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NAME OF WORK : **Comprehensive up-gradation of existing old outlived VRF AC system of centenary building to contemporary inverter technology at Indian Association of the Cultivation of Sciences (IACS) Jadavpur Kolkata.**

NIT No.: 11 – NIT/CE(Kol)/CPWD/2026 – 2027 (RECALL)

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Assistant Engineer (P) El. **Assistant Engineer (P)**

Executive Engineer (P)
O/o the Chief Engineer, Kolkata

This NIT is Approved for

₹1,87,64,663.00

(Rupees One Crore Eighty Seven Lakh Sixty Four Thousand Six Hundred Sixty Three) Only.

Chief Engineer, Kolkata
CPWD, Nizam Palace, Kolkata

WEB NOTICE

CENTRAL PUBLIC WORKS DEPARTMENT

NOTICE INVITING TENDER

The Executive Engineer(E), Kolkata-I, Central Public Works Department, Nizam Palace, Kolkata -20 on behalf of President of India invites online percentage rate bid in Single Bid system from approved and eligible contractors of CPWD enlisted in appropriate class in Building & Road category for the following work(s) :

NIT No.: 11 – NIT/CE(Kol)/CPWD/2026 – 2027 (RECALL)

NAME OF WORK: Comprehensive up-gradation of existing old outlived VRF AC system of centenary building to contemporary inverter technology at Indian Association of the Cultivation of Sciences (IACS) Jadavpur Kolkata.

Estimated Cost Total = ₹ 1,87,64,663.00
(Civil ₹ 8,66,155/-+ Elect. ₹ 1,78,98,508/-)= ₹1,87,64,663.00

(Rupees One Crore Eighty Seven Lakh Sixty Four Thousand Six Hundred Sixty Three) Only.

Earnest Money: ₹ 3,75,293.00

(Rupees Three Lakh Seventy Five Thousand Two Hundred Ninety Three) Only

Period of completion: 04 (Four) Months

Last time and date of submission of bid up to 03.00 PM 27/08/2026

The bid forms and other details can be obtained from the Website https://etender.cpwd.gov.in

Executive Engineer(E),
KCED – I, CPWD,
Nizam Palace, Kolkata-20.

___**___ Blanks to be filled by EE

(----------)*Date and time will be decided and filled by the tender inviting authority.

PART – A : General Information

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INFORMATION AND INSTRUCTIONS FOR BIDDERS FOR e-TENDERING

The Executive Engineer(E), Kolkata-I, Central Public Works Department, Nizam Palace, Kolkata -20 on behalf of President of India invites online percentage rate bid in Single Bid system from approved and eligible contractors of CPWD enlisted in appropriate class in Building & Road category for the following work(s) :

Sl. No.	NIT No.	Name of Work & location	Estimated cost put to tender	Earnest Money	Period of Completion	Last date & time of submission of bid and other Documents as specified in the press notice	Time & date of opening of bid
1	**11 – NIT/CE(KoI)/CPWD/2026 – 2027 (RECALL)**	**Comprehensive up-gradation of existing old outlived VRF AC system of centenary building to contemporary inverter technology at Indian Association of the Cultivation of Sciences (IACS) Jadavpur Kolkata.**	(Civil ₹ 8,66,155/-+ Elect. ₹ 1,78,98,508/-) = ₹1,87,64,663.00 (Rupees One Crore Eighty Seven Lakh Sixty Four Thousand Six Hundred Sixty Three) Only.	₹ 3,75,293.00 (Rupees Three Lakh Seventy Five Thousand Two Hundred Ninety Three) Only	04 (Four) Months	27-08-2026 at 03.00 P.M.	27-08-2026 at 03.30 P.M.

Note :

(1) The intending bidders may be aware of the recent modification in General Conditions of Contract (GCC) 2023. Before putting the financial quote, they should make clear assessment of the changes in GCC.

(2) Intending bidders are also advised to clearly understand the working condition & work culture to obviate any difficulty in execution of work at later stage.

___**___ Blanks to be filled by EE(E) / (KCED)-I

AE (P) EE (P)

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, the schedule of quantities of various types of work to be executed and the set of terms and conditions of the contract to be complied with and other necessary documents can be seen and downloaded from website **https://etender.cpwd.gov.in** free of cost.

4. But the bid can only be submitted after deposition of original EMD either in the office of Executive Engineer inviting bids or division office of any Executive Engineer, CPWD within the period of bid submission and uploading the mandatory scanned documents such as Insurance Surety Bonds, Account Payee Demand draft or Bankers Cheque or Fixed Deposit Receipts or / and Bank Guarantee (for balance amount as prescribed) from any of the Commercial Bank towards EMD in favour of **Executive Engineer(E), KCED- I**, **CPWD, Kolkata** receipt for deposition of original EMD to division office of any Executive Engineer (including NIT issuing Executive Engineer), CPWD and other documents as specified.

5. Those contractors who are not registered or have not updated their profile on the website mentioned above, are required to get registered / update their profile beforehand. The necessary training materials including the videos with step to step process are available on download section of **https://etender.cpwd.gov.in**.

6. The intending bidder must have valid Class-III digital signature certificate with encryption key (combo type) to perform any operations / transactions on the e-tendering portal / website and the bidder should download and install the eMsigner on their system as per instructions available on download section of **https://etender.cpwd.gov.in.**

7. On opening date, the contractor can login and see the bid opening process. After opening of bids he will receive the competitor bid sheets.

8. Contractor can upload documents in the form of JPG format and PDF format.

9. Contractor must ensure to quote rate of each item. The column meant for quoting rate in figures appears in pink color and the moment rate is entered, it turns sky blue.

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

However, if a tenderer quotes nil rates against each item in item rate tender or does not quote any percentage above/below on the total amount of the tender or any section/sub head in percentage rate tender, the tender shall be treated as invalid and will not be considered as lowest tenderer.

10. All the receipts to be received as Performance Guarantee Money, Late Fee, Deposits of works etc. should made only through E-Payment/NEFT/RTGS using Non-Tax Receipt Portal (NTRP) of the Government of India for which they have to register themselves in Bharatkosh.gov.in before making payments. The following references should be taken care of while making payments with regards to this Division :-

AE (P) EE (P)

(a)	Purpose	:	Deposit Works, Performance Guarantee, Late Fee.
(b)	Payment Type	:	(i) Part-III, for Deposit of Works (ii) Part-V, for Performance Guarantee (iii) Others for Late Fee
(c)	Ministry	:	(030) Urban Development & Urban Poverty Alleviation
(d)	Pay & Accounts Office (PAO)	:	043460 – PAO (East Zone), CPWD, Kolkata
(e)	Drawing & Disbursing Officer (DDO)	:	143491 – Executive Engineer(E), Kolkata Central Electrical Division-I, CPWD, Kolkata.

11. The department reserved the right to reject any prospective application without assigning any reason and to restrict the list of qualified contractors to any number deemed suitable by it, if too many bids are received satisfying the laid criterion.

12. **<u>List of Documents to be scanned and uploaded within the period of bid submission</u>:**

(i) Insurance Surety Bond, Demand Draft / Account Payee Banker's Cheque / FDR / Bank Guarantee of any commercial Bank against EMD.

(ii) Enlistment Order of the Contractor.

(iii) GST registration certificate, if already obtained by the bidder.

lf the bidder has not obtained GST registration as applicable (GST registration in West Bengal), then he shall scan and upload following undertaking along with bid documents.

"lf work is awarded to me, l/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 l/we shall be responsible for any delay in payments which will be due towards me/us on account of the work executed and/or for any action taken by CPWD or GST department in this regard."

(iv) Copy of receipt for deposition of original EMD issued from any Division office of CPWD (including NIT issuing EE).

(v) Certificate of ERP Training from any of the CPWD Regional Training Institutes (RTIs) issued through LMS(Learning Management System) in ERP. Newly enlisted contractor must complete the ERP training within 45 days of their enlistment.

(vi) Undertaking on structural stability and soundness as per prescribed format Form "F".

(vii) Declaration About Site Inspection as per prescribed format Form "H".

13. **<u>If the above mentioned documents are not scanned and uploaded within the period of bid submission the bid shall be treated as invalid and cancelled.</u>**

Executive Engineer(E),
KCED – I, CPWD,
Nizam Palace, Kolkata-20.

AE (P) EE (P)

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-H

DECLARATION ABOUT SITE INSPECTION

To,
Executive Engineer(E),
Kolkata Central Electrical Division-I,
CPWD, Nizam Palace,
Kokata-20.

Name of work: Comprehensive up-gradation of existing old outlived VRF AC system of centenary building to contemporary inverter technology at Indian Association of the Cultivation of Sciences (IACS) Jadavpur Kolkata.

Dear Sir,

It is hereby declared that as per CPWD–6 FOR e-BIDDING, Para 11, Page 14 , I/ We the bidder inspected and examined the subject site and its surrounding and satisfy myself / ourselves as to the nature of the ground and sub-soil (so far as is practicable),the forms and nature of the site/ ourselves before submitting the bid, the accommodation which may require and all necessary information as to risks, contingencies and other circumstances which may influence or affect our bid have been obtained. I/We the bidder shall have full knowledge of the site and no extra charge consequent upon any misunderstanding or otherwise shall be claimed in later date.

I /We bidder shall be responsible for arranging and maintaining at 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 me/us implies that I / We have read this notice and all other contract documents and has made myself /ourselves aware of the scope and specifications of the work to be done and local conditions and other factors having a bearing on the execution of the work.

Signature of Bidder (s) or an authorized Officer

of the firm with stamp & seal

AE (P) EE (P)

CPWD – 6

GOVERNMENT OF INDIA
CENTRAL PUBLIC WORKS DEPARTMENT

NOTICE INVITING BID

1. ~~Item rate~~/Percentage rate composite bids are invited by Executive Engineer(E), Kolkata - I, Central Public Works Department, Nizam Palace, Kolkata on behalf of President of India from approved and eligible contractors of CPWD enlisted in appropriate class in composite category for the work of "**Comprehensive up-gradation of existing old outlived VRF AC system of centenary building to contemporary inverter technology at Indian Association of the Cultivation of Sciences (IACS) Jadavpur Kolkata."**
The enlistment of the contractors should be valid on the last date of submission of bids.

1.1 In case the last date of submission of bid is extended, the enlistment of contractor should be valid on the original date of submission of bids. The work is estimated to cost **₹.1,87,64,663.00 (Civil : Rs. 8,66,155/- + Elect. : Rs.1,78,98,508/-) (Rupees One Crore Eighty Seven Lakh Sixty Four Thousand Six Hundred Sixty Three) Only.** This estimate, however, is given merely as a rough guide.

1.a.1 The authority competent to approve NIT for the combined cost and belonging to the major discipline will consolidate NITs for calling the bids. He will also nominate Division which will deal with all matters relating to the invitation of bids.For composite bid, besides indicating the combined estimated cost put to bid, should clearly indicate the estimated cost of each component separately. The eligibility of bidders will correspond to the combined estimated cost of different components put to bid.

2. Agreement shall be drawn with the successful bidders on prescribed Form No. CPWD 7/8 (or other Standard Form as mentioned) which is available as a Govt. of India Publication and also available on website **www.cpwd.gov.in**. Bidders shall quote his rates as per various terms and conditions of the said form which will form part of the agreement.

3. The time allowed for carrying out the work will be **04 (Four) 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 will be handed over partially as per vacation plan as directed by Engineer-in-Charge from time to time.

5. 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. The bid document consisting of plans, specifications, the schedule of quantities of various types of items to be executed and the set of terms and conditions of the contract to be complied with and other necessary documents except Standard General Conditions of Contract Form

can be seen on website **https://etender.cpwd.gov.in** or **www.cpwd.gov.in** free of cost.

6. After submission of the bid the contractor can re-submit/revise the 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. Earnest Money in the form of Insurance Surety Bonds, Account Payee Demand Draft, Fixed Deposit Receipt, Banker's Cheque or Bank Guarantee including e- Bank Guarantee (for balance amount as prescribed) from any of the Commercial Banks (drawn in favour of **Executive Engineer(E), KCED-I, CPWD, Kolkata**) shall be scanned and uploaded on the e-Tendering website within the period of bid submission. The original EMD should be deposited either in the office of Executive Engineer inviting bids or division office of any Executive Engineer, CPWD within the period of bid submission. The EMD receiving Executive Engineer (including NIT issuing EE/AE) shall issue a receipt of deposition of earnest money deposit to the bidder in a prescribed format (enclosed) uploaded by tender inviting EE in the NIT.

   A part of earnest money is acceptable in the form of bank guarantee also. In such case, minimum 50% of earnest money or `20 lakh, whichever is less, shall have to be deposited in shape prescribed above, and balance may be deposited in shape of Bank Guarantee including e- Bank Guarantee of any Commercial bank having validity for a period of 90 days for single bid works and 180 days for two bid system or more from the last date of receipt of bids which is to be scanned and uploaded by the intending bidders.

   The earnest money given by all the tenderers except the lowest tenderer shall be refunded immediately after the expiry of stipulated bid validity period or immediately after acceptance of the successful bidder, whichever is earlier.

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

   The bid submitted shall be opened at **03.30 PM on 27-08-2026.**

9. The bid submitted shall become invalid and e-Tender processing fee (if applicable) shall not be refunded if :

   (a) The bidder is found ineligible.

   (b) The bidder does not upload scanned copies of all the documents as stipulated in the bid document.

   (c) 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 tenderer in the office of tender opening authority.

________** To be Filled by EE(E)/KCED-I

AE (P) EE (P)

(d) If a tenderer quotes nil rates against each time in Percentage rate tender or does not quote any percentage above/below on the total amount of the tender or any section/sub head in percentage rate tender, the tender shall be treated as invalid and will not be considered as lowest tenderer.

10. The contractor whose bid is accepted will be required to furnish performance guarantee at specified percentage of the tendered amount as mentioned in schedule E and within the period specified in Schedule F. This guarantee shall be in the form of Insurance Surety Bonds, Account Payee Demand Draft, Fixed Deposit Receipt or Bank Guarantee from any of the Commercial Banks in accordance with the prescribed form. In case the contractor fails to deposit the said performance guarantee within the period as indicated in Schedule 'F', including the extended period if any, the Earnest Money deposited by the contractor shall be forfeited automatically without any notice to the contractor. The earnest money deposited along with bid shall be returned after receiving the aforesaid performance guarantee. The contractor whose bid is accepted will also be required to furnish either copy of applicable licenses/ registrations or proof of applying for obtaining labour licenses. registration with EPFO, ESIC and BOCW Welfare Board including Provident Fund Code No. If applicable and also ensure the compliance of aforesaid provisions by the sub contractors, if any engaged by the contractor for the said work within the period specified in Schedule F.

11. The description of the work is as follows:

"**Comprehensive up-gradation of existing old outlived VRF AC system of centenary building to contemporary inverter technology at Indian Association of the Cultivation of Sciences (IACS) Jadavpur Kolkata."**

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 bidders 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.

12. 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.

13. Canvassing whether directly or indirectly, in connection with bidders is strictly prohibited and the bids submitted by the contractors who resort to canvassing will be liable for rejection.

14. 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 bidders shall be bound to perform the same at the rate quoted.

15. 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.

16. No Engineer of Gazetted Rank or other Gazetted Officer employed in Engineering or Administrative duties in an Engineering Department of the Government of India is allowed to work as a contractor for a period of one year after his retirement from Government service, without the prior permission of the Government of India in writing. This contract is liable to be cancelled if either the contractor or any of his employees is found any time to be such a person who had not obtained the permission of the Government of India as aforesaid before submission of the bid or engagement in the contractor's service.

17. **The bids for the work shall remain open for acceptance for a period of 30 (thirty) days from the date of opening of bids in case of single bid system.**

    Further :

    (i) If any tenderer withdraws his tender or makes any modification in the terms & conditions of the tender which is not acceptable to the department within 7 days after last date of submission of bids, then the Government shall without prejudice to any other right or remedy, be at liberty to forfeit 50% of the earnest money absolutely irrespective of letter of acceptance for the work is issued or not.

    (ii) If any tenderer withdraws his tender or makes any modification in the terms & conditions of the tender which is not acceptable to the department after expiry of 7 days after last date of submission of bids, then the Government shall without prejudice to any other right or remedy, be at liberty to forfeit 100% of the earnest money absolutely irrespective of letter of acceptance for the work is issued or not.

    (iii) In case of forfeiture of earnest money as prescribed in para (i) and (ii) above, the bidders shall not be allowed to participate in the rebidding process of the same work.

18. This notice inviting Bid shall form a part of the contract document. The successful bidders/contractor, on acceptance of his bid by the Accepting Authority shall within 15 days from the stipulated date of start of the work, sign the contract consisting of:-

    (a) The Notice Inviting Bid, all the documents including additional conditions, specifications and drawings, if any, forming part of the bid as uploaded at the time of invitation of bid and the rates quoted online at the time of submission of bid and acceptance thereof together with any correspondence leading thereto.

    (b) Standard C.P.W.D. Form 7 or other Standard C.P.W.D. Form as applicable.

19. For Composite Bids :-

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

19.1.2 The bid document will include following four components:

Part A :- CPWD-6, CPWD-7 including schedule A to F for the major component of the work, Standard General Conditions of Contract for CPWD Construction Work 2023 as amended / modified up to last date of submission of bid.

Part B :- General / specific conditions and specifications and Schedule of Quantities applicable to Civil component(s) of the work.

Part C :- Schedule A to F for Electrical component(s) of the work. (SE/EE/DD(H) in charge of major component shall also be competent authority under clause 2 and clause 5 as mentioned in schedule A to F for major components) and General/specific conditions, specifications and Schedule of Quantities applicable to Electrical component(s) of the work.

Part D :- Proforma of Quoting Rate.

19.1.3 The bidders must associate himself, with agencies of the appropriate class eligible to bid for each of the minor component individually.

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

19.1.5 After acceptance of the bid by competent authority, the EE in charge of major component of the work shall issue letter of award on behalf of the President of India. After the work is awarded, the main contractor will have to enter into one agreement with EE in-charge of major component and has also to sign two or more copies of agreement depending upon number of EE's / DDH in-charge of minor components. One such signed set of agreement shall be handed over to EE/DDH in-charge of minor component(s).

EE of major component will operate Part A and Part B of the agreement. EE / DDH in-charge of minor component(s) shall operate Part- C along with Part A of the agreement.

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

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

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

19.1.9 In case the main contractor intends to change any of the above agency / agencies during the operation of the contract, he shall obtain prior approval of Engineer-in-Charge of relevant specialized component(s).

The new agency / agencies shall also have to satisfy the laid down eligibility criteria. In case Engineer-in-Charge is not satisfied with the performance of any

agency, he can direct the contractor to change the agency executing such items of work and this shall be binding on the contractor.

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

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

19.1.12A. The composite work shall be treated as complete when all the components of the work are complete. The completion certificate of the composite work shall be recorded by Engineer-in-Charge of major component after record of completion certificate of all other components.

19.1.12B Final bill of whole work shall be finalized and paid by the EE of major component.

Engineer(s) in charge of minor component(s) will prepare and pass the final bill for their component of work and pass on the same to the EE of major component for including in the final bill for composite contract.

20. The intending bidders are required to update their profile in CPWD e-tender portal and to upload their bids well in advance of last date of submission of tender. Any issue related to updating profile/uploading tender can be resolved through the concerned Executive Engineer (Phone no _____**_____ e-mail Id _____**_____) or ERP helpline no. 1800 180 3286 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.

21. Department is making efforts to get local body approvals timely. However, if required agency is to assist department in obtaining such approvals in the interest of work. For this, nothing extra shall be payable.

Executive Engineer(E)
KCED – I, CPWD,
Nizam Palace, Kolkata – 20

________** To be Filled by EE(E)/KCED-I

AE (P) EE (P)

SCOPE OF WORK

(A) Civil Works :

1. 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.
2. Providing and fixing 15 mm thick false ceiling tiles at all heights.

(B) Electrical Works:

1. Outdoor unit 18HP-23 Nos i.e., 414 HP have been considered.
2. Indoor unit of miscellaneous capacity 1.6 Tr to 8.0 Tr - 114 Nos.
3. Required copper conductor, Vertical DB, Horizontal DB, SPN DB, Isolator, MCB, MCCB etc have been considered.
4. Required size of copper pipe with insulation will be provided.
5. Repairing of existing duct have also considered.
6. Provision of MS stand for proper installation of ODU at terrace level.
7. Flushing of entire system with nitrogen for testing and top-up of the entire VRF system with 410A/R-32 refrigerant gas.
8. All existing IDU/ODU will be dismantled from its position and necessary bye back of old materials have been taken into estimate.

Form of Bank Guarantee for

Earnest Money Deposit/Performance Guarantee/Security Deposit/Mobilization Advance

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

OR**

Whereas the Executive Engineer (name of division) CPWD on behalf of the President of India (hereinafter called "The Government") has entered into an agreement bearing number _____ with ((name and address of the contractor)) (hereinafter called "the Contractor") for execution of work " (name of work) " The Government has further agreed to accept an irrevocable Bank Guarantee for `_____ . ____ (Rupees _____ only) valid upto (date) as **Performance Guarantee / security Deposit / Mobilization Advance** from the said Contractor for compliance of his obligations in accordance with the terms and conditions of the agreement.

2. We, (indicate the name of the bank) (hereinafter referred as "the Bank"), hereby undertake to pay to the Government an amount not exceeding `_____ . ___ (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 `_____ . ___ (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 rerating to the said agreement and we shall not be retrieved from our liability by reason of any such variation or extension being granted to the said contractor or for any forbearance, act of omission on the part of the Government or any indulgence by the Government to the said contractor or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

6. We, _____(indicate the name of the bank)_____ further agree that the Government at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor at the first instance without proceeding against the contractor and notwithstanding any security or other guarantee the Government may have in relation to the Contractor's liabilities.

7. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor.

8. We, _____(indicate the name of the bank)_____ undertake not to revoke this guarantee except with the consent of the Government in writing.

