.00
76	Structural steel work riveted, bolted or welded in built up sections, trusses and framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer all complete. [For Fabricating frame ODUs of split AC -.Design/Shape will be decided by Engineer-in-charge]	1000	kg	133.70	133700.00

77	All the bearing of motor and fans should be outside the air stream. wherever required, necessary vibration isolation arrangement as per specification complete etc as reqd at site.				
a)	Air Qty-10000 CFM at 70mm static	3	Nos.	463566.00	1390698.00
78	Supply of factory built floor mounted double skin type horizontal/vertical/ ceiling suspended air washer system units made of 25mm thick panels consisting of pre plasticized G.I. casing of thickness 0.6mm outside layer and 0.6 mm plain GI inside layer with polyurethane foam (PUF) insulation factory injected between them by injection moulding machine, complete with intake louver in powder coated Aluminium construction bird screen, 50 mm thick prefilter with synthetic and washable media with Aluminium frame, 200 mm deep cellulose pad for adiabatic cooling GI/ FRP spray distributor will be provided over cell pad to evenly distribute water on cell pad. 20 Gauge SS-304 sump with supply, overflow, quickfill, drain connection. Spray tank will be provided with float valve on makeup line and SS strainer on water suction line for pump. single/ three phase pump monoblock pump for water circulation with ball valves. CPVC line for suction and discharge. Two bend PVC eliminator to stop carryover of water particles along with air, DIDW centrifugal Backward curved fans TEFC squirrel cage induction motor of IE-2 efficiency suitable for $415 \pm 10\%$ volts suitable for VFD operation, 50Hz, 3 Phase AC supply. anti vibration mount 10 avoid transmission of vibration on casing.				
	Fan outlet will be connected with fire retardant, lint free canvas connection, V belt and pulley set for power transmission between motor and fan complete etc as reqd at site.				
(a)	6000 CFM@70mm Static	3	Nos.	186434.00	559302.00
79	Supply, Installation, Testing and commissioning of Exhaust hood duly constructed with superior quality Stainless steel 18G SS 304 with standard viscous baffle filters with oil collection box on rear and side in each piece, fume resistance bulk head light with glass complete with ceiling hangers, rods, angles and heat resistance wiring complete etc as reqd.				
a)	1000 x 600 width x height	35	Ft	15538.00	543830.00

80	Supplying, installation, balancing and commissioning of fabricated at site 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 with IS : 655 and approved drawings and specifications of following sheet thickness complete as required.				
a)	Thickness 0.80 mm sheet	200	sq. m	1415.00	283000.00
81	Supply, and fixing flexible convass duct connector between air handling unit and duct to avoid transfer of viberation from AHU to duct. flaxible connector will have GI flange on both side with gasketing. connector will be with duct and AHU with nut and bolts of suitable size complete etc as reqd at site.	3	Job	6083.00	18249.00
82	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.	6	sq. m	6285.00	37710.00
83	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.	6	sq. m	7580.00	45480.00
84	Supplying & laying of following sizes of 1.1 KV grid multicore copper conductor XLPE insulated and fire retardant PVC sheated armoured cable as per IS 7098 (part-1)1988 on surface of wall/ceiling/on existing cable tray complete as required.				
a)	4Cx10 Sqmm- Copper Armoured	150	Mtr.	1,698.00	254700.00
b)	3x1.5 sqmm- Copper Armoured	250	Mtr.	285.00	71250.00
85	Supplying and installing following size of perforated Hot Dipped Galvanised Iron cable tray (Galvanisation thickness not less than 50 microns) with perforation not more than 17.5%, in convenient sections, joined with connectors, suspended from the ceiling with two numbers GI Suspenders i/c base of suitable size GI angle, GI bolts & nuts, fastner etc as required.				
a)	100 mm width X 50 mm depth X 1.6 mm thickness	50	Meter	754.00	37700.00