9. This Bank Guarantee shall be valid up to _____ unless extended on demand by the Government. Notwithstanding anything mentioned above, our liability against this guarantee is restricted to ` _____ . ____ (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	:	_____	Name	:	_____
	Address	:	_____	Designation	:	_____
			_____	Staff code no.	:	_____
2.	Signature	:	_____	Bank seal	:	
	Name	:	_____			
	Address	:	_____			
			_____			_____

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

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

RECEIPT OF DEPOSITION OF ORIGINAL EMD

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

NAME OF WORK : **Comprehensive up-gradation of existing old outlived VRF AC system of centenary building to contemporary inverter technology at Indian Association of the Cultivation of Sciences (IACS) Jadavpur Kolkata.**

1. NIT No. :- **11–NIT/CE(Kol)/CPWD/2026– 2027 (RECALL)**
2. Estimated Cost :- ₹ 1,87,64,663.00
   (Civil : Rs. 8,66,155/- + Elect. : Rs. 1,78,98,508/-)
3. Amount of Earnest Money Deposit :- ₹ 3,75,293.00
4. Last date of submission of bid :- **27-08-2026 at 03:00 P.M.**

(______ to be filled by Executive Engineer(E) / KCED - I at the time of issue of NIT and uploaded along with NIT)**

5. Name of contractor :- _____***_____
6. Form of EMD :- _____***_____
7. Amount of Earnest money deposit :- `_____***_____
8. Date of submission of EMD :- _____***_____

(___*___ to be filled by EMD receiving EE)**

Signature, Name and Designation of EMD receiving officer (EE/AAO) along with Office stamp

AE (P) EE (P)

ELIGIBILITY CONDITIONS FOR SPECIALISED E & M WORK

1. If the main contractor is not himself eligible for specialized component of E&M Works, he/she shall engaged eligible associating agencies as per the eligibility criteria as below :

Sl. No.	Component	Approved Estimated Cost	Eligibility
A. E & M Work :			
1.	VRV/VRF Type Air conditioning System	₹ 1,78,98,508.00	**Three similar works** each costing not less than **40%** of the estimated cost. OR **Two similar works** each costing not less than **60%** of the estimated cost. OR **One similar works** each costing not less than **80%** of the estimated cost. Similar work is defined as : ***"SITC of VRV/VRF Type AC System"***

Note : (i) The value of executed works shall be brought to current costing level by enhancing the actual value of work at simple rate of 7% per annum calculated from the date of completion to the previous day of last date of submission of tender. For other conditions, refer special conditions specified in Part B & C.

(ii) The applicant shall either himself meet the eligibility conditions for the respective SPECIALIZED Civil and E&M components or otherwise, he will have to associate an agency meeting the eligibility requirements as given in this tender document and submit the details as per Form "A" within 30 days of award of work OR before start of specialized/minor component of work whichever is earlier.

(iii) The applicant/ main contractor has to submit consent letters as per Form "B" of this tender document from at least one eligible associate agency of the respective component of Specialized/ E&M work for each of the component of work by clearly indicating the component of work within 30 days of award of work OR before start of specialized/minor component of work whichever is earlier.

(iv) The main contractor will submit MOU signed with eligible associated contractor. The MOU in the enclosed Form "C" shall be signed by both the contractors, i.e. main contractor as 1st party and associated contractor as 2nd party, independently for EACH specialized Civil and E&M component, specified as above.

(v) If the main contractor fails to associate agency for execution of specialized/minor components of work within 30 days of award of work OR before start of specialized/minor component of work whichever is earlier or furnishes incomplete details or furnishes details of ineligible agencies even after the tenderer is given due opportunity, the entire scope of such component of work shall be withdrawn from the tender and the same shall be got executed by the Engineer-in –Charge at the risk and cost of the main contractor.

(vi) Verifiable completion certificates of the work, registration/approval documents as the case may be, duly attested by the applicant shall be submitted within 30 days of award of work OR before start of specialized/minor

component of work whichever is earlier. Valid Electrical license, as the case may be, duly attested by the applicant shall also be submitted within 30 days of award of work OR before start of specialized/minor component of work whichever is earlier.

(vii) Self-attested GST registration documents in respect of the associated agencies shall be submitted within 30 days of award of work OR before start of specialized/minor component of work whichever is earlier.

FORM - 'A'

UNDERTAKING REGARDING ASSOCIATION WITH THE AGENCIES HAVING EXPERIENCE OF SPECIALISED WORK

To,
The Executive Engineer,
Kolkata – IV, CPWD
Nizam Palace,
Kolkata – 700 020.

To,
The Executive Engineer (EL),
KCED - I, CPWD,
Nizam Palace,
Kolkata – 700 020.

Subject : **Comprehensive up-gradation of existing old outlived VRF AC system of centenary building to contemporary inverter technology at Indian Association of the Cultivation of Sciences (IACS) Jadavpur Kolkata.**

Sir,

Having examined the details given in the Bid Documents for the above said work. I / We hereby submit the following :

"I / We undertake that I/We will associate contractors having experience of execution of each specialized work mentioned in bid document."

Signature of the Bidder with seal

AE (P)

EE (P)

FORM - 'B'

CONSENT LETTER FROM ELIGIBLE ASSOCIATE AGENCY OF SPECIALIZED COMPONENT OF WORK

Name of Work : **Comprehensive up-gradation of existing old outlived VRF AC system of centenary building to contemporary inverter technology at Indian Association of the Cultivation of Sciences (IACS) Jadavpur Kolkata.**

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

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

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

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

Date : _____ / _____ / 20 _____

_____ (Signature with date of Major Component Contractor)

_____ (Signature with date of Specialized Component Contractor)

Address : _____

_____

Address : _____

_____

Witness with address : _____

(From Specialized component contractor)

Witness with address : _____

(From Major component contractor)

_____ AE (P)

_____ EE (P)

FORM - 'C'

AFFIDAVIT OF MEMORANDUM OF UNDERSTANDING (MoU)
(to be submitted for each and every E & M Component)

1. M/s. _____(Name of the firm with full address)_____

   Enlistment Status : _____ .

   Valid Upto : _____ .

   (Henceforth called the main Contractor)

2. M/s. _____(Name of the firm with full address)_____

   Enlistment Status : _____ .

   Valid Upto : _____ .

   (Henceforth called the Associated Contractor)

For the execution of E & M Work :

Name of the work : **Comprehensive up-gradation of existing old outlived VRF AC system of centenary building to contemporary inverter technology at Indian Association of the Cultivation of Sciences (IACS) Jadavpur Kolkata.**

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

We have agreed as under :

1. The Associated Contractor will execute all E & M works in the wholesome manner as per terms and conditions of the agreement.
2. The Associated Contractor shall be liable for disciplinary action if he fails to discharge the action(s) and other legal action as per agreement.

AE (P) EE (P)

3. All the machinery and equipment, tools and tackles required for execution of the E & M works, as per agreement, shall be the responsibility of the Associated Contractor.
4. The site staff required for the E & M work shall be arranged by the Associated Contractor as per terms and conditions of the agreement.
5. Site order book maintained for the said work shall be signed by the main contractor as well as by the Engineer of the Associated Contractor and by Associated Contractor himself.
6. All the correspondence regarding execution of the E & M work shall be done by the department with the Associated Contractor with a copy to the main contractor. In case of non-compliance of the provisions of agreement, the main contractor, as well as the associated contractor shall be responsible. The action under clauses 2 and 3 shall be initiated and taken against the main contractor.

SIGNATURE OF MAIN CONTRACTOR :

_____

_____

Date : _____ / _____ / 20 _____

Place : _____

1. Witness with address :

a. _____

_____

b. _____

_____

c. _____

_____

(From major component contractor side)

SIGNATURE OF ASSOCIATED CONTRACTOR :

_____

_____

Date : _____ / _____ / 20 _____

Place : _____

2. Witness with address :

a. _____

_____

b. _____

_____

c. _____

_____

(From minor component contractor side)

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

AE (P)

EE (P)

UNDERTAKING REGARDING ELECTRICAL LICENSE

To,
The Executive Engineer,
Kolkata –IV, CPWD
Nizam Palace,
Kolkata – 700 020.

To,
The Executive Engineer (EL),
KCED - I, CPWD,
Nizam Palace,
Kolkata – 700 020.

Sub. : Comprehensive up-gradation of existing old outlived VRF AC system of centenary building to contemporary inverter technology at Indian Association of the Cultivation of Sciences (IACS) Jadavpur Kolkata.

Sir,

Having examined the details given in the Bid Documents for the above said work. I / We hereby submit the following :

"I / We undertake that I/We will either obtain the valid electrical license at the time of execution of electrical work or associate contractor having valid electrical license of eligible class."

Signature of the Bidder with seal

AE (P)

EE (P)

FORM OF GUARANTEE BOND FOR WATER PROOFING WORKS

GUARANTEE BOND ON STAMPED PAPER

This agreement made this……..…….day of two thousand…….…….. between M/s……..……(hereinafter called the Guarantor of the one part) and the Executive Engineer, ……..

Whereas this agreement is supplementary to the contract (hereinafter called the Contract) dated…….. made between the Guarantor of the one part and Govt. of the other part, whereby the contractor inter alia, undertook to render the Buildings and structures in the said contract recited completely water and leak proof.

And whereas the Guarantor agreed to give a guarantee to the effect that the said structure will remain waterproof for ten years to be reckoned from the date after the maintenance period prescribed in the contract expires.

During this period of guarantee the Guarantor shall make good all defects and for that matter, shall replace at his risk and cost such members as may be damaged by water and in case of any other defect being found he shall render the building waterproof at his cost to the satisfaction of the Engineer-in-Charge and shall commence the works of such rectification within seven days from the date of issuing notice from the Engineer-in-Charge calling upon him to rectify the defects failing which the work shall be got done by the Department by some other contractor at the Guarantor's cost and risk and in the latter case the decision of the Engineer-in-charge as to the cost, recoverable from the Guarantor shall be final and binding.

That if the Guarantor fails to execute the waterproofing or commits breaches here under then the Guarantor will indemnify principal and his successors against all loss, damage, cost, expense or otherwise which may be incurred by him by reason of any default on the part of the Guarantor in performance and observance of this supplemental agreement. As to the amount of loss and/or damage and/or cost incurred by the Government the decision of the Engineer- in-charge will be final and binding on the parties.

In witness whereof of these presents have been executed by the Obligor……..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 OBLIGOR in presence of –

1. _____

2. _____

SIGNED for and on behalf of THE PRESIDENT OF INDIA by ……. in the presence of –

1. _____

2. _____

AE (P) EE (P)

CPWD - 7/8

PERCENTAGE RATE TENDER & CONTRACT FOR WORKS

Tender for the work of:- Comprehensive up-gradation of existing old outlived VRF AC system of centenary building to contemporary inverter technology at Indian Association of the Cultivation of Sciences (IACS) Jadavpur Kolkata.

(1) To be submitted/ uploaded by 27-08-2026 hours on 3:00 P.M. to the Executive Engineer(E), Kolkata – I, CPWD, Nizam Palace, Kolkata uploaded at **https://etender.cpwd.gov.in**.

(2) To be opened in presence of tenderers who may be present at 15:30 hrs. on 27-08-2026 in the office of the Executive Engineer(E), Kolkata - I, CPWD, Nizam Palace, Kolkata.

TENDER

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

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

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

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

A copy of earnest money deposit receipt of prescribed amount deposited in the form of Insurance Surety Bonds, Account Payee Demand Draft, Fixed Deposit Receipt, Banker's Cheque or Bank Guarantee (as prescribed) issued by a Commercial Bank, is scanned and uploaded. If I/We, fail to furnish the prescribed performance guarantee within prescribed period, I/We agree that the said President of India or his successors, in office shall without prejudice to any other right or remedy, be at liberty to forfeit the said earnest money absolutely. Further, if I/We fail to commence work as specified, I/We agree that President of India or the successors in office shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the said performance guarantee absolutely. The said Performance Guarantee shall be a guarantee to execute all the works referred to in the tender documents upon the terms and conditions contained or referred to those in excess of that limit at the rates to be determined in accordance with the provision contained in Clause 12.2 and 12.3 of the tender form.

___**___ Blanks to be filled by EE(E)/KCED –I

AE (P) EE (P)

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

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

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

Dated : _____ / _____ / 20 _____ _____

Witness : _____ (Signature of Contractor)

Address : _____ _____

Occupation : _____ (Postal Address)

AE (P) EE (P)

ACCEPTANCE

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

[in words]

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

(a) _____**_____ .

(b) _____**_____ .

(c) _____**_____ .

For & on behalf of the President of India.

Signatures : _____**_____

Dated : __**__ / __**__ / 20 __**__

Designation : _____**_____

__**__ Blanks to be filled by EE(E)/KCED –I

AE (P)

EE (P)

PROFORMA OF SCHEDULES (A to F)

SCHEDULE 'A' :

Schedule of quantities (as per PWD-3) : Page No. C-1 for Civil works
Page No. E-1to E-6 for Electrical works

SCHEDULE 'D' :

Extra schedule for specific requirements / document for the work, if any : As attached in tender documents.

SCHEDULE 'E' :

Reference to General Conditions of contract.	:	GCC Maintenance Works – 2023 as modified & corrected up to previous day of the last date of submission of tender.
NAME OF WORK	:	**Comprehensive up-gradation of existing old outlived VRF AC system of centenary building to contemporary inverter technology at Indian Association of the Cultivation of Sciences (IACS) Jadavpur Kolkata.**
Estimated cost of work	:	Estimated Cost Total = ₹ 1,87,64,663.00 (Civil ₹ 8,66,155/-+ Elect. ₹ 1,78,98,508/- = ₹ 1,87,64,663.00) (Rupees One Crore Eighty Seven Lakh Sixty Four Thousand Six Hundred Sixty Three) Only
Earnest money	:	Earnest Money: ₹ 3,75,293.00 (Rupees Three Lakh Seventy Five Thousand Two Hundred Ninety Three) Only
Performance Guarantee	:	(a) 5% of tendered value or Estimated Cost Put to Tender (ECPT) (whichever is higher) (b) Where the tendered amount is less than eighty percent (80%) of the Estimated Cost Put to Tender (ECPT), the Performance Guarantee, in addition to the requirement under (a) above, shall be increased by an amount equal to the difference between eighty percent (80%) of the ECPT and the tendered amount.
Security Deposit	:	**2.5% of tender value**

SCHEDULE 'F' :

GENERAL RULES & DIRECTIONS		:	
1.	Officer inviting tender	:	**Executive Engineer(E), Kolkata – I, CPWD, Kolkata**
2.	Maximum percentage for quantity of items of work to be executed beyond which rates are to be determined in accordance with Clauses 12.2 & 12.3	:	Refer Clause 12 of Schedule F.
3.	**Definitions**	:	
2(v)	Engineer-in-Charge	:	**Executive Engineer, Kolkata-IV, CPWD,** Kolkata or successor thereof for Civil work. **Executive Engineer (E), KCED-I, CPWD, Kolkata for electrical works** or successor thereof for E&M work.
2 (viii)	Accepting Authority	:	**Chief Engineer, Kolkata**, CPWD, Kolkata or successor thereof.

AE (P) EE (P)

2 (x)	Percentage on cost of materials and labour to cover all overheads and profits	:	**15%**
2 (xi)	Standard Schedule of Rates	:	**1. DSR' 2023 for Civil work with up-to-date correction slip & Market Rate.** **2. DSR (E&M) 2022 & 2025 for Electrical work with up-to-date correction slip & Market Rate**
2 (xii)	Department	:	**Central Public Works Department**
9 (ii)	Standard CPWD contract Form	:	**GCC Maintenance Works - 2023, CPWD Form & as modified & corrected up to previous day of the last date of submission of tender**.

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 Days
(ii)	Maximum allowable extension with late fee @ 0.1% per day of Performance Guarantee amount beyond the period provided in (i) above	:	03 Days

Clause 2 :

Authority for fixing compensation under clause 2. : **Chief Engineer, Kolkata**, CPWD, Kolkata or successor thereof.

Clause 5 :

Number of days from the date of issue of letter of acceptance for reckoning date of start. : **7 Days.**

Mile stone(s)

Mile stone(s) as per table given below

Sl. No.	Description of Milestone (Financial)	Physical Time in Days (From the date of start)	Amount to be with-held in case of non achievement of mile stone
(A)	(B)	(C)	(D)
1.	**25% Completion of Work**	**1 Month**	In the event of non- achieving of necessary progress as indicated in the table, amount @ 1.25% (One point twenty five percent) of the tender value will be withheld for each milestone.
2.	**55% Completion of Work**	**2 Months**	
3.	**85% Completion of Work**	**3 Months**	
4.	**100% Completion of Work including clearing of site and handing over.**	**4 Months**	

Time allowed for execution of work : 04 (Four) Months for execution.

Authority to decide :

AE (P) EE (P)

(i)	Authority to convey the decision of shifting of milestone and extension of time	**:**	**Executive Engineer(E), Kolkata-I**, CPWD, Kolkata or successor thereof.
(ii)	Authority to decision rescheduling of milestone and extension of time	**:**	**Chief Engineer, Kolkata**, CPWD, Kolkata or successor thereof.
(iii)	Shifting of date of start in case of delay in handing over of site	**:**	**Chief Engineer, Kolkata**, CPWD, Kolkata or successor thereof.

PROFORMA OF SCHEDULES CLAUSE 5 SCHEDULE OF HANDING OVER OF SITE

Part	Portion of site	Description	Time period for handing over reckoned from date of issue of letter of intent.
Part-A	Portion without any hindrance	Available	07 Days
~~Part-B~~	~~Portions with encumbrances~~	-	-
~~Part-C~~	~~Portions dependent on work of other agencies~~	-	-

Clause 6 :

Mode of measurement : Electronic Measurement Book (EMB)/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 : **₹ 1.60 Lakh for Civil component or as mutually agreed upon.**
₹ 33.50 Lakh for Electrical component or as mutually agreed upon

Clause 7A :

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

Clause 8A :

Authority to decide compensation on account if contractor fails to submit completion plans. **:** **Chief Engineer, Kolkata**, CPWD, Kolkata or successor thereof.

Clause 10A

LIST OF TESTING EQUIPMENT TO BE MANDATORILY PROVIDED BY THE CONTRACTOR AT SITE LAB.

Sl. No.	Equipment	Number (Minimum)
1.	Weighing Balance	
	(i) 20 Kg capacity, Semi self-indicating type-graduation 5 gm with dial range 0 – 1000 gm.	1
	(ii) 500 gm capacity, Electronic weighing machine – accuracy 0.1gm.	1
2.	Sieve as per IS460-1962	

	(i) I.S. sieves - 450mm internal dia, of sizes 100 mm, 80 mm, 63mm, 50 mm, 40 mm, 25 mm, 20 mm, 12.5 mm, 10 mm, 6.3 mm, 4.75mm, complete with lid and pan.	1
	(ii) I.S. sieves- 200mm internal dia (brass frame) consisting of 2.36mm, 1.18mm, 600 microns, 425 microns, 300 microns, 212 microns, 150 microns, 90 microns, 75 microns, with lid and pan.	1
	(iii) Sieve Shaker capable to handle 200 mm dia -300 mm dia sieve.	1
~~3.~~	~~Oven Electrically operated, thermostatically controlled up to 110 – sensitivity 1°C~~	~~1~~
4.	~~Equipment for slump test- Slump cone, steel plate, tamping rod, steel scale, scoop.~~	1
5.	Vernier Calliper	2
6.	~~100 Tonne Compression Testing Machine, electrically operated along with necessary dial gauge.~~	1
7.	Enamel trays (for efflorescence test for bricks)	
	(i) 300 mm × 250 mm × 40 mm	2
8.	Screw gauge	2
9.	~~Manually operated pump and water pressure gauges for hydraulic testing of pipes~~	2
10.	Graduated glass cylinder	1
11.	Graduated Measuring Cylinder – 200 ml capacity	3
12.	~~Cube mould of Size 150 mm x 150 mm x 150 mm~~	24
13.	Hammer – 1 lb& 2 lb	2 Each
14.	Screw Driver	5
15.	Measuring tape – 5 mtr. & 30 mtr.	2 Each
16.	Any other equipment for site tests as outlined in relevant BIS codes and as directed by the Engineer-in-charge (Both Civil and Electrical component).	

Clause 10B

Whether Clause 10 B shall be applicable : **Yes**

Clause 10C : **Applicable**

Component of labour expressed as percent of total value of component of work : **25% for Civil component**
15% for Electrical component

Clause 10CC : **Not Applicable.**

~~Sl. No.~~	~~Relevant component of Material / Labour for price escalation~~	~~Percentage of total value of work~~
~~1.~~	~~Cement Component~~	~~7.00%~~
~~2.~~	~~Labour Component~~	~~25.00%~~
~~3.~~	~~Civil Component of Other Construction Materials~~	~~35.00%~~

AE (P) EE (P)

~~4.~~	~~E & M (Electrical & Mechanical) component of Construction Materials~~	~~10.00%~~
~~5.~~	~~POL (Diesel) Component~~	~~5.00%~~
~~6.~~	~~Reinforcement Steel Bars / TMT Bars / Structural Steels (including strands and cables) component~~	~~18.00%~~
~~7.~~	~~Bitumen Component~~	~~--~~
	~~**Total**~~	~~**100%**~~

Clause 11 : Specifications to be followed for execution of work:

- **Civil Work:**

1. The Work will be carried out as per CPWD Specification 2019 Vol. I & II with up to date correction slips shall be followed. Item for which specification are not available in CPWD specification, shall be executed as per manufacturer or as per standard & sound engineering practice.
2. ISI marked materials or of superior make shall be used in the work. Materials, for which no ISI marks / Certification has been issued, shall be according to manufacturer's specification as per approved by Engineer-in-charge.

- **For Electrical work** :-

1. CPWD General Specifications for Electrical Works Part-I Internal & Part-II External - 2023. Part-III Lift & Escalators-2003, Part-V Wet Riser & Sprinkler system 2020, Part-VI Fire detection & alarm system-2018 with upto date correction slip.

Clause 12 :

Type of work Maintenance works

12	Deviation Limit	:	No limit

Clause 16	:	
Competent Authority for deciding reduced rates	:	**Chief Engineer, Kolkata**, CPWD, Kolkata or successor thereof.

Clause 18

LIST OF MANDATORY MACHINERY, TOOLS & PLANTS TO BE DEPLOYED BY THE CONTRACTOR AT SITE (For Civil Works)

Sl. No.	Machinery, Tools & Plants (as per requirement to complete the work)
1.	Excavator cum loader (various capacity).
2.	Bar Bending Machine.
3.	Bar Cutting Machine.
4.	Needle Vibrators – 25 mm, 40 mm, 60 mm
5.	Drilling Machine – with bits as per requirement.
6.	D.G Set of required capacity.
7.	Total Station and Auto levels.
8.	Steel shuttering with steel scaffolding – As per work programme.
9.	~~Piling rig.~~
10.	Concrete Pump along with required piping and associated tools and plants.
11.	Welding machine including for stainless steel welding.

AE (P) EE (P)

Sl. No.	Machinery, Tools & Plants (as per requirement to complete the work)
12.	Fully Automatic Batch Mix Plant of minimum capacity 20 Cum per hour along with printing of output mix facility. Engineer – in – Charge may allow lesser capacity mobile batch mix plant but with admixture dosing arrangement and printing of output mix facility.
13.	Concrete core cutting machine.
14.	Water Pump – for curing, spraying, etc..
15.	Concrete/Mortar Mixture machine hopper type – one bag capacity – 1 No.
16.	Rebound Hammer.
17.	Any other machinery required to get the pace of work as per approved construction program.
18.	As directed by Engineer – in – Charge.
For Electrical Works: List of mandatory machinery, tools & plants to be deployed by the contractor at site: - As required for timely execution of work as per direction of Engineer –in – charge. a. Screw Driver, b. Tester, c. Test lamp, d. Multimeter, e. Earth Tester, f. Megger, g. Tong Tester, h. Pillar, i. Slide Range/ spanner (various size) j. First Aid Box etc.	

Clause 19C : **Executive Engineer(E), Kolkata – I**, CPWD, Kolkata or successor thereof is the authority to decide penalty for each default.

Clause 19D : **Executive Engineer(E), Kolkata – I**, CPWD, Kolkata or successor thereof is the authority to decide penalty for each default.

Clause 19G : **Executive Engineer(E), Kolkata – I**, CPWD, Kolkata or successor thereof is the authority to decide penalty for each default.

Clause 19K : **Executive Engineer(E), Kolkata – I,** CPWD, Kolkata or successor thereof is the authority to decide penalty for each default.

Clause 19L The ESI and EPF contributions on the part of employer in respect of this contract shall be paid by the contractor. These contributions on the part of the employer paid by the contractor shall be reimbursed by the Engineer-in-charge to the contractor on actual basis

Clause 19M Sexual Harassment of Women at Workplace The contractor shall comply with all provision(s) and guideline(s) of Sexual Harassment of Women at Workplace (Prevention Prohibition and Redressal) Act, 2013 and amendment thereafter time to time or any other rules framed under any labour law affecting women worker(s)

Clause 25 :

(i)	Conciliator	:	Special Director General (Kolkata).
(ii)	Arbitrator Appointing Authority	:	Chief Engineer, Kolkata.
(iii)	Place of Arbitration	:	Kolkata.

Clause 32 :

Requirement of Technical Representative(s)* and recovery Rate

AE (P) EE (P)

Sl. No.	Requirement of Technical Staff**		Minimum Experience (Year)	Designation Technical Staff	Rate at which recovery shall be made from the contractor in the event of not fulfilling
	Qualification (of Major + Minor Component)	Number			
1	Graduate Engineer or Diploma Engineer	1 + 1	2 years or 5 years respectively	Project Manager cum Planning / Quality / Site / Billing Engineer	₹ 15,000.00 per month per person.

** Assistant Engineers retired from Government services and holding Diploma in relevant stream 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 the condition that such diploma holders should not exceed 50% of requirement of degree engineer.

Clause 38 :

(i)	(a)	Schedule/statement for determining theoretical quantity of cement & bitumen on the basis of Delhi Schedule of Rates 2023 printed by CPWD.	
(ii)	Variations permissible on theoretical quantities:		
	(a)	Cement	
		For works with estimated cost put to tender not more than ` 25 lakh.	3% plus/minus.
		For works with estimated cost put to tender more than ` 25 lakh.	2% plus/minus
	(b)	Bitumen All Works	2.5% plus & only & nil on minus side.
	(c)	Steel Reinforcement and structural steel sections for each diameter, section and category	2% plus/minus
	(d)	All other materials	Nil

AE (P) EE (P)

PART – B : CIVIL WORKS

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SPECIAL CONDITIONS FOR CIVIL WORKS

1. GENERAL :

1.1. **Specifications & Order of preference :**

1.1.1. Except for the items, for which Particular Specifications are given or where it is specifically mentioned otherwise in the description of the items in the schedule of quantities, the work shall generally be carried out in accordance with the "CPWD Specifications 2019 Vol. I & II" with up to date correction slips, Additional / Particular Specifications, Architectural / structural drawings and as per directions of Engineer-in-Charge.

1.1.2. The several documents forming the tender are to be taken as mutually complementary to one another. Detailed drawings shall be followed in preference to small scale drawings and figured dimensions in preference to scaled dimensions.

1.1.3. If there is any difference or discrepancy between the description of items as given in the schedule of quantities, particular specifications for individual items of work (including special conditions) and I.S. Codes etc., the following order of preference shall be observed :

(a) Description of items as given in Schedule of Quantities.

(b) Particular Specifications.

(c) Architectural drawings.

(d) Structural drawings.

(e) Special Conditions.

(f) Additional Conditions.

(g) CPWD Specifications with up to date correction slips.

(h) General conditions of contract for CPWD works as per Schedule-F

(i) Indian Standard Specifications of B.I.S.

(j) Manufacturers' specifications & as decided by Engineer-in-charge.

(k) Sound Engineering practices.

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

1.1.4. Any reference made to any Indian Standard Specifications, 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 make available when required at his own cost all such publications including relevant Indian Standard Codes applicable to the work at site.

1.2. **Scope:**

1.2.1. 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.

1.2.2. 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 of 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.

1.2.3. Contractor shall provide all the shop drawings or layout drawings for all the co-ordinate 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.

1.2.4. 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.

1.3. **Deployment of Technical staff & skilled labour:**

1.3.1. The 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 to provide the desired quality.

The Contractor shall depute Site Engineer & skilled workers as required for the work. He shall submit organization chart along with details of Engineers and supervisory staff. It shall be ensured that all decision making powers shall be available to the representatives of the contractor at site itself to avoid any likely delays on this account. The contractor shall also furnish list of persons for specialized works to be executed for various items of work. The Contractor shall identify and deploy key persons having qualifications and experience in the similar and other major works, as per the field of their expertise. If during the course of execution of work, the Engineer-in-Charge is of the opinion that the deployed staff is not sufficient or not well experienced; the Contractor shall deploy more staff or better-experienced staff at site to complete the work with quality and in stipulated time limit. The Project Manager of the contractor having minimum twenty years of experience in similar nature of work along with all technical staff as mentioned in the clause 36 of the GCC, shall always be available at the site during execution of work.

1.4. **Removal of Machinery, Tools & Equipment :**

1.4.1. Machinery, tools & equipment shall be allowed to be moved away from the site only when, in written opinion of Engineer-in-Charge, the same are no longer required at site of work.

1.5. **Site condition :**

1.5.1. The Tenderer shall acquaint himself with the site of work and 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 for cartage of materials by the contractor, the same shall be provided, improved and maintained by the contractor at his own cost.

1.6. **Precautionary measures :**

1.6.1. Temporary barricading with colour coated MS corrugated sheets & MS frame work shall be provided at Site to be constructed at their own cost. The barricading physically defines the boundaries of the plot for restricted entry to only those involved in the work and also to prevent any accident and also not causing any inconvenience to the traffic. The barricading panels shall be painted with "CPWD" mark in suitable size, shapes and number as directed by Engineer-in-charge without any extra cost. It shall be dismantled and taken away by the contractor after completion of the work at his own cost with the permission of Engineer-in-charge.

1.6.2. Contractor shall take all precautionary measures to avoid any damage to adjoining property. All necessary arrangement shall be made at his own cost. The contractor shall take all precautions to prevent his workmen and employees from removing and damaging any Flora (plant/vegetation) from the campus/site.

1.6.3. The contractor shall take all precautions to avoid accidents by exhibiting necessary caution boards day and night, speed limit boards, red flags, red lights and providing barriers. He shall be responsible for all damages and accidents caused to work due to negligence on his part. No hindrances shall be caused to traffic, during the execution of the work. In case of any accident of the labourers/ contractual staff, the entire responsibility will rest on the contractor and any compensation under such circumstances, if it becomes payable, shall be entirely borne by the contractor.

1.6.4. The contractor, his authorized representative, workmen etc. shall strictly observe orders pertaining to fire and safety precautions prevailing in the area.

1.6.5. The Contractor shall take all necessary precautions to prevent any nuisance or inconvenience to occupants of the adjacent properties and to the public in general. The Contractor shall take all care, as not to damage any other adjacent property in the campus or other services running adjacent to the plot. If any damage is done, to any property the same shall be made good by the Contractor at his own cost and to the entire satisfaction of the Engineer-in-Charge. The Contractor shall use such methodology and equipment for execution of the work, so as to cause minimum environmental pollution of any kind during construction, to have minimum construction time and minimum inconvenience to occupants of the buildings on the adjacent plot and public in general, etc. He shall make good at his own cost and to the entire satisfaction of the Engineer in Charge any damage to roads, paths, cross drainage works or public or private property whatsoever

caused, due to the execution of the work or by traffic brought thereon, by the Contractor. Further, the Contractor shall take all precautions to prevent any pollution of streams and waterways. All waste or superfluous materials shall be carted away by the Contractor, entirely to the satisfaction of the Engineer-in-Charge. 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 adjoining buildings. No claim what so ever on account of site constraints mentioned above or any other site constraints not specifically stated here, shall be entertained from the Contractor. Therefore, the Contractors are advised to visit site and get firsthand information of site constraints. Accordingly, they should quote their tenders. Nothing extra shall be payable on this account.

1.7. **General cleanliness of the site and Stacking & Storage of Materials :**

1.7.1. The site of work shall be always kept clean in general strictly adhering to approved job layout and Green building parameters. The Contractor shall take all care to prevent any water- logging at site. The waste water shall not be allowed to be collected at site. It may be directly pumped into the public drainage system with prior approval of the concerned authorities. For discharge into public drainage system, necessary permission shall be obtained from concerned authorities after paying the necessary charges, if any, directly to the authorities. The work shall be carried out in such a way that the area is kept clean and tidy. All the fees/charges in this regard shall be borne by the Contractor. Nothing extra shall be payable on this account.

1.7.2. The contractor 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, compound wall, services etc. are to be constructed.

1.7.3. For construction works which are likely to generate malba / rubbish, contractor shall dispose of malba, rubbish & other unserviceable materials and wastes at his own cost to the notified/specified dumping ground and under no circumstances these shall be stacked / dumped even temporarily, outside the construction premises.

1.7.4. The contractor shall construct suitable godowns, yard at the site of work for storing all other materials so as to be safe against damage by sun, rain, damages, fire, theft etc. at his own cost and also employ necessary watch and ward establishment for the purpose at his cost.

1.7.5. The site for the work is quite level and has minimal shrubbery. The bidders may note that no extra payment will be made for jungle clearing and he shall make at his own cost all necessary cleaning / clearing of the site for all activities related to this work.

1.7.6. The contractor shall not dump any malba or construction material in a manner that obstructs adjacent water bodies /streams. The same shall be kept in natural condition only.

1.8. **Lab Equipment :**

The contractor shall provide at his own cost suitable weighing, surveying and levelling and measuring arrangements as may be necessary at site for checking. All such equipment shall be got calibrated in advance from laboratory, approved by the Engineer-in-Charge. Nothing extra shall be payable on this account. A site laboratory with the minimum equipment as specified in NIT shall be established, made functional and maintained within 21 days from the award of the work without any extra cost to the department.

1.9. **Setting Out :**

1.9.1. 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.

1.9.2. In order to set the alignment of buildings / foundations and to mark the same on the ground, the agency is to adopt "total station" surveying method. The agency is to engage a well versed and well experienced surveyor in "total station" survey. Nothing extra for this total station survey is payable.

If at any time, any error in the respect of setting out appears 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. The approval by the Engineer-in-Charge, of the setting out by the contractor, shall not relieve the contractor of any of his responsibilities and obligation to rectify the errors/defects, if any, which may be found at any stage during the progress of the work or after the completion of the work

1.9.3. The contractor shall be entirely and exclusively responsible for the horizontal, vertical and other alignments, the level and correctness of every part of the work and shall rectify effectively any errors or imperfections therein. Such rectifications shall be carried out by the contractor at his own cost as per the instructions and satisfaction of the Engineer-in-Charge.

1.9.4. The Contractor shall carry out survey of the work area, at his own cost, setting out the layout of building in consultation with the Engineer-in-Charge & proceed further. Any discrepancy between the architectural drawings and actual layout at site shall be brought to the notice of the Engineer-in-charge. It shall be responsibility of the Contractor to ensure correct setting out of alignment. Total station survey instruments only shall be used for layout, fixing boundaries, and Centre lines, etc., along with the Theodolites. Nothing extra shall be payable on this account.

1.9.5. The contractor shall establish a permanent benchmark on site and mark the Reduced Level with respect to the GTS benchmark from the concerned authorities. All site levels shall be recorded with respect to the permanent benchmark so established. The contractor shall protect and maintain temporary/ permanent benchmarks at the site of work throughout the execution of the work. These bench marks shall be got checked by the Engineer- in-Charge or his authorized representatives. The work at different stages shall be checked with reference to bench marks maintained for the said purpose. Nothing extra shall be

payable on this account. All such reference points shall be in relation to the levels and locations, given in the Architectural and plumbing drawings.

1.10. **Temporary Water, Electricity & Telephone Connections :**

1.10.1. The contractor shall make his own arrangements for water including boring of tube wells etc. if necessary and permitted by the local authorities. Arrangement for electricity for execution of works shall be made by the contractor by obtaining electric connections and by providing diesel generators of adequate capacity if required. He shall make necessary payments directly to the State Govt. departments concerned. Nothing extra shall be paid on these accounts. Contractor shall get the water tested from laboratory approved by the Engineer-in-charge at regular interval as per the CPWD Specifications applicable. All expenses towards collection of samples, packing, transportation except testing charges etc. shall be borne by the contractor. The contractor shall obtain environmental and pollution clearance for the diesel generators. Nothing extra shall be paid on this account.

1.10.2. The Contractor shall arrange electricity at his own cost for testing of the various electrical installations as directed by Engineer-in-Charge and for the consumption by the contractor for executing the work. Also all the water required for testing various electrical installations, fire pumps, wet riser / fire fighting equipments, fire sprinklers etc. and also testing water supply, sanitary and drainage lines, water proofing of underground sump, overhead tanks, water proofing treatment etc. shall be arranged by the contractor at his own cost. Nothing extra shall be payable on this account.

1.10.3. The Contractor shall abide by all the rules/ bye laws applicable for water and electricity connections and he shall be solely responsible for any penalty on account of violation of any of the rules / byelaws in this regard. Nothing extra shall be payable on this account. The department shall remain indemnified against any claims for damages by any third party for the same.

1.10.4. The Contractor shall be responsible for maintenance and watch and ward of the complete installation and water / electricity meter and shall also be responsible for any pilferage, theft, damage, penalty etc. in this regard. The Contractor shall indemnify the Department against any claim arising out of pilferage, theft, damage, penalty etc. whatsoever on this account. Security deposit for the work shall be released only after No Dues Certificates are obtained from CPWD authorities and also from the local Authorities from whom temporary electric/ water / telephone connection have been obtained by the Contractor. Nothing extra shall be payable on this account.

1.10.5. The Department shall in no way be responsible for either any delay in getting electric and/or water and/or telephone connections for carrying out the work or not getting connections at all. No claim of delay or any other kind, whatsoever, on this account shall be entertained from the Contractor. Also contingency arrangement of stand-by water & electrical supply shall be made by the Contractor commencement and smooth progress of the work so that work does not suffer on account of power failure or disconnection or not getting connection at all. No claim of any kind whatsoever shall be entertained on this account from the Contractor. Nothing extra shall be payable on this account.

1.11. **Architectural and Structural Drawings :**

1.11.1. Before commencement of any item of work, the contractor shall correlate all the relevant architectural and structural drawings approved for the work, nomenclature of items, specifications etc. and satisfy himself that the information available there from is complete and unambiguous. The figures & the written dimensions of the drawing shall supersede the measurement by scale. The discrepancy, if any, shall be brought to the notice of the Engineer-in-Charge for immediate decision before execution of the work. The contractor alone shall be responsible for any loss or damage occurring by the commencement of work on the basis of any erroneous and/ or incomplete information and no claim, whatsoever shall be entertained on this account. The delay caused on account of non-timely action by the contractor in resolution of the differences whatsoever shall not be considered as valid ground for extension of time unless otherwise accepted by Engineer-In-Charge.

1.11.2. The information and site data shown in the drawings and mentioned herein and also elsewhere in the tender documents are being furnished for general information and guidance only. The department shall not bear responsibility for lack of such knowledge and also the consequences thereof. The Engineer-in-charge in no case shall be held responsible for the accuracy thereof or any interpretation/ or conclusions drawn there from by the contractor.

1.12. **Scaffolding &Staging :**

1.12.1. Wherever required for the execution of work, all the scaffolding shall be provided and suitably fixed, by the contractor. The scaffolding shall be provided strictly with steel double scaffolding system, suitably braced for stability, with all the accessories, gangways, etc with adjustable suitable working platforms to access the areas with ease for working and inspection. Single scaffolding system is strictly prohibited and shall invite necessary action. It shall be designed to take all incidental loads. It should cater to the safety features for workmen. Nothing extra shall be payable on this account. It shall be ensured that no damage is caused to any structure due to the scaffolding.

1.12.2. The contractor should submit the shop / fabrication drawings of staging and shuttering for approval of Engineer-in-Charge before actually commencing the execution of work under the item, unless otherwise allowed by the Engineer-in-charge. Nothing extra shall be payable on this account.

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

1.13.1. The Contractor shall conduct his work so as not to interfere with or hinder the progress of the work being performed by other Contractors or by the Engineer-in-Charge. As far as possible, he shall arrange his work and place, so as not to interfere with the operations of other Contractors or shall arrange his work with that of the others, in an acceptable and coordinated manner and shall perform it in proper sequence.

1.13.2. Other agencies may also simultaneously execute and install the works and the contractor shall afford necessary facilities for the same. The contractor shall leave such recesses, holes, openings, trenches etc. as may be required for such related works (for which inserts, sleeves, brackets, conduits, base plates, clamps etc. shall be available as specified elsewhere in the contract) and the contractor shall fix the same at the time of casting of concrete, stone work and brick work, if required, and nothing extra shall be payable on this account.

1.13.3. The Contractor shall cooperate with and provide the facilities to his associate Contractors and other agencies working at site for smooth execution of the work. The Contractor shall :

(a) Allow use of scaffolding already erected, toilets, sheds etc.

(b) Properly co-ordinate their work with the work of other Contractors.

(c) Provide control lines and benchmarks to his associate Contractors and the other Contractors.

(d) Provide electricity and water at mutually agreed rates.

(e) Provide hoist and crane facilities for lifting material at mutually agreed rates.

(f) Co-ordinate with other Contractors for leaving inserts, making chases, alignment of services etc. at site.

(g) Adjust work schedule and site activities in consultation with the Engineer-in-Charge and other Contractors to suit the overall schedule completion.

(h) Resolve the disputes with other Contractor amicably and the Engineer-in-Charge shall not be made intermediary or arbitrator. The contractor shall indemnify the Department against any claim(s) arising out of such disputes.

1.14. **Procurement of materials :**

1.14.1. All material shall only be brought at site as per program finalized with the Engineer- in Charge. Any pre-delivery of the material not required for immediate consumption shall not be accepted and thus not paid for.

1.14.2. The contractor shall procure the required materials in advance so that there is sufficient time for testing of the materials and approval of the same before use in the work.

1.14.3. The contractor shall get the source of various raw materials namely aggregate, cement, sand, steel, water etc. to be used on the work, approved from the Engineer-in-Charge and trial mixes for controlled concrete shall be done using the approved materials. 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.

1.14.4. Similarly, the contractor shall submit brand/make of various materials to be used for the approval of the Engineer-in-Charge along with samples and once approved, he shall stick to it. Any change will have to be got approved from engineer in charge in advance. Selection of materials shall be made considering the GRIHA requirements applicable for this contract.

1.15. **Protection of Existing Services & buildings and Materials :**

1.15.1. Existing drains, pipes, cables, over-head wires, sewer lines, water lines and similar services encountered in the course of the execution of work shall be protected against the damage by the contractor at his own expense. The contractor shall not store materials or otherwise occupy any part of the site in a manner likely to hinder the operation of such services. In case temporary

supporting of such services is required to facilitate the work, the same shall be done by the contractor at no extra cost.

1.15.2. In case the existing services are to be shifted permanently, then before dismantling the existing services, alternate/diversion of service lines has to be laid by the contractor so that there is no interruption in use of existing services. The contractor has to plan the alternate suitable route for diversion/shifting of service lines and get the same approved from the Engineer-in-Charge before starting shifting of services. Nothing extra shall be paid except the payment of dismantling and laying of new service lines as per conditions of contract.

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

1.15.4. The contractor shall be responsible for the watch and ward / guard of the buildings, safety of all fittings and fixtures including sanitary and water supply fittings and fixtures provided by him against pilferage and breakage during the period of installations and thereafter till the building is physically handed over to the client department. No extra payment shall be made on this account.

1.15.5. The contractor shall be fully responsible for the safe custody of materials brought by him/issued to him even though the materials may be under double lock key system.

1.16. **Rates and other conditions for payment :**

The rates quoted by the Contractor are deemed to be inclusive of the following

1.16.1. Site clearance, setting out work, profile, establishment of reference bench mark(s), taking spot levels, construction of all safety and protection devices, barriers, barricading, signage, labour safety, welfare & training measures for labour and staff, preparatory works, working during monsoon, working at all depths, height, lead, lift and location etc. until / unless specified otherwise, implementation of Green building norms as desired as per GRIHA Rating etc. and any other incidental works required to complete this work. Nothing extra shall be payable on this account. Payment for centering & shuttering, however, if required to be done for floor heights greater than 3.50m shall be admissible at rates arrived in accordance with clause 12 of the agreement if not already specified in the Schedule Of Quantities.