86	Making the opening in Brick Masonry including dismantling in floor or walls by cutting masonry and making good the damages to wall, flooring and jambs complete, to match the existing surface i/c disposal of mulba/ rubbish to the nearest municipal dumping ground. all complete as per direction of Engineer-in charge etc as reqd.	10	Sqm.	1,264.35	12644.00
87	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.				
a)	25 mm nominal dia Pipes	80	Mtr.	401.55	32124.00
88	Providing and fixing gun metal gate valve with C.I. wheel of approved quality (screwed end) :				
a)	25 mm nominal bore	6	Each	622.40	3734.00
89	Fabrication supplying, Installation, Testing and commissioning of Outdoor type compartmentalised feeder pillar made out of 2 mm thick and 350 mm deep CRCA sheet with trappered roof having both sides cable alleys and bus bar chamber, double door arrangement on front and back side (with two leaf doors on front with) with locking arrangement. having suitable size four strip aluminium bus bar of full length with base frame made out of 50 mm x 50 mm x 6 mm (thick) angle iron having 30 cm legs i/c apron plates all around of not less than 200 mm with complete with connection and interconnections with 2.5 sq.mm PVC insulated FRLS copper conductor cable/ insulated copper conductor strip of appropriate size and terminal block (on outgoing) there in, duly power coated, labelling, i/c entire length panel shall have a common copper earth strip of size 20mm x 3mm at the rear with 2 Nos. earth stud, etc as reqd.	6	Sq mtr	28073.00	168438.00
90	Supplying & fixing following switchgears & accessories in the existing cubical panel i/c spreaders connection etc. complete as reqd.				
a)	63 Amp 16ka FP MCCB	3	Nos.	11822.00	35466.00
b)	40 A 16 KA FP MCCB	3	Nos.	11822.00	35466.00

c)	96mm x 96mm 0-500 volt digital 3-ph. Voltmeter with built in selector switch	6	Nos.	2189.00	13134.00
d)	96mm x 96mm suitable range digital 3-ph. Ammeter with built in selector switch	6	Nos.	2189.00	13134.00
e)	LED type indicating light set for main incoming R-Y-B	18	Nos.	196.00	3528.00
f)	Star Delta Starter suitable for upto 22.0 Kw motor	3	Nos.	16036.00	48108.00
g)	DOL starter suitable for upto 5.5Kw motor	3	Nos.	6099.00	18297.00
h)	ON/OFF switch	12	Nos.	340.00	4080.00
i)	Auto/Manual selector switch	6	Nos.	485.00	2910.00
j)	Handle	6	Nos.	804.00	4824.00
	<u>Fire Alarm System</u>				
91	Supplying, installation, testing & commissioning of smoke detector with builtin LED and mounting base complete with all connections etc. as required.	100	Each	1223.00	122300.00
92	Supplying, installation, testing & commissioning of heat detector operating at 54°C/57°C with rate of rise cum fixed temperature (dual thermistor) type with mounting base complete with all connection etc. as required.	15	Each	1136.00	17040.00
93	Supplying, installation, testing & commissioning response indicator on surface/recess MS box having two LEDs metallic cover complete with all connections etc. as required.	50	Each	222.00	11100.00
94	Supplying, installation, testing & commissioning of manual call box of ABS type in surface/recess with stainless steel chain & hammer assembly complete with glass and push button etc. as required.	20	Each	444.00	8880.00
95	Supplying, installation, testing & commissioning fire alarm sounder with facility to make announcement, mounted in A.B.S. box with hinged cover plate & suitable for operation with amplifier i/c line matching transformer etc. complete as required.	20	Each	530.00	10600.00

96	Supplying, installation, testing & commissioning sector panel suitable for following zones, complete with visual indications for short circuit fault, open circuit fault, fire condition and all other standard facilities as per IS:2189 with mimic diagram for all area/zone covered, complete with all connections, interconnections as required.				
(a)	4 Zone	3	Each	9808.00	29424.00
97	Supplying & laying of 2 x 1.5 sqmm fire alarm armoured cable, 600/1000V rated with annealed copper conductor having XLPE insulation, steel wire armouring & FRLS outer sheath complete as required.	900	Mtr	192.00	172800.00
	Fire Fighting System				
98	Supplying, installation, testing and commissioning of electric driven terrace pump suitable for automatic operation and consisting of following, complete in all respects, as required: (Terrace Pump) (a) Horizontal type, multistage, centrifugal, split casing pump of cast iron body & bronze impeller with stainless steel shaft, mechanical confirming to IS : 1520 b) Suitable HP squirell cage induction motor TEFC type suitable for operation on 415 volts, 3 phase, 50 Hz, AC supply with IP55 class of protection for enclosure, horizontal foot mounted type with Class-'F' insulation, conforming to IS-325. (c) M.S.fabricated common base plate, coupling, coupling guard, foundation bolts etc.as required. (d) Suitable cement concrete foundation duly plastered				
(a)	450 lpm at 35 m Head	6	Each	91384.00	548304.00
99	Providing, laying, testing & commissioning of 'C' class heavy duty MS pipe conforming to IS 3589/IS 1239 including Welding, fittings like elbows, tees, flanges, tapers, nuts bolts, gaskets etc. and fixing the pipe on the wall/ceiling with suitable clamp/support frame and painting with two or more coats of synthetic enamel paint of required shade complete as required :				
(a)	80 mm dia	500	METER	2277.00	1138500.00
100	Supplying and fixing single headed internal hydrant valve with instantaneous Gunmetal/Stainless Steel coupling of 63 mm dia with cast iron wheel ISI marked conforming to IS 5290 (Type -A) with blank Gunmetal/Stainless Steel cap and chain as required :				
(a)	Single headed Stainless steel	4	Each	6632.00	26528.00