1.16.2. For works below ground level the contractor shall keep that area free from water. If dewatering or bailing out of water is required the contractor shall do it and nothing extra shall be paid. This will include water encountered from any source such as rains, floods, sub-soil water table being high or any other cause whatsoever. Any arrangements required to be made for keeping out water from entering critical areas, like sand bags, shoring, sheet piling, etc. are to be done by the contractor and his quoted rates are deemed to be inclusive of the same.

1.16.3. legal or financial implications resulting out of disposal of earth shall be sole responsibility of the contractor. Nothing extra over the agreement rates shall be paid on this account. No extra lead shall be payable for disposal of waste material / excavated earth outside the campus. The contractor shall make his own arrangement for borrow pits / disposal grounds. He shall make suitable enquiries regarding the above before quoting his rates.

1.16.4. All labour, material, tools and plants and other inputs involved in the execution of the item.

1.16.5. Providing sunk flooring in bath-rooms, kitchen, etc. if provided in the drawings.

1.16.6. Performance test of the entire installation(s) before the work is finally accepted.

1.16.7. Any cement slurry added over base surface (or) for continuation of concreting for better bond is deemed to have been built in the items.

1.16.8. The percentage quoted by the tenderer, shall be inclusive of all taxes including GST and levies applicable in respect of this contract shall be payable by the contractor and Government will not entertain any claim whatsoever in respect of the same.

1.16.9. For completing the work in time, the Contractor might be required to work in two or more shifts (including night shifts). No claim whatsoever shall be entertained on this account, 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.

1.16.10. The Contractor shall keep himself fully informed of all acts and laws of the Central & State Governments, all orders, decrees of statutory bodies, tribunals having any jurisdiction or authority, which in any manner may affect those engaged or employed and anything related to carrying out the work. All the rules & regulations and bye-laws laid down by Collector / MC etc. and any other statutory bodies shall be adhered to, by the contractor, during the execution of work. The Contractor shall also adhere to all traffic restrictions notified by the local authorities. The water charges (for municipal water connection as well as tanker water) shall be borne by the contractor. Also, if the contractor obtains water connection for the drinking purposes from the municipal authorities or any other statutory body, the consequent sewerage charges shall be borne by the contractor. All statutory taxes, levies, charges (including GST, water and sewerage charges, charges for temporary service connections and / or any other charges) payable to such authorities for carrying out the work, shall be borne by the Contractor. The Contractor shall arrange to give all notices as required by any statutory / regulatory authority and obtain all requisite licenses wherever required and shall pay to such authority all the fees that are required to be paid for the execution of work. He shall protect and indemnify the Department and its officials & employees against any claim and /or liability arising out of violations of any such laws, ordinances, orders, decrees, by himself or by his employees or his authorized representatives. Nothing extra shall be payable on these accounts. The fee payable to statutory authorities for obtaining the various permanent service connections and Occupancy Certificate for the building shall be borne by the Department.

1.16.11. Royalty at the prevalent rates shall have to be paid by the contractor *on all the boulders, stone aggregate, brick aggregate, shingle, coarse or fine sand, earth, gravel, bajri etc.* collected by him for the execution of the work, directly to the Revenue Authority or authorized agent of the State Government concerned or Central Government.

Royalty at the prevalent rates shall be paid by the contractor or the RMC supplier as per the terms of supply between them, on all materials such as *stone aggregate, coarse or fine sand etc.* collected by him for the execution of the work, directly to the revenue authority of the State Government concerned. Further, contractor needs to submit proof of submission of full royalty to the State Government or local authority. Nothing extra shall be payable on this account.

1.16.12. 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, water storage tanks, installation and consumption charges of temporary electricity, telephone, water etc. required for execution of the work, liaison and pursuing for obtaining various No Objection Certificates, completion certificates from local bodies etc., protection works, barricading, 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, for various items in the schedule of quantities. Nothing extra shall be payable on these accounts. Before start of the work, the Contractor shall submit to the Engineer-in-Charge, a site / construction yard layout, specifying areas for construction, site office, positioning of machinery, material yard, cement and other storage, steel fabrication yard, site laboratory, water tank, etc.

1.16.13. The Contractor shall assume all liability, financial or otherwise in connection with this contract and shall protect and indemnify the Department from any and all damages and claims that may arise on any account. The Contractor shall indemnify the Department against all claims in respect of patent rights, royalties, design, trademarks of name or other protected rights, damages to adjacent buildings, roads or members of public, in course of execution of work or any other reasons whatsoever, and shall himself defend all actions arising from such claims and shall indemnify the Department in all respect from such actions, costs and expenses. Nothing extra shall be payable on this account.

1.16.14. The Contractor shall make all necessary arrangements for protecting from rain or likewise extreme weather conditions, the work already executed and for carrying out the further work, during monsoon including providing and fixing temporary shelters, protections etc. Nothing extra shall be payable on this account.

1.16.15. In case of flooding of site on account of rain, sub-soil water or any other source and any consequent damage, whatsoever, no claim financially or otherwise shall be entertained not withstanding any other provisions elsewhere in the contract agreement. Also, the Contractor shall make good, at his own cost, the damages caused, if any. Further, no claims for hindrance shall be entertained on this account.

1.16.16. No payment shall be made for any damage caused by fire, rain, snowfall, flood or any other natural calamity, whatsoever during the execution of the work. The contractor shall be fully responsible for any damage to the govt. property and the work for which payment has been advanced to him under the contract and he shall make good the same at his risk and cost. The contractor shall be fully responsible for safety and security of his material, T&P/Machinery brought to the site by him. The contractor shall maintain all the work in good condition at his own cost till the completion of the entire work.

1.16.17. In case the same item appears more than once in the schedule of work under the same sub head or among the different sub heads of works, the lowest rate quoted for that item shall be taken for other items also and tender will be evaluated accordingly. Similarly, if any part or component of the item is provided in more than one item but required only once, Engineer-in-Charge shall recover the cost of providing and fitting the unutilized components of the item.

1.16.18. The ESI and EPF contribution on the part of employer in respect of this contract shall be paid by the contractor. These contributions on the part of employer paid by the contractor shall be reimbursed by the Engineer in charge to the contractor on actual basis. The applicable and eligible amount of EPF& ESI shall be reimbursed preferably within 7 days but not later than 30 days of submission of documentary proof of payment which are in order.

1.17. **Foreign Exchange :**

1.17.1. No foreign exchange shall be made available by the Department for importing (purchase) of equipment, plants, machinery or part thereof, materials of any kind or any other items if 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.

1.17.2. The contractors have to quote the corresponding imported items in "Indian Rupees" in the Schedule of Quantities which shall include all incidental charges including freight, taxes including GST, import duties, fluctuations in currency rates. No extra payment will be made over and above the quoted rates.

1.18. **Tools &Plant :**

1.18.1. No tools and plants including any special T&P etc. shall be supplied by the Department and the Contractor shall have to make his own arrangements at his own cost. No claim of hindrance (or any other claim) shall be entertained on this account.

1.19. **As Built & Service Drawings :**

1.19.1. The contractor shall submit completion plan and (4 sets) of "as built" drawings as applicable within thirty days of the completion of the work. These drawings shall have the following information in addition to the usual architectural, structural, services and electrical drawings :

(a) All piping and their diameters including soil waste pipes and vertical stacks.

(b) Ground and invert levels of all drainage pipes together with locations of all manholes and connections, up to outfall.

(c) All water supply line with diameters, locations of control valves, access panels etc.

In case, the contractor fails to submit the completion plan as aforesaid, he shall be liable to pay a sum of 0.1% of Tendered Value or ` 50,000.00 whichever is more or as may be fixed by the Chief Engineer (Kolkata), CPWD, Nizam Palace, Kolkata and in this respect the decision of the Chief Engineer shall be final and binding on the contractor.

The contractor shall submit completion plans for Internal and External Civil, Electrical and Mechanical Services within thirty days of the completion of the work, provided that the service plans having been issued for execution by the Engineer-in-Charge, unless the contractor, by virtue of any other provision in the contract, is required to prepare such plans.

1.20. **Computerized MBs &SMBs :**

1.20.1. The contractor shall make available four (04) sets of computerized Standard Measurement Books (SMBs) having measurement of all the permanent standing in a building.

1.20.2. The contractor will submit computerized measurement sheet for the work carried out by him for making payment as per Clause-6 of the CPWD General Conditions of Contract 2020 for construction works (with correction slips upto the last date of submission of tender). For casting of RCC members and other hidden items the corrected and duly test checked measurement sheets of reinforcement or that of other hidden items shall be deposited with Engineer in charge or his authorized representative, before casting of RCC or other hidden items. The delay in submission of corrected and duly checked measurement sheet may, therefore, delay casting of RCC or execution of hidden item for which no hindrance shall be recorded.

1.20.3. Electronic measurement book is introduced. The contractor shall comply with the same as per the direction of Engineer-in-charge.

1.21. **Water Supply & Sanitary Installations &Testing :**

1.21.1. Water tanks, taps, sanitary, water supply and drainage pipes, fittings and accessories should conform to approved manufacturers specifications where CPWD Specifications are not applicable. The contractor should get the materials (fixtures/fittings) tested from approved labs wherever required at his own cost. The contractor shall submit for the approval of the Engineer-in-Charge, the name of the plumbing agency (along with their working experience in recent past) proposed to be engaged by him.

1.21.2. The contractor shall give performance test of the entire installation(s) as per the standing specifications before the work is finally accepted and nothing extra whatsoever shall be payable to the contractor for the test.

1.22. The contractor shall provide watch & ward facility after physical completion on till handing over the premises at their cost. No extra payment shall be made on this account.

2. RECORDING OF HINDRANCES :-

2.1. No Hindrance register will be maintained at site. Whenever any hindrance comes to the notice of the contractor he should at once bring it to the notice of Engineer-in- charge who will resolve the same at the earliest.

2.2. The Contractor shall apply for EOT if the date of completion is to be extended because of such hindrance.

2.3. Similarly the contractor shall apply for shifting of milestones, if in his opinion, there is justification for doing so. The Engineer-in-Charge shall convey the decision of the competent authority before withholding of amount on account of non-achievement of milestone.

3. SECRECY :

3.1. The contractor shall take all steps necessary that all persons employed on any work in connection with the contract have noticed that the Indian Official Secrets Act 1923 applies to them & will continue so to apply even after the execution of such works under the contract.

3.2. The contract is confidential and must be strictly confined to the contractor's own use (except so far as confidential disclosure to sub-contractors or suppliers as necessary) and to the purpose of the contract.

3.3. All documents, copies thereof & extracts there from furnished to the contractor shall be returned to the Engineer-in-Charge on the completion of the work / works or the earlier determination of the contract.

4. LABOUR AND SECURITY :

4.1. 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 statement 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 a sum not exceeding `5,000.00 for every default, breach or furnishing, making, submitting, filing such materially incorrect statements and in the event of the contractor(s) defaulting continuously in this respect, the penalty may be enhanced to `5,000.00 per day for each day of default subject to a maximum of 5 per cent 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. No payment shall be made for construction of labour housing.

4.2. 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.

4.3. Contractor should provide his plan for labour huts as per his requirement and get it approved from the Engineer-in-Charge. The contractor will be provided limited space for hutments of security personal / watchmen inside the campus. The contractor shall make his own arrangement for housing all construction workers &labour at his own cost and nothing extra shall be payable on this account.

4.4. The contractors are required to provide such accommodation for workmen as is acceptable to local bodies & Green building norms and nothing extra shall be paid on this account.

4.5. The contractor shall employ only Indian Nationals after verifying their antecedents. The contractor shall, on demand submit list of his agents, employees and work people concerned & shall satisfy as to the bonafides of such people.

4.6. 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.

5. OFFICE INFRASTRUCTURE :

5.1. For Quality Control Measures, Preparation of Bills and Monitoring the Quality, the contractor shall provide one Computer having Intel core i7 processor, MS-Windows-10, A-3 Coloured Inkjet & A-4 Laserjet Printers, Scanners, UPS etc. with data entry operator in the site office of Engineer-in-Charge.

5.2. The contractor shall make arrangement for Helmets and leather shoes (meant of construction work at sites) for all field staff of the department during the entire period of construction for safety reasons. One helmet and two pairs of shoes per staff member (maximum twelve members) of the departments per year shall be arranged by the contractor. Nothing extra shall be paid to the contractor at this account.

6. DOCUMENTATION :

The Contractor shall render all help and assistance in documenting the total sequences of this project by way of arranging for photography, slides, audio / video recording & other records etc. Nothing extra shall be payable to Contractor on this account. The original films shall be the property of the Department. No copy shall be prepared without the prior approval of the Engineer- in – Charge.

7. PROGRESS CHART :-

7.1. The contractor shall submit the "Time and Progress Chart and monthly Progress Report" using the mutually agreed software or in other format decided by Engineer-in-charge for the work done during previous month to the Engineer-in-charge on or before 5th day of each month failing which a recovery `5,000.00 shall be made on per week or part basis in case of delay in submission of the above report.

7.2. The program chart should include the following: -

(a) Descriptive note explaining sequence of various activities.

(b) BAR CHARTS prepared in mutually agreed software or in other format decided by Engineer-in-charge which will indicate resources in terms of manpower and specialized equipment for every important stage.

(c) Program for procurement of materials by the contractor.

(d) Program for achieving milestones.

7.3. The submission for approval by the Engineer-in-charge of such programme or 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.

8. PROGRESS AND MONITORING OF WORK :

8.1. The progress report shall contain the following, apart from whatever else may be required as specified :-

(a) Construction schedule of the various components of the work through a bar chart for the next three months (or as may be specified by Engineer-in-charge), showing the micro milestones, targeted tasks and up to date progress. At least 10 digital photographs showing all the parts of construction site along with at least 5 minutes video of executions of different items in soft copy has to be submitted in every monthly progress report.

(b) Progress chart of the various components of the work that are planned and achieved, for the month as well as cumulative up to the month, with reason for deviations, if any in a tabular format.

(c) Plant and machinery statement, indicating those deployed in the work.

(d) Man-power statement, indicating individually the names of all the staff deployed on the work, along with their designations. Number of skilled workers and unskilled workers deployed on the work and their location of deployment.

(e) Financial statement, indicating the broad details of all the running account payment received up to date, such as gross value of work done, advances taken, recoveries effected, amount withheld, net payments details of Cheque payment received, extra /substituted /deviations items if any, etc.

8.2. For completing the work in time, the Contractor might be required to work in two or more shifts (including night shifts). No claim whatsoever shall be entertained on this account, 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.

8.3. The work should be planned in a systematic manner so that chase cuttings in the walls, ceilings and floors is 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 co-ordination of various disciplines viz. building works, sanitary & water supply & electrical installations etc.

8.4. The contractor shall conduct his work, so as not to interfere with or hinder the progress or completion of the work being performed by other contractor(s) or by the Engineer-in- Charge and shall as far as 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 Engineer-in-charge.

8.5. The Contractor shall do proper sequencing of the various activities by suitably staggering the activities within various pockets in the plot so as to achieve early completion. The agency may deploy adequate equipment, machinery and labour as required for the completion of the entire work within the stipulated period specified. Also ancillary facilities shall be provided commensurate with requirement to complete the entire work within the stipulated period. Nothing extra shall be payable on this account. Adequate number/sets of equipment in working condition, along with adequate stand-by arrangements, shall be deployed during entire construction period. It shall be ensured by the Contractor that all the equipment, Tools & Plants, machineries etc. provided by him are maintained in proper working conditions at all times during the progress of the work and till the completion of the work. Further, all

the constructional tools, plants, equipment and machineries provided by the Contractor, on site of work or his work shop for this work, shall be exclusively intended for use in the construction of this work and they shall not be shifted / removed from site without the permission of the Engineer-in-Charge.

8.6. 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.

9. PROJECT REVIEW MEETINGS :

9.1. The contractor, immediately on award of work shall submit details of his key personnel to be engaged for the work at site. In addition, he shall furnish the Engineer-in-charge detailed organization involved with the work.

9.2. The contractor shall present the program and status at various review meetings as required.

9.3. Monthly Review Meetings: Shall be attended by Project - in - charge and the Management Representative who can take independent decisions along with CPWD, client's representatives.

Agenda :

(a) Progress Status/ Material procurement/ Labour deployment.

(b) Completion Outlook.

(c) Major hold ups/slippages.

(d) Assistance required.

(e) Critical issues / bottlenecks in execution.

(f) Any decision on queries raised either by Contractor/PMC.

(g) Anticipated cash flow requirement for next two months.

10. DEFECT LIABILITY PERIOD (REFUND OF SECURITY DEPOSIT) :

10.1. The defect liability / maintenance period shall be 12 months after the date of completion of work for this contract agreement. The Security Deposit shall be released after the defect liability period of 12 months after completion of work and for this, the contractor shall have to produce a certificate stating that no defects are pending for rectification from the Engineer-in-charge, but subject to other provisions specified elsewhere in the contract agreement.

10.2. In case the contractor does not rectify the defects after getting notice from the Engineer-in-charge, the defect liability period shall get extended without further notice and remain extended till the defects are removed by the contractor.

11. SAFETY MEASURES :

11.1. The issue of construction safety & standards has gained utmost importance in recent times. This subject is to be dealt with in an integrated manner with an approach to developing and establishing a safety culture at work sites. Broadly, its components are :

(a) Creating awareness.

(b) Education.

(c) Training.

(d) Implementation.

(e) Enforcement measures.

All workers of contractor and associate agencies, invariably and at all the times, must follow all safety norms, adopt safe construction practices and use all required safety gadgets in their working throughout the project duration.

11.2. The Contractor shall monitor and achieve the objectives of construction safety continuously, progressively and through affirmative action, and shall oversee implementation of safety program over the entire construction period through a dedicated & qualified safety manger. Nothing extra shall be paid on this account.

11.3. **Warning / Caution Boards :**

All temporary warning / caution boards / glow signage display such as "Construction Work in Progress", "Keep Away", "No Parking", Diversions & protective Barricades etc. shall be provided and displayed during day time by the Contractor, wherever required and as directed by the Engineer-in-Charge. These glow signage and red lights shall be suitably illuminated during night also. The Contractor shall be solely responsible for damage and accident caused, if any, due to negligence on his part. Also he shall ensure that no hindrance, as far as possible, is caused to general traffic during execution of the work. This signage shall be dismantled & taken away by the Contractor after the completion of work, only after approval of the Engineer – in – Charge. Nothing extra shall be payable on this account.

11.4. **Sign Boards :**

11.4.1. The Contractor shall provide and erect a display board of size and shape as required and paint over it, in a legible and workman like manner, the details about the salient features of the project, as required by the Engineer-in-Charge. The Contractor shall fabricate and put up a sign board in an approved location and to an approved design indicating name of the project, client / owner, architects, structural consultants, Department etc. besides providing space for names of other Contractors, Associate contractors and specialized agencies. Nothing extra shall be payable on this account.

11.4.2. A display board shall be kept at site which would list the names of workers, teams and agencies following safety program in the best manner. This would be updated weekly.

11.4.3. Necessary protective and safety equipment shall be provided to the Site Engineer, Supervisory staff, labour and technical staff of the contractor by the Contractor at his own cost and used at site.

11.4.4. No inflammable materials including P.O.L shall be allowed to be stored in huge quantity at site. Only limited quantity of P.O.L may be allowed to be stored at site subject to the compliance of all rules / instructions issued by the relevant authorities and as per the direction of Engineer -in- Charge in this regard. Also all precautions and safety measures shall be taken by the Contractor for safe handling of the P.O.L products stored at site. All consequences on account of unsafe handling of P.O.L shall be borne by the Contractor.

11.5. **Barricading of site :**

The entire site is to be barricading with colour coated GI sheets of height 3 m from Road level. The barricading should be rigid enough to withstand Gusty winds. The

Barricading shall be taken away by the contractor after completion of work. No separate payment will be made for erection of such barricading around the site.

12. SPECIAL CONDITION FOR HARDWARE AND SANITARY WARES :

12.1. Engineer-in-Charge will take a decision regarding model numbers of equivalent Door/window hard ware/ sanitary ware at the time of execution, in case the material, from the manufacturer whose model number is mentioned, is not available. However, in case, the equivalent model so approved, is cheaper than the model already mentioned in item/approved makes list, the price adjustment will be made based on the difference in market rate. In case, the rate of subsequently approved model is more, no extra payment will be made on this account."

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

(a) 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.

(b) 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, 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.

13. INSPECTION OF WORKS :

13.1. In addition to the provisions of relevant clauses of the contract, the work shall also be open to inspection by the Chief Engineer, CPWD, Kolkata and other senior officers of CPWD in addition of the Engineer-in-charge, his authorized representatives, authorities and team of third party Quality Assurance engaged for the work. The contractor shall at times during the usual working hours and at all times at which reasonable notices of the intention of the Engineer-in-charge or other officers as stated above to visit the works shall have been given to the contractor, either himself be present to receive the orders and instructions or have a responsible representative duly accredited in writing, to be present for that purpose.

13.2. The committee/consultant appointed by CPWD, shall be inspecting the works including workshops and fabrication factory to ensure that the works in general being executed according to the design, drawings and specifications laid down in the contract. Their observations shall be communicated by CPWD engineering staff and compliance is to be reported to CPWD. The committee/consultant appointed by CPWD shall certify on completion of particular building that it has been constructed according to the approved drawings design and specifications.

13.3. Senior Officers of CPWD, Dignitaries from Central Ministry / Department, IACS Authorities shall be inspecting the on-going work at site at any time with or without prior intimation. The contractor shall, therefore, keep updated the following requirements and detailing :-

(a) Display Board showing detail of work, weekly progress achieved with respect to targets, reason of shortfall, status of manpower, wages being paid for different categories of workers.

(b) Entrance and area surrounding to be kept cleaned.

(c) Display layout plan key plan, Building drawings including plans, elevations and sections.

(d) Upto date displays of programme chart (Bar charts).

(e) Keep details of quantities executed, balance quantities, deviations, possible Extra item, substituted Item etc.

(f) Keep plastic / cloth mounted one sets of building drawings.

(g) Set of Helmets and safety shoes for safety.