101	Supplying, fixing, testing and commissioning of butterfly valve of PN 1.6 rating with bronze/gunmetal seat duly ISI marked complete with nuts, bolts, washers, gaskets conforming to IS 13095 of following sizes as required :				
(a)	80mm dia	28	Each	5406.00	151368.00
102	Supplying, fixing, testing & commissioning of double flanged sluice valve of rating PN 1.6 with non rising spindle, bronze/gun metal seat, ISI marked complete with nuts, bolts, washers, gaskets and conforming to IS 780 of following sizes as required :				
a)	80mm dia	14	Each	11386.00	159404.00
103	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/cm2 complete as required.	6	Each	1424.00	8544.00
104	Providing, installation, testing and commissioning of non-return valve of following sizes confirming to IS: 5312 complete with rubber gasket, GI bolts, nuts, washers etc.as required :				
(a)	80 mm dia	14	EACH	8255.00	115570.00
105	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)	80 mm dia	5	EACH	5117.00	25585.00
106	Supplying and fixing 63 mm dia, 15 m long RRL hose pipe with 63 mm dia male and female couplings duly bound with GI wire, rivets etc. conforming to IS 636 (type-A) as required:				
(a)	Stainless Steel (Grade 304)	8	EACH	4667.00	37336.00
107	Supplying and fixing first-aid Hose Reel with MS construction spray painted in post office red, conforming to IS 884 complete with the following as required. 20 mm nominal internal dia water hose thermoplastic (Textile reinforced) type -2 as per IS: 12585 20 mm nominal internal dia gun metal globe valve & nozzle. Drum and brackets for fixing the equipments on wall. Connections from riser with 25 mm dia stop gun metal valve & M.S. Pipe and socket.				

(a)	30 m	10	EACH	9440.00	94400.00
108	Supplying & fixing 63 mm dia gun metal short branch pipe with 20 mm nominal internal diameter size nozzle conforming to IS 903 suitable for instantaneous connection to interconnect hose pipe coupling as required:				
(a)	Stainless Steel (Grade 304)	4	EACH	1756.00	7024.00
109	Supplying and fixing air vessel made of 250 mm dia, 8 mm thick MS sheet, 1200 mm in height with air release valve on top and flanged connection to riser, drain arrangement with 25 mm dia gun metal wheel valve with required accessories, pressure gauge and painting with synthetic enamel paint of approved shade as required.	3	SET	19402.00	58206.00
110	Providing & fixing of pressure switch in M.S. pipe line including connection etc. as required.	8	EACH	1670.00	13360.00
111	Providing & fixing flow switch in following sizes M.S. pipe including connection etc as required.				
(a)	100mm dia	8	EACH	8069.00	64552.00
112	Providing and fixing CO 2 High Pressure Portable 4.5 kg Fire Extinguisher, filled with CO 2 Gas as per IS 15222, Gross Weight 16.4, empty weight 11.9 Kg, Control discharge mechanism fitted with 1 Meter Wire Braided Hose & Flat Horn with Diffuser Nozzle for dispersed discharge of CO2, Discharge Time 12 Sec, Average Discharge is 95%, Applicable on Class B, C and electrically started Fire, Fire Rating 55B, Internal coating is not applicable & External coating is of enamel spray painting, Powder Coated Handle, Valve Confirm to IS 3224 ISI Marked, CO2 Cylinder construction: hot spinning by seamless pipes & bearing ISI mark, Body confirms to IS 7285 and PESO APPROVED, Extinguishers confirmed to IS 15683:2018 and ISI marked.	10	Nos.	9032.00	90320.00
113	Providing and Fixing ABC Type Fire Extinguisher Cap. 4 kg Filled with Mono Ammonium Phosphate Powder 90% confirms to IS 4308, Stored Pressure Type, UGTS Pressure Gauge, Gross Weight 6.7 Kg, Empty Weight 2.7 Kg, Can Height 490mm, Diameter 140 ± 10mm, Discharge Time 18 Sec, Controllable discharge mechanism, Jet Range 3 Meters, Average Discharge is 92%, applicable on Class A,B & C and electrically started Fire, Fire Rating 4A:144B, Can Construction : Deep drawn & MIG welded, EPDM Rubber Hose with both end Aluminum crimped, Internal & External - Pure Polyester Powder coating (UV Resistant), Brass forged	10	Nos.	3419.00	34190.00