14. INSURANCE POLICIES :

Before commencing the execution of work, the Contractor shall, without in any way limiting his obligations and liabilities, insure at his own cost and expense against any damage or loss or injury, which may be caused to any person or property, at site of work. The Contractor shall obtain and submit to the Engineer-in-Charge proper Contractor All Risk Insurance Policy for an amount equivalent to 110% of the contract amount for this work, with Engineer- in-Charge as the first beneficiary. The insurance shall be obtained in joint names of Engineer- in-Charge and the Contractor (who shall be second beneficiary). Also, he shall indemnify the Department from any liability during the execution of the work. Further, he shall obtain and submit to the Engineer-in- Charge, a third party insurance policy for maximum Rs. 20 lakh for each accident, with the Engineer-in-Charge as the first beneficiary. The insurance shall be obtained in joint names of Engineer-in-Charge and the Contractor (who shall be second beneficiary). The Contractor shall, from time to time, provide documentary evidence as regards payment of premium for all the Insurance Policies for keeping them valid till the completion of the work. The Contractor shall ensure that Insurance Policies are also taken for the workers of his Sub-Contractors / specialized agencies also. The contractor including subcontractors shall provide comprehensive group insurance cover for all the workers and their supervisory staff deployed at site. The details of insurance cover to be provided shall be submitted by the contractor / associate agencies within 20 days of date of start. In case of a default, appropriate policy shall be got done by the safety monitoring committee and double the fee of the policy shall be recovered from the next bill of the contractor. Without prejudice to any of its obligations and responsibilities specified above, the Contractor shall within 15 days from the date of letter of acceptance of the tender and thereafter at the end of each quarter submit a report to the Department giving details of the Insurance Policies along with Certificate of these insurance policies being valid, along with documentary evidences as required by the Engineer-in-Charge. No work shall be commenced by the Contractor unless he obtains the Insurance Policies as mentioned above. Also, no payment shall be made to the Contractor on expiry of insurance policies unless renewed by the Contractor. Nothing extra shall be payable on this account. No claim of hindrance (or any other claim) shall be entertained from the contractor on these accounts.

15. APPLICABLE PERMITS :

15.1. The contractor(s) shall give to the Municipality, police and other authorities all necessary notices etc. that may be required by law and obtain all requisite licenses for temporary obstructions, enclosures etc. and pay all fee, taxes including GST and charges which may be levied on account of these operations in executing the contract. He shall make good any damage to the adjoining property whether public or private and shall supply and maintain lights either for illumination or for cautioning the public at night.

15.2. The contractor shall ensure that applicable permits mandated by the local bodies and in case warranted for this work are obtained as required under the Applicable Laws.

16. LOCAL BYE-LAWS :

16.1. The building work shall be carried out in the manner complying in all respects with the requirements of relevant bye-laws of the local body under the jurisdiction of which the work is to be executed or as directed by the Engineer-in-Charge and nothing extra shall be paid on this account.

16.2. Some restrictions may be imposed by the local police etc. on the working time and for movement of labour, materials etc. the contractor shall be bound to follow all such restrictions/instructions and nothing extra shall be payable on this account.

16.3. The contractor shall not stack building material/ malba on the road or on the land owned by any other authority, as the case may be. In case, the Contractor is found stacking the building material/ malba as stated above, he shall be liable to pay the stacking charges as may be levied by local body or authority and also to face penal action as per the rules, regulations and bye-laws of the said body or authority. The Engineer-in-Charge shall be at liberty to recover the sums due but not paid to the concerned authorities on the above counts from any sums due to the contractor including amount of the Security Deposit or Retention Money in respect of this contract or any other contract.

17. FINAL TESTING OF THE INSTALLATION :

The Contractor shall demonstrate trouble free functioning of all the Civil and E & M installations and services. The Engineer-in-Charge or his authorized representatives shall carry out final inspection of the various Civil and E & M services and installations. Any defect(s) noticed during demonstration shall be rectified by the Contractor at his own cost to the entire satisfaction of the Engineer-in-Charge. Nothing extra shall be payable on this account.

18. FIRE CLEARANCE CERTIFICATE :

The contractor shall obtain Fire Clearance Certificate for the completed building and services from the concerned Fire Services Department.

19. SAMPLE ROOM AND TOILETS :

One Sample Room and one sample toilet incorporating all relevant internal items including, painting, water supply and sanitary installations, electrical installations and services be completed within 4 (Four) months from the date of start of work failing to which recovery will be made at `5,000.00 per day till sample Room and Toilet are completed to the satisfaction of Engineer-in-charge. This penalty shall be non- refundable.

20. DE-WATERING :

20.1. 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. 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 for all the operations described in this para.

20.2. 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.

20.2.1. For works below ground level the contractor shall keep that area free from water. If dewatering or bailing out of water is required the contractor shall do the same at his own cost and nothing extra shall be paid except otherwise provided in the items of Schedule of Quantities.

20.2.2. The Contractor shall make all necessary arrangements for protecting from rains, fog or likewise extreme weather conditions, the work already executed and for carrying out further work, during monsoon including providing and fixing temporary shelters, protections etc. Nothing extra shall be payable on this account and also no claims for hindrance shall be entertained on this account.

20.2.3. In case of flooding of site on account of rain or any other cause and any consequent damage, whatsoever, no claim financially or otherwise shall be entertained notwithstanding any other provisions elsewhere in the contract agreement. Also, the Contractor shall make good, at his own cost, the damages caused, if any. Further, no claims for hindrance shall be entertained on this account.

20.2.4. The contractor will take reasonable precautions to prevent his workman and employees from removing and damaging any flora (plant/vegetation) from the project area.

ADDITIONAL CONDITIONS FOR CIVIL WORK

1. QUALITY ASSURANCE / TESTING OF MATERIALS :-

1.1. Water tanks, taps, sanitary, water supply & drainage pipes, fittings & accessories should conform to bye-laws of local body/corporation, where CPWD specifications are not available. 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 shall submit for the approval of the Engineer-in-Charge, the name of the plumbing agency (along with their working experience in recent past) proposed to be engaged by him.

1.2. With each Running Bill, the details of test carried out shall be submitted by the contractor as per prescribed Proforma.

1.3. Samples of materials required for testing shall be provided free of charge by the contractor. The contractor shall provide at his own cost suitable weighing and measuring arrangements at site for checking the weight / dimension as may be necessary. The sealed samples are to be handed over to the testing lab by the contractor in the presence of representative of Engineering in charge. The cost of the tests shall be borne by the contractor.

1.4. The Contractor shall at his own risk and cost make all arrangements and shall provide all such facilities including material and labour, the Engineer-in-Charge may require for collecting, preparing, forwarding the required number of samples for testing as per the frequency of test stipulated in the contract specifications or as considered necessary by the Engineer-in-Charge, at such time and to such places, as directed by the Engineer-in- Charge. Nothing extra shall be payable for the above.

1.5. The Contractor or his authorized representative shall associate in collection, preparation, forwarding and testing of such samples. In case he or his authorized representative is not present or does not associate him, the result of such tests and consequences thereon shall be binding on the Contractor .The Contractor or his authorized representative shall remain in contact with the Engineer-in–Charge or his authorized representative associated for all such operations. No claim of payment or claim of any other kind, whatsoever, shall be entertained from the Contractor.

1.6. Maintenance of Register of Tests :-

(a) 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.

(b) All Samples of materials including Cement Concrete Cubes shall be taken jointly with Contractor by representative of the Engineer in Charge. All the assistance shall be provided by the contractor. Cost of sample materials is to be borne by the contractor and he shall be responsible for safe custody of samples to be tested at site.

(c) All the test in field lab setup at Construction Site shall be carried out by the Engineering Staff deployed by the contractor which shall be 100% witnessed by representative of the Engineer in Charge.

(d) All the entries in the registers will be made by the designated Engineering Staff of the contractor and same should be regularly reviewed by Engineer in Charge or his representative.

(e) Contractor shall be responsible for safe custody of all the test registers.

1.7. Extensive testing of the materials used for construction is a pre-requisite for attaining high quality of the work. This shall also require specialized tests, physical, chemical, ultrasonic, x-ray and various other types of tests which cannot possibly be carried out in a site laboratory. These tests also require specialized personnel who regularly deal in such testing. Therefore, the need arises for carrying out the tests in outside laboratories. These laboratories may be in the Govt. sector, Semi Govt. All Govt. Institutes, Indian Institute of Technology, National Institute of Technology, Central and State funded laboratories stands approved. No approval is required for testing in these laboratories/institutes by CPWD authority and LAB should be NABL approved.

1.8. Ultrasonic pulse velocity test shall be conducted on all RCC columns and at least 5% of the total number of other RCC members in each category i.e. beam, slab and footing for ensuring quality of concrete as per directions of Engineer- in charge. The cost of the same shall be borne by the contractor.

1.9. In case there is any discrepancy in frequency of testing as given in list of mandatory tests and that in individual sub-heads of work as per CPWD Specifications higher of the two frequencies of testing shall be followed and nothing extra shall be payable on this account.

1.10. The contractor shall ensure quality construction in a planned and time bound manner. Any sub-standard material / work beyond set out tolerance limit shall be summarily rejected by the Engineer-in-charge & contractor shall be bound to replace / remove such sub- standard / defective work immediately. If any material, even though approved by Engineer-In-Charge is found defective or not conforming to specifications shall be replaced / removed by the contractor at his own risk & cost.

1.11. In addition to the supervision of work by CPWD engineers, the Architects deployed by the Client/CPWD, CPWD Quality Control/ Assurance Team and Third party Quality Control/ Assurance Team shall also be carrying out regular and periodic inspection of the ongoing activities in the work and deficiencies, shortcomings, inferior workmanship pointed out by them shall be communicated by CPWD engineers to the contractor. Upon receipt of instructions from Engineer in Charge these are also to be made good by necessary improvement, rectification, replacement upto his complete satisfaction. Special attention shall be paid towards line and level of internal and external plastering, exposed smooth surface of RCC members by providing fresh shuttering plates, rubberized linings to all the shuttering joints, accurate joinery work in wooden doors and windows, thinnest joints in stone/ tiling / cladding work, non-hollowness in floor and dado tiles work, protection of scratches over flooring by impounding layer of plaster of Paris, water tight pipe linings, absence of hollow vertical joints in brick masonry, proper compaction of filled up earth etc. to achieve an Institution of International standards and up keeping of quality assurance shall be of paramount importance, as such.

1.12. The Contractor shall submit, within 15 days after the date of award of work, a detailed and complete method statement for the execution, testing and Quality Assurance, of such items of works, as directed by the Engineer-in-Charge. All the materials to be used in the work, to give the finished work complete in all respects, shall comply with the requirements of the specifications and shall pass all the tests required as per specifications as applicable or such specifications / standards as directed by the Engineer-in-Charge. However, keeping the Quality Assurance in mind, the Contractor shall submit, on request from the Engineer-in-Charge, his own Quality Assurance procedures for basic materials and such items, to be followed during the execution of the work, for approval of the Engineer-in-Charge.

2. FIELD LABORATORY :

2.1. The contractor has to establish within 30 days from the award of work a field laboratory at site including all necessary equipments and skilled manpower for the Field Tests as indicated in the tender document at his own cost to have proper quality control and `5,000.00 per day shall be recovered from the contractor for any delay beyond the specified period. If contractor fails to establish lab within additional period of 15 days, the Engineer in charge shall initiate action as deemed fit under relevant clauses of the agreement.

2.2. For performing the above tests, the Field Testing Equipment and Instruments as indicated in the tender document are to be arranged and maintained by the contractor at his own cost. The field lab shall be air conditioned and maintained to be dust free.

2.3. The contractor shall ensure quality construction in a planned and time bound manner.

2.4. Any sub-standard material / work beyond set-out tolerance limit shall be summarily rejected by the Engineer-in-Charge & contractor shall be bound to replace / remove such sub-standard / defective work immediately.

2.5. The list of Laboratory/ Field equipment referred above is to be arranged and maintained by the contractor at the site of work. In case the equipment required for any test is not available at site, the department shall get the test conducted from the third party. However in that event, besides providing free materials of sample, the cost of taking of sample, packing, transportation, testing charges etc. shall be borne by the contractor irrespective of the results.

3. SAMPLE OF MATERIALS :-

3.1. All materials and fittings brought by the contractor to the site for use shall conform to the samples approved by the Engineer-in-Charge which shall be preserved till the completion of the work. If a particular brand of material is specified in the 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 List of Preferred Makes given in the tender document for approval of Engineer-in-Charge. For all other items, ISI Marked materials and fittings 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 for the approval of Engineer-in-Charge.

3.2. The Contractor shall procure and provide all the materials from the manufacturers / suppliers as per the list attached with the tender documents, as per the item description and particular specifications for the work. The equivalent brand for any item shall be permitted to be used in the work, only when the specified make is not available. This is, however, subject to documentary evidence produced by the contactor for non-availability of the brand specified and also subject to independent verification by the Engineer-in-Charge. In exceptional cases, where such approval is required, the decision of Engineer- in-Charge as regards equivalent make of the material shall be final and binding on the Contractor. No claim, whatsoever, of any kind shall be entertained from the Contractor on this account. Nothing extra shall be payable on this account. Also, the material shall be procured only after written approval of the Engineer-in-Charge.

3.3. 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. Samples including brand / quality of materials and fittings to be used in the work 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.

3.4. BIS marked materials except otherwise specified shall also be subjected to quality test besides testing of other materials as per the specifications described for the item/material. Wherever BIS marked materials are brought to the site of work, the contractor shall, furnish manufacturer's test certificate or test certificate from approved testing laboratory to establish that the material procured by the contractor for incorporation in the work satisfies the provisions of specifications relevant to the material and / or the work done.

3.5. BIS marked items (except cement & steel for which separate provisions have been made) required on the work shall be got tested, for only important tests, which govern the quality of the product, as decided by the Engineer-in-Charge. The frequency of such tests (except the mandatory test) shall be 5% of the frequency as specified in BIS. For mandatory test, frequency shall be as specified in the CPWD Specifications.

3.6. For certain items, if frequency of tests is neither mentioned in the CPWD Specifications nor BIS, then tests shall be carried out as per directions of Engineer-in-Charge.

4. CEMENT & STEEL REINFORCEMENT :

4.1. Contractor has to procure Cement and Steel and has to produce manufacturers test certificate and challan for each lot of Cement & Steel Reinforcement procured at site.

4.2. CEMENT :-

4.2.1. The contractor shall procure Portland Pozzolona Cement (PPC) conforming to IS: 1489 (Part-1) as stipulated in the items of work, from reputed manufacturers of cement as mentioned in "List showing preferred brands / Manufacturers / Makes" or from any other reputed cement manufacture having a production capacity not less than 1 million Ton per annum as approved by Chief Engineer Kolkata, CPWD, Kolkata. The cement of approved make as aforesaid in 50 kg.

bags bearing manufacturer's name and ISI marking, along with manufacturers test certificate for each lot shall be procured by the contractor. Portland Pozzolona Cement is to be used for RCC works only subject to fulfillment of conditions of circular No. CDO/SE(RR)/Fly ash (MAN) 02 dated 09.04.09. However, if the contractor uses higher grade of cement or uses OPC only nothing extra shall be paid. The use of PPC shall be regulated as per the following conditions stipulated in the circular dated 09.04.2009 :-

(a) IS:456-2000 Code of Practice for Plain and Reinforced Concrete (as amended upto date) shall be followed in regard to Concrete Mix Portion and its production as under :

  i) The concrete mix design shall be done as "Design Mix Concrete" as prescribed in clause-9 of IS 456 mentioned above.

  ii) Concrete shall be manufactured in accordance with clause 10 of above mentioned IS:456 covering quality assurance measures both technical and organizational, which shall also necessarily require a qualified Concrete Technologist to be available during manufacture of concrete for certification of quality of concrete.

(b) Minimum M25 grade of concrete shall be used in all structural elements of RCC, both in load bearing and framed structure.

(c) The mechanical properties such as modulus of elasticity, tensile strength, creep and shrinkage of flyash mixed concrete or concrete using flyash blended cements (PPC) are not likely to be significantly different and their values are to be taken same as those used for concrete made with OPC.

(d) To control higher rate of carbonation in early ages of concrete both in flyash admixed as well as PPC based concrete, water/binder ratio shall be kept as low as possible, which shall be closely monitored during concrete manufacture.

  If necessitated due to low water/binder ratio, required workability shall be achieved by use of chloride free PC based high performing chemical admixtures conforming to IS:9103. The compatibility of chemical admixtures and super plasticizers with each set OPC, fly ash and /or PPC received from different sources shall be ensured by trails.

(e) In environment subjected to aggressive chloride or sulphate attack in particular, use of flyash admixed or PPC based concrete is recommended. In case, where structural concrete is exposed to excessive magnesium sulphate, flyash substitution/content shall be limited to 18% by weight. Special type of cement with low C3A content may also be alternatively used. Durability criteria like minimum binder content and maximum water/binder ratio also need to be given due consideration in such environment.

(f) Wet curing period shall be enhanced to a minimum of 10 days or its equivalent. In hot & arid regions, the minimum curing period shall be 14 days or its equivalent.

(g) Subject to General Guidelines detailed out as above, PPC manufactured conforming to IS:1489 (Part-I) shall be treated at par with OPC for manufacture of Design Mix Concrete for structural use in RCC.

(h) Till the time, BIS makes it mandatory to print the %age of flyash on each bag of cement, the certificate from the PPC manufacturer indicating the same shall be insisted upon before allowing use of such cements in works.

(i) While using PPC for structural concrete work, no further admixing of flyash shall be permitted.

4.2.2. Samples of cement arranged by the contractor shall be taken by the Engineer-in-Charge and got tested in accordance with provisions of relevant BIS Codes. The cement for such testing purpose shall be supplied by the contractor free of charge. In case test results indicate that the cement arranged by the contractor does not conform to the relevant BIS Codes, 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. The cost of tests shall be borne by the contractor.

4.2.3. Cement shall be brought at site in bulk supply of approximately 200 tonnes or as decided by the Engineer-in-Charge.

4.2.4. Separate godowns for tested cement and fresh cement (under testing) to be constructed by the contractor at his own cost as per sketches given in C.P.W.D Specifications having weather-proof roofs and walls. The size of the cement godown is indicated in the sketches for guidance. The actual size of godown shall be as per site requirements and nothing extra shall be paid for the same. Each godown shall be provided with a single door with two locks. The keys of one lock shall remain with Engineer-in-Charge or his authorized representative of the work and that of other lock with the authorized agent of the contractor at the site of work so that the cement is issued from godown according to the daily requirement with the knowledge of both parties. The account of daily receipt and issue of cement shall be maintained in a register in the prescribed proforma and signed daily by the contractor or his authorized agent and Engineer-in-Charge or his authorized representative in token of its correctness. The day to day receipt and issue accounts of different grade/brand of cement shall be maintained separately in the standard proforma by the contractor or his authorized representative which shall be duly signed by the authorized representative of the Engineer-in-Charge before issue to the work on day to day basis.

Required number of cement godowns each having capacity as decided by the Engineer-in- Charge shall be constructed by the contractor at site of work for which no extra payment shall be made. The contractor shall be responsible for the watch and ward and safety of the cement go-downs. The contractor shall facilitate the inspection of the cement go-downs by the Engineer-in-Charge at any time.

The pages of the register should be machined numbered and each page initialled by the EE. The cement godown and the register are required to be checked by the AE/EE in-charge of the work as mentioned below:-

(a) At least weekly or fortnightly, respectively in case of works at the he headquarters of AE/EE and.

(b) Whenever they visit the site of work in case of works located outside the Sub- Divisional/Divisional Head Quarters.

(c) In the case of large concentrated projects like major bridges etc., the EE should check the cement register at least fortnightly.

4.2.5. The actual issue and consumption of cement on work shall be regulated and proper accounts maintained as provided in the contract. The theoretical consumption of cement shall be worked out as per procedure prescribed in Clause-38 of the GCC-2020 and shall be governed by the conditions laid therein.

4.2.6. 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. In the event of it being discovered that after the completion of the work, the quantity of cement used is less than the quantity ascertained as herein before provided (allowing variation on the minus side as stipulated in Clause - 38), the cost of quantity of cement not so used shall be recovered from the contractor as specified in schedule. Decision of the Engineer-in-Charge in regard to theoretical quantity of cement which should have been actually used as per the schedule and recovered at the rate specified, shall be final and binding on the contractor.

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

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

4.2.8. Cement shall be removed from site immediately by the contractor on receipt of 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.

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

4.2.10. Cement, which is not used within 90 days from its date of manufacture, shall be retested at approved laboratory. Until the results of such tests are found satisfactory, it shall not be used on the work

4.2.11. Compressive Strength of Cement

The compressive strength of cement used in the work shall be found out in accordance with IS: 4031 (Part-6)-1988 (Re-affirmed 2019) with upto date Amendments.

4.3. STEEL REINFORCEMENT :-

4.3.1. The Contractor shall procure IS marked Corrosion Resistant TMT bars of various grades from the Approved steel manufacturers (as per the list of approved makes furnishing the part of this document) or their authorized dealers having valid BIS license for IS: 1786-2008 and further confirming to the OM No. DG/MAN/382, dated 6.2.19.

The modification guideline for procurement of steel are given below :

(a) Steel reinforcement bar comply with the requirements given in the latest version of IS 1786. Additional requirement like Chemical Composition Requirement for Manganese and Copper, Tempered Martensite ™ Ring Requirement< Marketing requirement and compliance of the provisions of ISO 3001-2015 and ISO 14001:2004) as desired by Engineer-in-Charge.

(b) The Contractor shall obtain manufacturer's certificate stating the process of manufacture, chemical composition and test sheet giving 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.

(c) 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 NABL accredited laboratory or any Government Laboratory.

(d) Reinforcement bar is one of the most important building materials. Its quality directly affects the life span, resistance to earthquake and durability of the structure. In order to ensure consistent quality of rebars, the NIT approving authority may prescribe reputed brands like SAIL, RINL, TATA, JSW, JSPL, any other brand with approval of competent authority in the list of preferred make. Only corrosion resistant steel rebars shall be used.

4.3.2. The procured steel should have following qualities :

(a) Excellent ductility, bend ability and elongation of finished product due to possible refining technology.

(b) Consumption of steel should be accurate as per design

(c) Steel should have no brittleness problem in finished product.

(d) Steel should carry the quality of corrosion and earthquake resistance.