	valves with safety Pin is of SS material, Made up from 1.6mm thick sheet, ISI Approved IS 15683:2018.				
114	Providing and fixing K Class Kitchen Wet chemical (Blend of Potassium Acetate, Potassium citrate or Potassium carbonate) 6 ltr. Fire Extinguisher , Smooth and Polished Stainless Steel body, Applicable fire class K, UGTS Pressure Gauge, Can Height 550 mm, Diameter 150 ± 10mm, Discharge Time 13 Sec, Jet Range 2 Meters, Average Discharge is 95%, Controllable discharge mechanism with EPDM Hose & Specially designed Nozzle that allows a broad, dispersed discharge of agent that delivers a high volume, low velocity delivery of wet chemical which doesnt cause the cooking oil to splash. CE Marked Valve with inbuilt NRV & Safety Release Provision and safety Pin is of SS material, Sheet metal thickness : 0.9 to 1 mm. Confirms to IS 15683 & ISI marked & CE Marked.	6	Nos.	12496.00	74976.00
115	Providing and fixing of hose cabinet (Double Door) of size 750mmX600X250mm made of 16 gauge thick MS sheet with 4 mm thick float glass doors in front painted "FIRE" in red paint i/c necessary locking arrangement suitable to accommodate 2 nos. 15 mtr. long hose pipe. 1 no. brach pipe mounted on wall or raised brick platform & duly painted with post office red externally and white internally with synthetic enamel paint complete in all respects for external hydrant. as directed by Engineer-in-Charge.	4	Each	8,896.00	35584.00
116	less credit for the unservicable items dismantled items during execution of the work.				
a)	Ceiling fan	60	Nos.	-300.00	-18000.00
b)	Exhaust fan/Fresh Air Fan	15	Nos.	-200.00	-3000.00
c)	Panel	3	Nos.	-5000.00	-15000.00
d)	Assorted Light Fittings	300	Nos.	-100.00	-30000.00
e)	SPN & TPN Distribution Board	40	Nos.	-100.00	-4000.00
f)	less credit for the dismantled Copper wire wires from light points/circuit/submain/power circuit wiring.	100	kg	-400.00	-40000.00
g)	less credit for the dismantled aluminium wire wires from light points/circuit/submain/ power circuit wiring.	30	Kg	-100.00	-3000.00
h)	Assorted Industrial type sockets	20	Nos.	-10.00	-200.00
Total					3,15,92,797.00

Assistant Engineer (E)-P
FED, CPWD, NH-IV,
Faridabad.

Executive Engineer (E)
FED, CPWD, NH-IV,
Faridabad.

PART - D

FINANCIAL BID

PROFORMA FINANCIAL BID

CENTRAL PUBLIC WORKS DEPARTMENT				
NIT No. 07/SE-FARIDABAD/NIT/2026-27				
Name of Work: Up-gradation of Officer's Messes of various Units at NSG Manesar, Gurugram. SH: Renovation and upgradation of Officer's mess of Training centre, 11 SRG and 51 SAG at NSG Manesar camp. Manesar, Gurgaon - Civil and Electrical works.				
Name of Contractor:				
S. No.	Component of Work	Estimated Cost (Rs.)	Quoted Percentage (at par/above/below) the Total Estimated Cost	TOTAL TENDERED AMOUNT (Rs.)
1.	Major Component (Civil Works) (As per Schedule of Qty)	Rs.4,91,25,873/-		
2.	Minor Component (E&M Works) (As per Schedule of Qty)	Rs.3,15,92,797/-		
TOTAL ESTIMATED COST		Rs.8,07,18,670/-		