(e) Quality steel with achievement of proper level of sulphur and phosphorus as per IS: 1786-2008.

4.3.3. The contractor shall have to obtain and furnish test certificates to the Engineer-in- charge in respect of all supplies of steel brought by him to the site of work.

4.3.4. Samples shall also be taken and got tested by the Engineer-in-charge as per the provisions in this regard in relevant BIS codes. In case the test results indicate that the 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 on written orders from the Engineer-in-charge to do so. Else the department shall remove it and recover double the cost of removal from the contractor.

4.3.5. The steel reinforcement bars shall be brought to the site in bulk supply of 10 tonnes or more, or as decided by the Engineer-in-charge. All the reinforcing steel before its use in the building shall be painted with anti-corrosive paint of approved make.

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

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

Size of bar	For consignment below 100 tonnes	For consignment above 100 tonnes
Under 10mm dia bars	One sample for each 25 tonnes or par 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.

4.3.8. The contractor shall supply free of charge the steel required for testing including its transportation to testing laboratories. The cost of tests shall be borne by the contractor.

4.3.9. The actual issue and consumption of steel on work shall be regulated and proper accounts shall be maintained as provided in clause 10 of the contract. The theoretical consumption of steel shall be worked out as per procedure prescribed in clause 38 of GCC-2020 and shall be governed by conditions laid therein. In case the consumption is less than theoretical consumption including permissible variations leading to under designing of the structure, the work shall be summarily rejected, otherwise recovery at the rate so prescribed shall be made after ensuring structural soundness and stability.. In case of excess consumption, no adjustment needs to be made.

4.3.10. The steel brought to site and the steel remaining unused shall not be removed from site without the written permission of the Engineer-in-charge.

4.3.11. The contractor shall submit original vouchers from the manufacturer for the total quantity of steel supplied under each consignment to be incorporated in the work. All consignment received at the work site shall be inspected by the Site staff along with the relevant documents before acceptance. The contractor shall obtain Original Vouchers and Test Certificates and furnish the same to the Engineer-in-Charge in respect of all the lots of steel brought by him from approved supplier to the site of work. The original vouchers and test certificates shall be defaced by the Site staff and kept on record in the site office.

4.3.12. Reinforcement including authorized spacer bars and laps shall be measured in length of different diameters as actually (not more than as specified in the drawings) used in the work nearest to a centimeter. Wastage and unauthorized overlaps shall not be measured.

4.3.13. The standard sectional weights referred to as in Table 5.4 in para 5.3.4 in CPWD Specifications will be considered for conversion of length of various sizes of M.S. Bars, Steel Bars and T.M.T. bars into Standard Weight.

4.3.14. Records of actual Sectional weights shall also be kept dia-wise and lot-wise. The average sectional weight for each diameter shall be arrived at from samples from each lot of steel received at site. The decision of the Engineer-in-Charge shall be final for the procedure to be followed for determining the average sectional weight of each lot. Quantity of each diameter of steel received at site of work each day will constitute one single lot for the purpose. The weight of steel by conversion of length of various sizes of bars based on the actual weighted average sectional weight shall be termed as Derived Actual Weight. However for the stipulated issue of steel reinforcement up to and including 10mm diameter bars, the actual weight of steel issued shall be modified to take into account the variation between the actual and the standard coefficients and the contractors' accounts will be debited by the cost of modified quantity.

4.3.15. (a) If the Derived Weight is less than the Standard Weight then the Derived Actual Weight shall be taken for payment provided, if it is within the following tolerances specified in IS1786-2008, otherwise whole lot will be rejected.

Tolerances on Nominal Mass :

Sl. No.	Nominal Size in mm	Tolerance on Nominal mass Percent		
		Batch	Individual Sample*	Individual sample for coil**
(a)	Upto and including 10	$\pm$7	-8	$\pm$8
(b)	Over 10 upto and including 16	$\pm$5	-6	$\pm$6
(c)	Over 16	$\pm$3	-4	$\pm$4

* For individual sample plus tolerance is not specified.

** For coils batch tolerance is not specified.

(b) If the Derived Actual Weight is found more than the Standard Weight, the Standard Weight as per in sub-para (2.3.11) 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.

4.4. SAFETY IN CONSTRUCTION

4.4.1. The contractor shall employ only such methods of construction, tools and plants as are appropriate.

4.4.2. The contractor shall take all precautions and measures to ensure safety of works and work man and shall be fully responsible for the same.

4.4.3. Safety pertaining to construction such as centering & shuttering, scaffolds, ladders, working platforms, gangway etc. shall be governed by CPWD safety code, relevant safety codes and the directions of Engineer in charge.

4.4.4. All the staging to be either of tubular steel structure with adequate bracings as approved or made of built up structural sections made from rolled structural steel sections.

4.4.5. Work shall be properly designed for self-weight, weight of reinforcement, weight of fresh concrete and in addition the various live loads likely to be imposed during construction process.

4.4.6. The form work shall be designed & constructed so as to remain sufficiently rigid during placing & compaction of concrete & shall be such as to prevent loss of slurry from the concrete.

4.4.7. The vertical supports shall be adequately braced or otherwise secured in position that these do not fall when the load gets released or the supports are accidentally hit.

4.4.8. A thorough inspection of tubular steel centering is necessary before its erection and members showing evidence of excessive rusting, kinks, dents or damaged welds shall be discarded. Buckled or broken members shall be replaced. Care shall also be taken that locking devices are in good working order and that coupling pins are effectively aligned to frames. Tubes should have end to end joints in adjacent tubes staggered. Sleeve couplers should be used in preference to joint pins for axial connections.

4.4.9. Inclined forms which give rise to very high horizontal forces should be taken care of by trussing and diagonal bracing

4.4.10. Vertical members should be placed centrally under the members to be supported and over the member supporting them with no eccentricity exceeding 25mm

4.4.11. The centering frames shall be tied together with sufficient braces to make a rigid and solid unit. It shall be ensured that struts and diagonal braces are in proper position and are secured so that frames develop full load carrying capacity. As erection progresses, all connecting devices shall be in place and shall be fastened for full stability of joints and units.

4.4.12. Wedges under the supports shall be set on firm soil / PCC which assures adequate stability for all props. Care shall be taken not to disturb the soil under the supports. Adequate drainage shall be provided to drain away the water coming due to rains, easing of forms or during the curing of the concrete to avoid softening of the supporting soil strata.

4.4.13. During pouring of the concrete the centering shall be constantly inspected and strengthened, if required wedges below the vertical supports tightened and adjustment screws properly adjusted as necessary.

4.4.14. Only workmen actually engaged in the form work shall be allowed in the area during operations. Those engaged in removing the form work shall wear helmets, gloves and heavy soled shoes and approved safety belts etc.

4.4.15. The safety code as lay down in respective clauses of Agreement shall be strictly followed.

ADDITIONAL CONDITIONS FOR GREEN BUILDING :

GRIHA V.2019 Mandatory Criteria to be followed by the Contractor

4.5. The contractor shall follow the following Green building norms of GRIHA V.2019 :

4.5.1. The contractor shall take dated photographs with geo-coordinates and video graph of the site at the time he takes over the same.

4.5.2. Adopt at least six measures to minimize air and soil pollution during construction.

(a) Provide 3 m high continuous barricading along the site boundary.

(b) Provide wheel washing facility/gravel bed at all vehicular entrances and exits of the site.

(c) Ensure diesel generator sets are in compliance with CPCB norms and have an exhaust with stack height of at least 2 m from the top of the generator with a cap.

(d) Implement a spill prevention plan for storage of diesel, admixtures, curing compounds, bitumen, and other hazardous material.

(e) Ensure that fine aggregate, excavated earth, and other construction material with a tendency to get airborne are covered or are sprinkled regularly with non-potable STP water.

(f) Ensure sprinkling of water on unpaved pathways on the site with non-potable water in order to mitigate air pollution.

(g) Limit the speed of vehicular movement on site to 10 km/h.

(h) Ensure that vehicles carrying waste materials out of the site are covered.

4.5.3. Adopt at least two strategies from the list, as given below, to minimize water consumption during construction :

(a) Use of gunny bags, ponding technique, or curing compound. – Mandatory

(b) Meter and monitor the consumption of water during construction.

(c) Use water-reducing admixture in concrete mix.

(d) Use of treated wastewater and/or captured storm water.

4.5.4. Ensure that the equipment installed within the project (whichever applicable as per Table 3.5) is either BEE-star labelled or of equivalent performance.

Table 3.5 List of BEE-star labelled equipment

Equipment	Star Labelled	3 Stars and Above
LED/TFL	Mandatory	1 Point
Unitary/Split air-conditioners		
Ceiling fans		
Geysers		
UPS		
Solid state inverters		

4.5.5. Ensure that all interior wall and ceiling finishes such as primers, paints, putty, etc. have low VOC content as per Appendix 4C, Table 1 and are lead free.

Table 1 VOC limits for liquid coating

Paint Application	Type of Finish	VOC Limit (g/L)
Interior coatings	Flat	< 50
	Non-flat	< 150
Exterior coatings	Flat	< 200
	Non-flat	< 100
Anti-corrosive	Gloss/semi-gloss/flat	< 250

4.5.6. Ensure that tobacco smoking is prohibited on-site during the entire construction phase.

4.5.7. The contractor shall display prominently on site the Green Building measures being adopted. Nothing extra shall be payable for the same.

5. ADDITIONAL CONDITION FOR SITE OFFICE :

5.1. Contractor shall provide (built up) site office with furniture, all civil & electrical fittings & fixtures including AC in all rooms. The site office shall have 04 (Four) rooms having carpet area of minimum 10Sqm each including one meeting room, toilet, store room etc. The electricity and day to day maintenance including cleaning, sweeping, security etc shall be within the scope of the rates quoted by the Contractor. The contractor shall provide clean and safe drinking water for the workers, technical staffs, site staff and other persons associated with project either employed/hired by contractor or department or client.

5.2. Above facility has to be made functional within 30 days after award of work. Nothing extra shall be payable to contractor for providing these facilities and resources.

PARTICULAR SPECIFICATIONS FOR CIVIL WORK

1. GENERAL

1.1 The Civil works shall be carried out as per CPWD Specifications 2019 Vol.I& II with upto date correction slips.

1.2 The work shall be executed and measured as per metric dimensions given in the Schedule of quantities, drawings etc.(F.P.S. units wherever indicated are for guidance only).

1.3 Wherever any reference to any Indian Standard Specification occurs in the documents relating to this contract, the same shall be inclusive of all amendments issued the retour revisions thereof, if any.

1.4 Unless otherwise specified in the schedule of quantities the rates for all items of the work shall be considered as inclusive of pumping outer 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, and sub-soil water table being high due to any other cause whatsoever.

1.5 Unless otherwise specified in the schedule of quantities, particular specifications or CPWD specifications(subject to the order or preference provided elsewhere in this document)the rates tendered by the tenderer shall be all inclusive and shall apply to all lifts, all heights and a ll floor including terrace, lead sand depths and nothing extra over and above the schedule of quantity shall be payable on this account.

1.6 The work shall be carried out in accordance with the Architectural drawings ,structural drawings and approved shop drawings. The structural, shop and architectural drawings shall have to be properly correlated before executing the work. Incase of any difference noticed between architectural and structural drawings, the contractor shall obtain final decision of the Engineer-in-charge. Incase of any discrepancy in the item given in the schedule of quantities appended with the tender and architectural drawings related to the relevant items, the former shall prevail unless and otherwise given in writing by the Engineer- in -charge. Nothing extra shall be payable on this account.

1.7 The following additional specifications shall apply:

1.7.1 All stone aggregates shall be of hard stone variety to be obtained from approved quarries at Rampurhat, Naihati, or Sainthia in Birbhum district of W.B or as approved by Engineer-in-Charge.

1.7.2 Sand to be used for cement concrete work including RCC, mortar for masonry and plaster work shall be clean sand of required Zone II or III and screened if required. It shall be obtained from approved quarry at Goul Bazar (Medinipur district), Sainthia or as approved by Engineer-in-Charge.

1.7.3 Fly Ash Brick of size 230 x 110 x 70 mm shall be obtained from the approved manufacturer.

1.8 The rates for all items of work shall unless clearly specified otherwise include rates for all floor levels of building and cost of all operations and all inputs of labour, material, T&P, scaffolding, wastages, watch and ward, other inputs, all incidental charges, all taxes, GST, duties, levies etc. required for execution of the work.

1.9 All crossings, embedment etc. in walls and floors for water supply, drainage and sanitary pipes, fittings etc. shall be provided for individual walls and floors so as to avoid cuttings of masonry work and floors. All such are as shall be made good during finishing and nothing extra shall be payable on these accounts.

1.10 Product delivery, storage and handling of chemicals.

1.10.1 The contractor shall construct storage space for Chemicals to ensure that the storage conditions are as recommended by the manufactures.

1.10.2 All the materials shall be procured an delivered in sealed containers with labels legible and intact.

1.10.3 All the chemicals (polymers, epoxy, water proofing compound, plasticizer, Polysulphide, PU Sealants all exterior and interior paints, polish etc.) shall be procured inconvenient 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.)drum sunless otherwise specifically permitted by the Engineer-in-Charge. One sample from each lot of the chemical procured by the contract or shall be tested in a laboratory as approved by the Chief Engineer.

1.10.4 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 contract or and no claim, what sever, on this account shall been tertained. 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.

1.10.5 All the chemicals shall be procured by the contract or 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. Special care should be taken by the contractor to ensure that chemicals are used before the expiry of their shelf life.

1.10.6 The original copies of challan /cash memos towards the quantity of variouschemicals 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.

1.10.7 The Name of manufacturers, manufacturer's product identification, manufacturer's mixing instructions, warning for handling and toxicity and date of manufacturing and shelf life shall be clearly and legibly mentioned on the labels of the each container.

1.10.8 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.

1.10.9 All filled containers shall be handled in safe manner and in away to avoid breaking container seals.

1.10.10 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.

1.10.11 All arrangements for measuring, dosing and mixing of material/chemicals at site have to be made by the contractor.

1.10.12 Contractor shall suitably advise his site Engineer and all the workers as regards safe handling of chemicals. Necessary protective and safety equipment inform of hand gloves, gogles .shall be provided by the contractor and be also used at site.

1.10.13 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, what sever, shall be entertained on this account.

1.10.14 The chemicals shall be tested in an independent laboratory as approved by the Chief Engineer at the frequency as specified. Of required, more samples may have to be tested as per the direction so the Engineer-in-Charge. Nothing extra shall be payable on this account. The testing charges shall be borne by the contractor.

2. <u>EARTH WORK:-</u>

2.1 Earthwork shall be executed as per CPWD specifications.

2.2 Excavation shall be under taken to the width off noting 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 a this own expense shall put up the necessary shoring, strutting and planking or cut slopes with or without steps, to as after angle or both with due regard to the safety of personnel and works

and to the satisfaction of the Engineer-in-charge. Measurement of plan area of excavation for payment shall only be permitted.

2.3 All the major excavation shall be carried out by mechanical excavator. No extra payment shall be made for that.

2.4 The contractor shall make this own cost all necessary arrangements for maintaining water level in the area low enough where works are going on 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 and for which no extra payment shall be made. This will include water coming from any source, such as rains, accumulate drain water, floods, leakages from sewer and water mains sub soil water table being high or due to any other cause what sever. The contractor shall make necessary provision of pumping, dredging, bailing out water coming from all above sources and excavation and other works shall be kept free of water by providing suitable systems like sandbags, sheet piles, etc. as approved by the Engineer-in-Charge. Nothing extra shall be payable for the same.

2.5 De-watering required, if any, shall be done conforming to BIS Code IS:9759 (guidelines for de-watering during construction) and /or as per the specifications approved by the Engineer-in-Charge. Design of an appropriate and suitable de-watering system shall be the Contractor's responsibility. Such scheme shall be modified / augmented as the work proceeds based on fresh information discovered during the progress of work, at 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 de-watering adopted shall have adequate built in arrangement to serve as stand-by to attend to repair of pumps etc. And disruption of power /fuel supply. Nothing extra shall be payable on this account.

2.6 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.

3. <u>R.C.C. WORK:-</u>

3.1 Design Mix Concrete.

3.1.1 The term machine batched, machine mixed and machine vibrated design mix cement concrete used in the document shall mean the concrete produced in fully automatic concrete batching &mixing plant, placed in position by the concrete pump and vibrated by surface vibrator/ needle vibrator/ plate vibrator, as the case may be to achieve the required strength and durability. In case of low volumes of concrete required on certain occasions, Engineer-in-Charge may allow, with recorded reasons, mobile weigh batching plants with admixture dosing facility and output mix printout facility.

The RCC work shall be done with Design Mix Concrete. Wherever letter "M" has been indicated, the same shall imply for the Design Mix Concrete. The Design Mix Concrete will be designated based on the principles given in IS:456,10262 &SP23.The Conditions &Specifications stated herein shall have precedence over all conditions & specifications stated in relevant I.S. Codes/C.P.W.D. Specifications. The concrete mix shall be designed for the specified target mean compressive strength in order to ensure that work test result do not fall below the acceptance criteria specified for the concrete mix. The cement shall be actually weighed as presumption of each bag having 50kg shall not be allowed. The Contractor shall design mixes for each class of concrete indicating that the concrete ingredients and proportions will result in concrete mix meeting the requirements specified. Nothing extra shall be paid on this account.

Admixture should be added as a specific technical requirement so as to meet the workability/slump requirement or for any other reason but nothing extra is to be paid to

contractor on account of adding admixtures. The admixture shall conform to IS: 9103. The chloride content in admixture shall satisfy the requirement of BS: 5075. The total amount of chlorides in admixture mixed concrete shall also satisfy the requirements of I S : 456:2000. Admixtures shall not be used without approval of Engineer-in-Charge. When everrequired, the admixture of approved quality & approved make only shall be used to attain the required workability .Nothing extra on account of use of Admixture / Super-Plasticizer shall be payable.

However, if admixture is not used in approved design mix, necessary recovery shall be made as per agreement item.

3.1.2 The sources of coarse aggregate, fine aggregate, water, admixture & cement to be used in concrete work shall be identified by the contractor &he will satisfy himself regarding their conforming to the relevant specifications &their availability before getting the same approved from the Engineer-In-Charge.

3.2 GENERAL INFORMATION FOR BATCH MIX CONCRETE (BMC)/DESIGN MIX CONCRETE (DMC) TOBE GIVENTOTHE SUPPLIERBY THE CONTRACTOR

3.2.1 The contractor shall be free to use Ready Mix Concrete (RMC) in place of Batch mix concrete at his own cost with the approval of Engineer-in-Charge. The contractor shall ensure that transit mixtures shall transport the concrete to site. All the precautions shall be taken during the transportation and handling of concrete to achieve the desired strength, durability, etc. as envisaged in the Mix Design. Contractor has to get the approval from Engineer-In-Charge regarding source of RMC by giving the details of such plants indicating name of owner / company, its location, technical establishment, past experience. The contractor shall bring Ready Mix Concrete from approved RMC plants as mentioned in the list showing preferred Brands/Manufacturers/Makes enclosed in this NIT. The contractor has to produce text of MOU proposed to be entered between purchaser (the contractor) and supplier (R.M.C. plant)to the Engineer-in-charge. The Engineer-in-charge shall give approval in writing. The contractor shall draw the MOU with approved RMC plant owner/company and submit to Engineer-in-charge with in a week of such approval. The contractor will not be allowed to purchase ready mixed concrete without completion of above stated formalities for use int his project.

3.2.2 Not with standing the approval granted by Engineer-in-charge in aforesaid manner, the contractor shall be fully responsible for quality of concrete including input control, transportation and placement etc.

3.4. WATER CEMENT RATIO AND SLUMP

3.4.1 In proportioning a particular mix, the manufacturer / producer / contractor shall give due consideration to the moisture content in the aggregates, and the mix shall be so designed as to restrict the maximum free water cement ratio tolessthanthe0.45.

3.4.2 Due consideration shall be given to the workability of the concrete thus produced. Slump shall be controlled on the basis of placement in different situations.

Placing Conditions	Degree of Workability	Slump(mm)
(1)	(2)	(3)
Lightly reinforced sections in slabs, beams, walls, columns	Low	25-75
Heavily reinforced section in slabs, beams, walls, columns.	Medium	50-100
Pumped concrete	Medium	75-100

3.5 CHARACTERISTIC COMPRESSIVESTRENGTH ACCEPTANCE CRITERIA

In the designation of concrete mix letter M refers to the mix and the number to the specified characteristic compressive strength of 15cm –Cube at 28days expressed in N/mm^2.

Specified Grade	Mean of the Group of 4 Non-over lapping consecutive test results in N/mm^2	Individual Test Results in N/mm^2
(1)	**(2)**	**(3)**
M25 or Above	≥Fck+ 0.825xestablished standard deviation (rounded offto nearest 0.5 N/mm^2) or F_{ck}+ 4 N/mm^2, whichever is greater where f_{ck} is characteristic compressive strength of CC cube at 28 days.	≥F_{ck}– 4 N/mm^2

Note :

(i) In the absence of established value of standard deviation, the values given in Table as mentioned below in para 3.10may be assumed, and attempt should be made to obtain results of 30 samples as early as possible to establish the value of standard deviation.

(ii) The acceptance criteria for compressive strength as mentioned in IS:456-2000 as a mended up to date shall prevail over the above criteria in case of any difference.

3.6 The Contractor shall engage one of the following approved laboratories/ test house for designing the concrete mix in accordance with relevant IS Code and to conduct laboratory tests to ensure the target strength& workability criteria for a given grade of concrete :-

Any IIT Or NIT, Bengal Engineering and Science University, Shibpur (W.B.) or as approved by Engineer-in-Charge in writing.

In the event of CPWD approved laboratories /Govt Labs are unable to carry out the requisite design/testing, the contractor may have it done from any other NABL accredited laboratory withprior approval of the **Chief Engineer.**

3.7 **The contractor shall submit a this own cost, the mix design report from approved laboratories for approval of Engineer-in-charge within the time lines specified in the Milestones for the project.** No concreting shall be done until the mix design is approved. Every time sources of materials/cement ischanged mix design report has to be re-done and has to be approved from Engineer In charge. In case of the likely use of admixtures in concrete, the contractor shall design and test the concrete mix by using trial mixes with admixtures also, for whichnothing extra shall be payable.

The various ingredients for mix design/ laboratory tests shall be sent to the lab/test houses through the Engineer-in-charge and the sample so such aggregates sent shall be preserved at site by the department. Nothing extra shall be paid on this account.

3.8 All cost of mix designing and testing, connected there with, including charges payable to the laboratory shall be borne by the Contractor including redesigning of the concrete mix whenever required & as directed by Engineer-In-Charge.

3.9 The mix design for a specified grade of concrete shall be done for a target mean compressive strength Tck = Fck+ 1.65xS

Where Fck = 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 obtained for different grades of concrete shall be as follows:-

GRADE OFCONCRETE	STANDARD DEVIATION

M-25	4.0
M-30	5.0
M-35	5.0
M-40	5.0

However, actual standard deviation based on test strength of samples for each grade of concrete shall be calculated separately as per procedure laid down in clause 9.2.4 of Code of Practice IS 456:2000.

3.10.1 **TRIAL BATCHES**

a. The designed mix proportions shall be checked for target mean compressive strength by means of trial batches.

b. Minimum three sets of separate preliminary tests shall be carried out for each trial batch of concrete mix. Each test shall comprise of six specimen sand only one test- set of six specimens shall be made on any particular day.

c. The quantities of materials for each trial mix shall be sufficient for at least six specimens (cubes) and the concrete required for carrying out workability tests.

d. The workability of trial mix No.1 shall be measured and mix shall be carefully observed for freedom from segregation, bleeding and its finishing characteristics. The water content, if required, shall be adjusted corresponding to the required changes in the workability.

e. With the modified Water Content, the mix proportions shall be re-calculated by keeping with water cement ratio unchanged. The mix proportion, as modified, shall form the Trial Mix No.2 and tested for the specified strength and workability.

f. In addition, trial mix No.3 and 4 shall be designed by keeping water contents same as that determined for trial mix 2 but varying the water cement ratio by$\pm$10 percent of the specified value and tested for their design characteristics.

g. Out of the six specimen of each set, three shall be tested at seven days and remaining three at 28 days. The preliminary tests at seven days are intended only to indicate the strength to be attained at 28 days, while the design mix shall be approved only on the basis of test strength at 28 days.

3.11 DESIGN MIX CONCRETE FROM FULLY AUTOMATIC COMPUTERISED CONCRETE BATCHINGANDMIXINGPLANT

3.11.1 Proportioning Concrete

In pro portioning 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.

3.11.2 Production of Concrete

3.11.2.1 The concrete shall be produced in a central batching and mixing plant with, computerized printing for contents and admixture dosage. The batching plant shall be fully automatic. Automatic batcher shall be charged by devices which, when actuated by a Single starters which 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.

(a) Batching equipment

(b) Mixers

(c) Control panels

(d) Mechanical material feeding and elevating arrangements

3.11.2.2 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 water tight 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 up ward shall be enclosed and insulated .The batch bins shall be constructed so as to by self- cleansing during draw down. The batch bins shall in general conform to the requirements of IS :4925.

3.11.2.3 WATER :

1. Water to be use din manufacturing and curing of Concrete shall be tested be for use.

   All such tests shall be submitted to the Engineer in - charge for his approval be for water is used in work.

2. Contractor shall identify the location of source of water intended to be used. Each such source of water shall be separately tested. In the event of a change in source of water all tests specified here in shall have to be repeated.

3. In the event of water is drawn from tube wells or open wells, water samples shall be taken for seasonal fluctuations in water table or atintervals to be directed by the Engineer in -charge.

4. Water samples from each source shall be tested as under :

SL. No.	Test	Number of tests for each sources
(a)	Acidity	3
(b)	Alkalinity	3
(c)	Presence of Solids	3

Mean values of the above tests shall be taken as the representative value and the acceptance criteria shall be based on the test results. All testing procedure and computation of test results shall conform to IS: 3025

5. Approved quality water shall be collected and stored in the Under Ground sumps/elevated tanks for the day to day requirement of work and same shall be used for all cement works and also for curing. Due care shall be taken in this regard.

3.11.2.4 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	±2% of the quantity of cement in each batch
Measurement of Water	±3% of the quantity of water in each batch
Measurement of Aggregate	±3% of the quantity of aggregate in each batch
Measurement of Admixture	±3% of the quantity of admixture in each batch

3.11.2.5 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.

3.11.2.6 Transportation, Placing and Compaction of Concrete

(i) 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 mixers peed shall not be less than 4rev/ min. of the drum and not greater than a speed resulting in a peripheral velocity of the drum as 70 m /minute aits largest diameter. The agitating speed of the git at or shall be not be less than 2rev/min. and not more than 6rev/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 an uniform mix, after all ingredients, have been charged in to the drum. Unless tempering water is added, all rotation after 100 revolutions shall be a 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.

(ii) 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 therein the pump-receiving hopper during operation. The lines shall always be maintained clean and shall be free of dents.

(iii) Materials for pumped concrete shall be batched consistently and uniformly.

(iv) 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 finerthan0.25mm).Proportion of fine aggregates passing through 0.25 mm 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 distance sand 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.

3.12 PREPARATION OF MIXES AS PER APPROVED DESIGN MIX AND CONDUCTING CONFIRMATORY TESTAT FIELD LAB.

3.12.1 The contractor shall make the cube soft rial 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 7days and 28days.Test cubes shall be taken fromtrial mixes as follows.

3.12.2 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 a stage of 28 days. The cubes shall be made, cured, transported and tested strictly in accordance with specifications. The average strength of six has been approved, the evaluationnof test results will be done as per IS :456-2000.

3.12.3 Frequency of Sampling

3.12.3.1 *Sampling Procedure*engaged for

A random sampling procedure shall be adopted to ensure that each concrete batch shall have are a sinkable chance of being tested that is the sampling should be spread over the entire period of concreting and cover all mixing units.

3.12.3.2 *Frequency*

The minimum frequency of sampling of concrete of each grade shall be in accordance with the following :

***Quantity of Concrete in the Work,* m³**	***Number of Samples***

1 –5	1
6 – 15	2
16 – 30	3
31 – 50	4
51 and above Plus one additional sample for each additional 50 m^3or part thereof	4

NOTE- *At least one sample shall be taken from each Shift. Where concrete is produced at continuous production unit, such as batch-mixed concrete plant, frequency of' sampling may be decided by Engineer- in-charge in such a manner so to ensure that each concrete batch shall have are as on able chance of being tested.*

3.12.4 Test Specimen

Three tests specimens shall be made for each sample for testing at 28 days. Additional samples may be required for various purposes such as to determine the strength of concrete at 7 days or at the time of striking the form work, or to determine the duration of curing, or to check the testing error. Additional samples may also be required for testing samples cured by accelerated methods as described in IS 9103.The specimen shall be tested as described in IS 516.

3.12.5 Test Results of Sample

The test result soft 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 do neat the laboratory established at site by the contractor and remaining 10% in the laboratory as mentioned in para 3.6, or in any other NABL accredited laboratory as directed by the Chief Engineer, CPWD, Kolkata.

3.12.6 ACCEPTANCE CRITERIA

3.12.6.1 Compressive Strength

The concrete shall be deemed to comply with the strength requirements when both the following condition are met:

a) The mean strength determined from any group of four consecutive test results complies with the appropriate limits in col 2 of Table given under para 3.5 above.

b) Any individual test result complies with the appropriate limits in col.3 of Table given under para3 .5 above.

3.12.6.2 Quantity of Concrete Represented by Strength Test Results

The quantity of concrete represented by a group of four consecutive test- results shall include the batches from which the first and last samples were taken together with all intervening batches.

Where the mean rate of sampling is not specified the maximum quantity of concrete that four consecutive test results represent shall be limited to 60 m^3.

3.12.6.3 Concrete of each grade shall be assessed separately.

3.12.6.4 Concrete is liable to be rejected if it is porous or honey-combed, its placing has been interrupted without providing a proper construction joint, there in for cement has been displaced beyond the to clearances specified, or construction tolerances have not been met. However, the hardened concrete may be accepted after carrying out suitable remedial measures to the satisfaction of the Engineer-in-Charge.

3.12.7 Ultrasonic Pulse Velocity Method of Test for RCC

3.12.7.1 The under lying principle of assessing the quality of concrete is that comparatively higher velocities are obtained when the quality of concrete interims of density, homogeneity and uniformly is good. The consistency of the concrete as regards its general quality gets established. In case of poorer quality lower velocities are obtained. If the rear cracks, void s or flaws inside the concrete which come in the way of transmission of pulse, lower velocities are obtained.

3.12.7.2 The quality of concrete in terms of uniformity ,incidence or absence of internal flaws, cracks and segregation etc. indicative of the level of workmanship employed ,can thus be assessed using the guidance given in table below, which have been evolved for characterizing the quality concrete in structure in term of the ultrasonic pulse velocity.

Velocity criterion for Concrete Quality Grading.

Sl. No.	Pulse velocity by Cross Probing (km/sec)	Concrete Quality Grading
1	Above 4.5	Excellent
2	4.5 to 3.5	Good
3	3.5 to 3.0	Medium
4	Below 3.0	Doubtful

Note : In Case of" doubtful" quality it may be necessary to carry further tests.

3.12.7.3 Pulse velocity method of test of concrete is to be conducted for CPWD works as a routine test. The acceptance criteria as per the above table will be applicable which is as per IS: 13311(Part-1):1992. From the above "Good" and "Excellent" grading are acceptable and below these grading the concrete will not be acceptable**. The cost of testing shall be borne by the contractor.**

3.12.7.4 All RCC Columns and 5% (of number) of the other RCC members in each category i.e. beam, column, slab and footing may be tested by UPV test method for establishing quality of concrete. It is suggested that test be conducted on RCC beam near joint with column, on RCC column near joint with beam, on RCC footings and rafts. On RCC rafts a suitable grid can be worked out for determining number of tests. In addition doubtful areas such as honeycombed locations, locations, where continuous seepage is observed, construction joints and visible loose pockets will also be tested.

3.12.7.5 The test results are to be examined in view of the above acceptance criteria "Good" and "Excellent" and wherever concrete is found with less than required quality as per acceptance criteria, repairs to concrete will be made. Honeycombed areas and loose pockets will be repaired by grouting using Portland Cement Mortar/Polymer Modified Cement Mortar /Epoxy Mortar, etc. after chipping loose concrete in appropriate manner. In areas where concrete is found below acceptance criteria and defects are not apparently visible on surface, injecting approved grout in appropriate proportion using epoxy grout /acrylic Polymer modified cements slurry made with shrinkage compensating cement / plain cement slurry etc. will be resorted to for repairs. (Refer relevant chapters from CPWD Hand Book on Repairs and Rehabilitation of RCC Buildings). Repair to concrete will be done till satisfactory results are obtained as per the acceptance criteria by retesting of the repaired area. **If satisfactory results are not obtained dismantling and relaying of concrete will be done.**

3.13 **COVER BLOCKS**: Contractor shall use factory made cover blocks of approved shape and strength for all RCC works to avoid displacement of bars in any direction and to ensure proper cover. Alternatively, the contractor may manufacture the cover blocks as per approved methodology by Engineer-In-charge. The grade of concrete shall be same grade as of concrete in which they will be used. The concrete shall be fibre reinforced concrete with 6 mm down graded aggregate. Shape & sizes hall be as decided by Engineer-In- charge.

3.15 CURING:

i. The contractor shall ensure moist curing to all structural members in general.

ii. Curing shall be done with 2 or 3 layers of wet hessian cloth covered by PVC sheets in order not to allow the moisture to evaporate.

iii. Since the design mix is having controlled water content, the contractor shall protect the concrete from drying shrinkage by resorting to early age curing. Covering of wet hessian cloth shall be done after the onset of the final setting time.

iv. The contractor shall submit methodology of proposed curing which ensures continuous maintenance of required temperature regime.

v. Membrane curing by chemical compounds may be allowed at places which are normally in accessible and repair works and nothing extra is payable on this account. If curing particular brand of compounds from Engineer-In-Charge.

3.16 RATES:-

(i) The rate includes the cost of materials, labour and T&P, including mixing, placing, pumping of concrete and transportation involved in all the operations described above except for the cost of centring, shuttering & reinforcement which will be paid for separately.

(ii) In case of rejection of concrete on account of unacceptable compressive strength, governed by para" Standard of Acceptance" as above, the work for which sample shave failed shall be redone at the cost of contractor. However, the Engineer-in-charge may order for additional tests (like cutting cores, ultrasonic pulse velocity test, load test on structure or part of structure, etc) to be carried out at the cost of contractor to as certain if the portion of structure where in concrete represented by the sample has been used, can be retained on the basis of results of individual or combination of the 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 CPWD Specifications.

3.17 RCC WORK (ORDINARY)

3.17.1 The work shall be done in accordance with CPWD Specifications with up to date correction slips.

3.17.2 Water Cement ratio for Ordinary RCC work shall not be more than 0.45.Contractorshall use concrete mixture of proper design having arrangement for measuring water for mixing of concrete.

3.18 FORM WORK

3.18.1 The work shall be done in general as per CPWD Specifications. The safety of the cantering / shuttering and scaffolding and its proper design shall be the responsibility of the contractor.

3.18.2 Only M.S. centering / shuttering and scaffolding material unless & otherwise specified shall be used for all R.C.C. work to give an even finish of concrete surface. **However, marine-ply shuttering in exceptional cases as per site requirement may be used on specific request from contractor to be approved bythe Engineer-in-Charge.**

3.18.3 Nothing extra shall be paid for the centering and shuttering, circular in shape whenever the form work is having a mean radius exceeding 6 m in plan.

3.18.4 Nothing extra shall be paid for grid beam sand the corresponding slab shaving clear span more than 1.20 metres.

3.18.5 In order to keep the floor finish as per architectural drawings and to provide required thickness of the flooring as per specifications, the level of top surface of R.C.C. shall be accordingly adjusted at the time of its cantering, shuttering and casting for which nothing extra shall be paid to the Contractor.

As per general engineering practice ,level of floors in toilet/bath, balconies, shall be kept 12 to 20 mm or as required, lower than general floors and shuttering should be adjusted accordingly. Nothing extra is payable on this account.

3.18.6 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 are required to complete the shuttering panels.

Dented, broken, cracked, twisted or rusted shuttering plates shall not be allowed to be used on the work.

The shuttering plates shall be cleaned properly with electrically driven sand restoremove any cement slurry or cement mortar or rust. Proper shuttering oil or de-bonding compound such as " Reebole" of FOSRO Co equivalent shall be applied on the surface of the shuttering plates in the requisite quantity be for assembly of steel reinforcement. Nothing extra shall be paid on this account.

3.18.7 Concreting of upper floor shall not beenup after the concrete has set at least for three days.

3.18.8 The work is to be executed around and inside the existing building. Proper care should be taken during execution of work so that existing Electrical cables, AC duct, AC External/Internal Units, Furniture, Electrical fittings, Doors & windows, Window Glass Panes, Water Supply & Sewerage pipe line etc. are not damaged. If any damage occurs during execution, the same is to be repaired by the Contractor at his own cost.
Nothing extra payment shall be made to the Contractor on any of these accounts.

3.19 REINFORCEMENT:-

3.19.1 The reinforcement shall be done as per CPWD Specifications.

3.19.2 The rate of item of reinforcement of RCC work includes all operations including straightening, cutting, bending, welding, binding with an neared steel or welding and placing in position at all the floors with all leads and lift complete as per CPWD Specifications.

3.19.3 The contractor shall provide approved type of support for maintaining the bars in position and ensuring required pacing and correct cover of concrete to reinforcement as called for in the drawings, spacer blocks of required shape and size. Chair sands paper bars shall be used in order to ensure accurate positioning of reinforcement. **Spacer blocks shall be cast well in advance with approved proprietary pre-packed free flowing mortars (Conb extra as manufactured by M/S Fosroc Chemicals India Ltd. Or approved equivalent)** of high early strength and same colour as surrounding concrete. However, Cover Guard Bars shall also be used to maintain proper cover of RCC Columns in addition to spacer blocks as mentioned above. Pre- cast cement mortar/ concrete blocks/blocks of polymer shall not be used as spacer blocks unless specially approved by the Engineer-in-charge. The rate of RCC items is inclusive of cost of such cover blocks & Cover Guard Bars. Nothing extra shall be paid on this account.

4.0 <u>MASONRY WORK:-</u>

4.1.1 The Fly ash based C C block masonry as per SOQ shall be carried out as per CPWD Specifications.

Fly Ash bricks conforming to quality standard of IS:13894 having minimum average compressive strength of 10 N/sq.mm of size 22.9 x 11.4 x 7 cm shall be used.

4.1.2 The rate shall also include for leaving chases /notches for dowels/cramps for all kinds of cladding to come over brick work.

4.1.3 Brick work provided around shaft or lift walls or around slab cut outs shall be measured in the brick for corresponding floor level. Nothing extra shall be paid on this account.

4.1.4 M.S. Strip /Bar provided at every third course of half brick masonry shall be in single piece. If required, welding joint can be used without over laps. Nothing extra shall be paid for welding and over laps

5.0 EXPANSION JOINT

5.1 General

5.1.1 Seismic/separation/expansion joints shall be provided where shown in the drawings and as per CPWD specifications and as directed by Engineer-in-Charge. They shall be constructed within gap between the adjoining parts of the works of the width specified, if so provided in the structural design.

5.1.2 The contractor shall ensure that no debris is allowed to enter and settle in expansion joints.

5.1.3 The expansion joint shall be cleaned and made dry completely. All loose materials shall also be removed. The joints gap shall be made uniform in width and depth after cleaning the joints. The backup materials of best quality shall be provided in position in order to produce thoroughly together in required portion as prescribed by manufactures specification, so that a uniform mixture obtained. The mixed solution shall be applied to two sides of the joint that it covers the sides complete. Disturbed edges of RCC members near expansion joints shall be finished with rich mortar without any extra work includes providing required width of expansion board in the joints and measurement of expansion board only shall be taken.

6.0 GRANITE / MARBLEOR LIKE WORKS :

6.1 The granite/marble or like stone work shall, in general, be carried out as per the CPWD Specifications. The specifications for dressing, laying, curing, finishing, measurements, rate etc.for the granite/marble or like stone flooring shall be same as that of works for the Marble flooring, skirting and risers of steps under Flooring Sub Head of the CPWD Specifications.The wall lining/ veneer work with granite/marble or like stone shall be as per the CPWD Specifications for Marble work Sub Head.

6.2 The decision of the Engineer-in-Charge as regards the approval of the samples for the various types of the granite/marble or like stones shall be final and binding on the Contractor. No claim of any kind what's ever shall been retrained from the Contractor on this account. The Contractor shall then procure and get the mock up prepared at site of work for approval of quality of workmanship and the granite/marble or like stone as specified. The mock up shall be prepared in lift lobby, toilet etc. On one of the floors. The size of the stones shall be as per the architectural drawings. If the quality of the workmanship and the materials as per the required standards, the mock up shall be allowed as part of the work and measured for payment and shall not be dismantled. Otherwise, it shall be dismantled by the contractor as directed by the Engineer-in-Charge and taken away from the site of the work at his own cost. Nothing extra shall be payable on this account.

6.3 The granite/marble or like stone slabs shall be cut to required sizes and shapes, as per the architectural drawings, to negotiate the curved steps in segmented manner. The risers shall also be cut to required sizes and shapes and the edges chamfered at the joints, all as per the architectural drawings. However, the Contractor shall prepare the detailed shop drawings for the same and commence work only after the approval by the Engineer-in- Charge. The rate shall also include any consequent wastage, incidental charges involved in this work. Nothing extra shall be payable on this account. For the purpose of payment, the actual area of each type of granite/marble or like stone as laid shall be measured.

6.4 For the steps (risers and treads) in the linear profile, the granite/marble or like stone shall be provided in single pieces as per the architectural drawings, unless otherwise specifically permitted by the Engineer-in-Charge. Wherever grooves are required to be provided the same is to be done as per architectural drawings and as directed by the Engineer-in-charge. Wherever required, the joints shall be provided as per the architectural drawings. Nothing extra shall be payable on these accounts.

6.5 The granite / marble or like stone similar locations shall be in single piece unless otherwise directed by the Engineer-in-Charge. Wherever stone slab other than in single piece is allowed to be fixed, the joints shall be provided as per the architectural drawings and as per the directions of the Engineer-in-Charge. Depending on the number of joints, as far as

possible, the stone slabs shall be procured and fixed in slabs of equal lengths as per the architectural drawings and as directed by Engineer-in-Charge.

6.6 While fixing the granite/marble or like stone slabs in sills, soffits and jambs of doors, windows, ventilators etc., rebates shall be made by overlapping the stones at the required places for fixing shutters for doors, windows and ventilators etc. as shown in the architectural drawings and as per the directions of the Engineer-in-Charge. Epoxy based adhesives shall be used for fixing the granite/marble or like stones to each other, or wherever required. The authorized overlap as per the architectural drawings or as directed by the Engineer-in-Charge shall be measured for payment under the same item. However, any extra mortar thickness required due to the overlap arrangement shall be deemed to have been included in the rate of this item. Nothing extra shall be payable on this account. The stone shall have uniform thickness and shall be provided in sizes as per the architectural drawings. The stone slab shall have uniformly levelled surface after fixing. All the joints shall be finished smoothly in a workmanlike manner.

6.7 The granite /marble or like stone work shall be adequately protected by a layer of Plaster of Paris, which shall be maintained throughout and removed just before handing over of the works for which nothing extra shall be payable.

7.0 **<u>WOODWORK</u> :**

7.1 The wood work in general shall be carried out as per CPWD Specifications (Volume-I) 2019, with up-to-date correction slips

7.2 The sample of timber to be used shall be deposited by the contractor with Engineer-in-charge before commencement of work.

7.3 The shape and size of beading shall be as per drawings. The joints of beading shall be mitred.

7.4 Timber shall be of specified species, good quality and well- seasoned as per requirement of IS code / CPWD Specifications. It shall have uniform colour, reasonably straight grains and shall be free from knots, cracks, shakes and sapwood. It shall be close grained. The contractor shall deposit the samples of species of timber to be used with the Engineer-in-Charge for testing before commencement of the work and get them approved.

7.5 Wood work shall not be painted, oiled or otherwise treated before it has been approved by the Engineer-in-charge. All portion of timber including architrave abutting against masonry, concrete, stone or embedding round shall be painted with approved wood preservative or with boiling coal tar.

7.6 The contractor(s) shall produce cash voucher and certificates from approved Kiln Seasoning Plants about the timber used on the work having been kiln seasoned and chemically treated by them, failing which it would not be accepted as kiln seasoned and/or chemically treated.

7.7 Transparent sheet glass conforming to IS:2835 shall be used. Thickness being governed as under unless otherwise specified in the item in wood work/steel work:

Area of Glazing	Thickness
(a)For glazing area up to 0.50 sqm.	4.0 mm
(b)For glazing area more than 0.50 sqm. to 0.90 sqm	6.0 mm

7.8 Factory made wooden flush door and panelled and wire gauge shutters shall be manufactured and carried out as per CPWD specifications (Volume-I,2019 with up to date correction slips).

7.10 The contractor shall propose well in advance to Engineer-in-Charge, the names and address of the factory where from the contractor intends to get the shutters manufactured along with the credential of the firm. The contractor shall place the order for manufacturing of shutters only after obtaining approval of the Engineer- in –Charge whose decision in this case shall be final &binding. In case the firm is not found suitable he shall propose another factory. The

factory may also be inspected by a group of officers before granting approval; shutters shall however he accepted only if the seemed the specified test.

7.11 Contractor will arrange stage wise inspection of the shutters at factory by the Engineer- in-Charge or his authorized representative. The contractor will have no claim if the shutters brought at site in part or full lot are rejected by the Engineer-in-Charge due to bad workmanship/ quality. Such defective shutters will not be measured and paid. The contractor shall remove the same from the site of work within 7days after the written instruction in this regard are issued by the Engineer-in-Charge.

7.12 The shutters should be brought at site without primer/ painting.

7.13 (a) Inspection of shutters shall be carried out for dimensions & tolerances, size & type general construction &workmanship, finish &glazing at the following frequency:-

Lot Size	Sample Size	Permissible number of defectiveness
Upto 25	2	0
26 to 50	5	0
51 to 100	8	0
101 to 150	13	1
151 to 300	20	2
301 to 500	32	3
501 to 1000	50	5
1001 &above	80	7

(b) Criteria for conformity

Any sample shutter failing in any one or more of the requirements inspected for as above shall be considered as defective .Alot shall be considered as having satisfied the requirements of the standard if the number of defective shutters in the sample does not exceed the corresponding permissible number of defectiveness given above.

(c) Testing–The shutters shall be tested for species seasoning & treatment, defects in the timber, panel material, construction &workmanship in the approved Laboratory at the frequency mentioned in CPWD specification.

If shutters are found defective in any one of the criterion double the shutter shall be tested &if found permissible can be accepted. If shutter is found defective in more than one criterion, the whole lot shall be rejected.

(d) Finish

i) All components of door shutter shall have smooth finish.

ii) Panels of the door shutters shall be flat and well sanded to a smooth and level Surface.

iii) All the surfaces of door shutters which are required to be painted or polished or varnished shall begot approved from the Engineer In Charge before applying protective coat of primer, polish or varnish.

8. <u>Flush Doors</u> – As per CPWD Specifications

9. <u>STEEL WORK</u>

9.1 All steel work shall be carried out as per CPWD Specifications.(Volume1)2019withup-to- date correction slips.

9.2 All welded steel work shall be tested for quality of weld as laid down in IS822:1970 before actual execution.

10. FLOORING

10.1 All work in general shall be carried out as per CPWD Specifications (Volume1)2019withup-to-date correction slips.

10.2 Whenever flooring is to be done in patterns of tile sand stones, the contractor shall get samples of each pattern laid and approved by the Engineer-in-charge before final laying of such flooring. Nothing extra shall be payable on this account.

10.3 Different stones/tiles used in pattern flooring shall be measured separately as defined in the nomenclature of the item and nothing extra for laying pattern flooring shall be paid over and above the quoted rate. No additional wastage, if any, shall be accounted for any extra payment.

10.4 Samples of flooring stones/Tile (Kota/Marble/ Granite/Ceramic tiles/ Vitrified tiles etc.) shall be deposited well in advance with the Engineer-in-Charge for approval. The sizes of stones for flooring shall be of a size not less than 600mmx600mm or as approved by Engineer- in-Charge. Approved samples should be kept at site with the Engineer-in-Charge and the same shall not be removed except with the written permission of Engineer-in-Charge. No payment what's ever shall be made for these samples.

10.5 Full width Marble/ Kota/Granite stone over kitchen platform shall be provided except to adjust for closing pieces. The marble/stone flooring in tread sand risers of stair case is to be laid in single piece.

10.6 The rate of items of flooring is inclusive of Providing Sunken Flooring in Bathrooms, Kitchen, W.C., etc. and nothing extra on this account is admissible.

10.8 The joints of the flooring material (stones or tiles) shall match with the joints of the corresponding skirting material, unless otherwise mentioned in the drawings or directed by Engineer-in-charge.

10.9 Proper gradient shall be given to flooring for toilets, veranda, kitchen, court yard etc. so that wash water flows towards the direction of floor trap. Any reverse slope if found, shall be made good by the contractor by ripping open the floor/grading concrete and nothing shall be paid for such rectifications.

10.10 The flooring and skirting will be executed as per pattern shown in the Architectural drawings and as per approval of Engineer-in-Charge and nothing extra shall be payable on this account.

10.11 The rate shall include the cost of all materials and labour involved in all the operations. Nothing extra shall be paid for use of cut/sawn stone/tiles in the work.

11. VITRIFIED TILES FLOORING

11.1 The tiles shall be of approved make and shall generally conform to Table12of IS:15622.TheVitrified tiles of specified sizes shall be used &sample of tiles shall be got approved from the Engineer–in–charge. The Mandatory tests for vitrified tiles shall be got done as per CPWD Specifications (volume– 1) 2019 /relevant BIS Code.

11.2 The vitrified tile shall be as specified in the item. The tiles shall be of specified colours as shown in the drawings or as approved by Engineer–in–Charge and will be laid in pattern as per architectural drawings. Nothing extra shall be paid for laying tiles in specific pattern. The tiles shall be first quality of approved make.

12. WATER PROOFING:-

12.1 The work shall be got executed as per CPWD or manufactures' specifications and from the specialized agency as approved by the Engineer in -Charge.

12.2 Contractor shall also submit the names of water proofing specialist alongwith information about their technical capabilities and list of similar works executed by the specialized agency in the past for the approval of Engineer-in-charge within 30 days from the date of award of work.

12.3 Total quantity of the water proofing compound required shall be arranged only after obtaining the prior approval of the make by Engineer-in-charge in writing. Materials shall be kept under double lock and key and proper account of the water proofing compound used in the work shall be maintained. It shall be ensured that the consumption of the compound is as per specified requirements.

12.4 The finished surface after water proofing treatment shall have adequate smooth slope as per the direction of the Engineer-in-charge.

12.5 Before commencement of treatment on any surface, it shall be ensured that the outlet drain pipes /spouts have been fixed and the spout openings have been chased and rounded off properly for easy flow of water.

12.6 **GUARANTEE BOND FOR ALL WATERPROOFING ITEMS:-**

Ten years Guarantee bond in prescribed Performa **given in the tender document** 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. **10% (Ten percent)of the cost of water-proofing work shall be retained as Security Deposit and the amount so deducted would be released after 10(Ten)years from the date of completion of the entire work under the agreement, if the performance of the treatment is found satisfactory**. If any defect is noticed during the guarantee period, the contractor shall rectify it within 15 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 .However, this security deposit can be released in full ,if bank Guarantee or FDR of equivalent amount for Full **10(Ten) years** is produced and deposited with the department.

12.7.1 **The entire water proofing work on sunken slab so fall toilets, roof slabs shall be video recorded covering all the operations/ activities such as surface preparation to the final layer of water proofing coating. The video clippings shall be submitted to Engineer-in-charge along with monthly progress report during each month. Nothing extra shall be paid towards to cost of video recording and submission of DVD disk /pen drive consisting the video clippings.**

12.8 Curing of water proofing treatment shall be done for a minimum of ten days

13. **FINISHING:-**

13.1 The work shall be done in accordance with CPWD Specifications- 2019 Vol. I with up to date correction slips and the manufacturer's specifications where CPWD specifications are not available.

13.2 **The quantity of paint required as per theoretical consumption including wastages, if any, shall be procured from the approved manufacturer or his authorized dealers and deposited with the representative of the Engineer-in-Charge at site.**

13.3 **Agency is to procure minimum 50% of the paint / primer / putty etc. as per theoretical consumption before starting of the finishing items. The same shall be serial numbered and checked by JE, AE & EE and duly signed. Subsequent balance quantity shall be procured @ minimum 25% of the required quantity before consumption of initial quantity and the same shall be duly checked and signed by JE & AE. EE may also check it suitably.**

13.4 The paint shall be obtained in smaller packing (around 20 litre).

13.5 The paint shall be kept in the joint custody of the Department and the Contractor and day-to-day account of receipt and issue shall be maintained. However, the safe custody and watch and ward shall remain to be the responsibility of the Contractor. Nothing extra shall be payable on this account.

13.6 The name of the manufacturer, manufacturer's product identification, manufacturer's mixing instructions, warnings and instructions for handling and application, toxicity and date of

manufacturing and shelf life shall be clearly and legibly mentioned on the labels of each container. These details shall be kept in record. The material shall be consumed in the order of material brought to site, first come first consume basis. The Contractor shall obtain and submit to the Department the manufacturer's certificate for compliance of the various characteristics of the materials as per the manufacturer's specification sand also copy of the manufacturers test report for the record.

13.7 Empty containers of the paints shall not be removed from site till the completion of the work unless otherwise permitted and shall be removed only with the permission of the Engineer-in- Charge or his authorized representative at site of work.

13.8 All arrangements for measuring, dosing etc. At site shall be made by the Contractor. Nothing extra shall be payable on this account.

13.9 The Contractor shall apply samples of each kind of paint for the approval of shade and colour as per the directions of the Engineer-in-Charge before procuring the paint in mass.

13.10 All incidental charges of cartage, storage, wastage, safe custody, scaffolding, cost of sample sand mock-ups etc. shall be borne by the Contractor and no claim, what sever, shall be entertained on this account.

14. <u>SANITARY INSTALLATIONS / WATER SUPPLY/DRAINAGE: -</u>

14.1 The contractor shall be responsible for the protection of the riod of installation and thereafter until the building is handed over.

14.2 The contractor shall furnish all labour, materials and equipment, transportation and incidental necessary for supply, installation, testing and commissioning of the complete Plumbing/ Sanitary system as described in the Specification sand as shown on the drawings. This also includes any material, equipment, appliances and incidental work not specifically mentioned here in or noted on the Drawings/Documents as being furnished or installed, but which are necessary and customary to be performed under this contract. The Plumbing/Sanitary System shall comprise of following:

a. Sanitary Fixtures and Fittings.
b. Internal and External Water Supply.
c. Internal and External Drainage.
d. Balancing, testing & commissioning.
e. Test reports and completion drawings.

14.3 For the work of water supply and sanitary installations, the contractor shall engage the approved licensed plumbers and submit the name of proposed plumbing agencies with their credentials for approval of the Engineer-in-Charge. For quality control & monitoring of workmanship, contractor shall assign at least one engineer who would be exclusively responsible for ensuring strict quality control, adherence to specifications and ensuring top class workmanship for the installation.

14.4 The working general shall be carried out as per CPWDS pacifications (Volume-II)2019with up-to-date correction slips.

14.5 The tendered rates shall include the cost of cutting holes in walls, floors, RCC slabs etc. wherever required and making good the same for which nothing extra shall be paid.

14.6 Nothing extra for providing &fixing C P Brass caps/extension pieces wherever required for CP Brass fittings shall be paid beyond the rates payable for corresponding CP Brass fittings.

14.7 The contractor shall examine all architectural, structural, plumbing, electrical and other services drawings and check the as- built works before starting the work, report to the Engineer- In- Charge any discrepancies and obtain clarification. Any changes found essential to co-ordinate installation of his work with other services and trades, shall be made with prior approval of the Engineer In-Charge without additional cost to the department.

14.8 All the shop drawings shall be prepared on computer on Auto CAD platform based on Architectural Drawings and site measurements no later than two months of the date of start of the plumbing work as per approved program, contractor shall furnish, for the approval of Engineer In-Charge, the two sets of detailed shop drawings of complete work and materials

including layouts for Plant room, Pump room, Typical toilets drawings showing exact location of supports, flanges, bends, tee connections, reducers, detailed piping drawings showing exact location and type of supports, valves, fittings etc; external insulation details for pipe insulation etc.

14.9 The shop drawings shall contain all information required to complete the work. These Drawings shall contain details of construction, size, arrangement, operating clear acnes, performance characteristics and capacity of all items of equipment, also the details of all related items of work by other contractors, if any. Each shop drawing shall contain tabulation of all measurable items of equipment/materials/works and progressive cumulative totals from other related drawings to arietta variation-in-quantity statement at the completion of all shop drawings. Minimum 4sets of drawings shall be submitted after final approval along with CD. When he makes any amendments in the above drawings, the contractor shall supply two fresh sets of drawings with the amendments duly incorporated along with check prints, for approval. The contractor shall submit further four sets of shop drawings to the Engineer In-Charge for the exclusive use by the Engineer In-Charge and all other agencies. No material or equipment may be delivered or installed at the job site until the contractor has in his possession, the approved shop drawing for the particular material/equipment/installation.

14.10 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.

14.11 Samples of all materials like valves, pipes and fittings etc. Shall be submitted to the Engineer - in-Charge prior to procurement for approval and retention by Engineer In-Charge and shall be kept in their site office for reference and verification till the completion of the Project. Wherever directed a mock up or sample installation shall be carried out for approval before proceeding for further installation without any extra cost.

14.12 Approval of shop drawings shall not be considered as a guarantee of measurements or of building dimensions. Where drawings are approved, said approval does not mean that the drawings super the contract requirements, nor does it in any way relieve the contractor of the responsibility requirement to furnish material and perform work as required by the contract.

14.13 All materials and equipment shall conform to the relevant Indian Standards and shall be of the approved make and design. Makes shall be in conformity with list of approved manufacturers as per the tender document.

14.14 Balancing of all water systems and all tests as called in the CPWD Specifications shall be carried out by the contractor through a specialist group, in accordance with the Specifications and Standards. The installation shall be tested and shall be commissioned only after approval by the Engineer In-Charge. All tests shall be carried out in the presence of the representatives of the Engineer In-Charge and nothing extra shall be payable on this account.

14.15 The contractor shall submit completion plans for water supply, internal sanitary installations and building drainage work within 15 days of the date of completion. These drawings shall be submitted in the form of two sets of CD's and four portfolios (300x450mm) each containing complete set of drawings on approved scale indicating the work as installed. These drawings shall clearly indicate complete plant room layouts, piping layouts and sequencing of automatic controls, location of all concealed piping, valves, controls and other services. In case the contractor fails to submit the completion plans as aforesaid, security deposit shall not be released and these shall be got prepared at this risk and cost.

14.16 The CCI/CI/PVC pipe and GI pipe etc. wherever necessary shall be fixed to RCC columns, beams etc. with rawl plugs and nothing extra shall be paid for this.

14.17 The variation in consumption of material shall be governed as per CPWD specification and clauses of the contract to the extent applicable.

14.18 The pig lead to be used in joints of 150 mm, 100 mm,75 mm,50 mm dia of sand cast iron, centrifugally cast (Spun)iron pipes shall be as per relevant CPWD Specifications.

14.19 The contractor shall bear all incidental charges for cartage, storage and safe custody of materials and shall construct suitable godsons, yards at the site of work for storing materials so as to be safe against damage by sun, rain, fire or theft etc., at his own cost and also employ necessary watch and ward establishment for the purpose at his own cost.

14.20 All 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 in the Schedule of Quantities, specifications, elsewhere in this tender document & drawings. The quoted rates shall be deemed to be all inclusive for a complete item fit for use including all materials, labour, T&P, specials, equipment, testing & commissioning etc. Accessories shall include proper fixing arrangement, brackets, nuts, bolts, screws and required connection pieces. Nothing extra whatsoever shall be payable on this account.

14.21 Fixing screws shall be half round head chromium plated brass screws with C.P. washers where necessary or otherwise as provided in the item.

14.22 Porcelain sanitary ware shall be glazed vitreous china of first quality free from warps, cracks and glazing effects and shall conform to relevant BIS codes. Colour of sanitary ware, shall be specified or as selected by the Engineer-in-Charge. Nothing extra shall be payable on this account.

14.23 Horizontal pipes running along ceiling shall be fixed on structural adjustable clamps of approved design. Horizontal pipes shall be laid to uniform slope and the clamps adjusted to the proper levels so that the pipes fully rest on the mind are properly secured.

14.24 Contractor shall provide all nuts, bolts, welding material and paint the Clamps with one coat of red oxide and two or more coats of black enamel paint.

14.25 Slotted angle/channel supports on walls shall be provided wherever shown on drawings.

Angles/channels shall be of sizes shown on drawings or specified in schedule of quantities. Angles/channels shall be fixed to brick walls with bolts embedded in cement concrete blocks and to RCC walls with suitable anchor fasteners. The spacing of support bolts horizontally shall not exceed 1m.

14.26 Wherever M.S. clamps are required to be anchored directly to brick walls, concrete slabs, beams or columns, nothing extra shall be payable for clamping arrangement and making good with cement concrete 1:2:4 mix(1cement:2coarse sand:4 stone aggregate 20mm nominal size)o r as directed by the Engineer-in-Charge.

14.28 Rates for all items quoted shall be inclusive of all work and items given in the above mentioned specifications and Schedule of Quantities and applicable for the work under floors, in shafts or at ceiling level at all heights and depths. All rates are inclusive of cutting holes and chases in RCC and masonry work and making good the same. All rates are inclusive of pre testing and on site testing of the installations, materials and commissioning.

14.29 Cleaning and Disinfection of Pipelines:-

On completion of hydraulic tests and before a pipe is disinfected, it shall be proved to be free from obstruction, debris and sediment by scouring or by any other process which the Engineer-in-charge may prescribe. Upon satisfactory completion of testing and cleaning, the pipe lines shall be disinfected as ordered. Chlorine solution shall be applied at the charging point as the pipe line is being filled and shall be continued until the pipe line is full and at least 50 parts of chlorine per million parts of water have been made available and distributed evenly. If ordinary bleaching power is used, proportions will 150 gms of power to1000 litre of water. If proprietary brand is used, the proportion shall be as specified by the manufacturer. The treated water shall be left in pipe line for a period as directed but not exceeding 24 hours chlorine residual tests shall be taken at various points along the pipe line. The disinfection process shall be repeated until the sump le of water taken from the pipe line are declared fit for human consumption by a recognized laboratory.

14.30 Opening, cut out in slabs, beams as required shall be left out by inserting PVC spouts of required size before casting of RCC members. Nothing extra shall be paid on this account.

14.31 The entire responsibility for the quality of work will however rest with the building contractor only.

15. STAINLESSSTEELRAILINGS:

15.1 Providing, fabricating and fixing in position welded built-up section using stainless pipes and connecting plates, of Grade S.S.304 and of required diameter &thickness as per the directions of the Engineer-in-Charge, at the junctions of doors, on walls, other locations as directed etc. Including cutting, welding, grinding, bending to required profile and shape, hoisting, buffing and polishing, cutting chase/embedding in RCC/Masonry, fixing using stainless steel screws, nuts ,bolts and washers or stainless steel fasteners as required to make it rigidly fixed &stable and making good the plaster/flooring etc. all complete, at all floors and all levels as directed by the Engineer-in-Charge.

15.2 Rate includes cost of all inputs of materials, labour, T&P, etc. involved in the work and all incidental charges to execute this item. However, for the purpose of payment only the actual weight of the stainless pipes and stainless steel plates provided and fixed shall be measured in kg.

16. Aluminium work

16.1 The work shall be carried out as per specified CPWD specifications in general and as per direction of Engineer-in-Charge.

17. UPVC WINDOWS:.

The work shall be carried out as per specified CPWD specifications with upto date correction slips and as per directions of Engineer-in-Charge.

18. PILE WORK :

18.1 Definition:-The definition of terminology shall be as per (IS-2911 Part I/Section 2 of latest edition).

18.2 The construction of bored cast-in-situ concrete piles shall be carried out in all respects as per the provision stipulated in the agreement, as per IS-2911 Part- I/Section-2 (latest edition) and as per direction of Engineer-in-Charge.

18.3 The piles shall be bored cast-in-situ concrete piles and shall carry a safe load as mentioned against the item for piling work in the schedule.

18.4 The permissible positional deviation from the true position of pile : -

(i) No pile shall be more than 75 mm out of the true position as shown in the approved plan/drawing at the level of bottom of pile cap. In case the pile is displaced by more than 75 mm from its true position, the contractor shall be required to submit modified design based on actual displacement for approval of the Department. Any extra cost in the work involved on account of such modification shall be borne by the contractor.

(ii) No error in verticality of the pile exceeding 1.5% (One decimal Five percent) from the true vertical shall be permitted. In case the deviation in verticality exceeds this limit, the pile shall be liable for rejection. The contractor in such case may be permitted to re-design the pile as a battered pile or he may provide extra pile/piles to satisfy structural requirements at his own risk and cost.

18.5 The contractor shall be responsible for any adverse effect due to providing such extra pile on other piles.

18.6 The distance between centre to centre of piles shall not normally be less than 2.75 to 3 times the diameter of the pile and 2.5 times under exceptional cases. In case different sizes of piles are used the diameter of biggest pile shall be the guiding factor.

18.7 A minimum length of one meter of temporary casing shall be inserted in each bored pile. Boring shall be done by rotary type drilling rigs/machine using direct mud circulation method. No auger or cutter boring will be permitted. Stabilisation of edges shall be done by use of bentonite solution having specific gravity. 1.1 to 1.2 and conforming to Specification detailed in, Appendix A of IS 2911 (Part-I/Section-2) 1979 or latest edition. The specific gravity of the mud suspension near about the bottom of the hole shall whenever practicable be determined by suitable slurry sampler in a first few piles and at suitable intervals of piles

and recorded. Consistency of the drilling mud suspension shall be controlled throughout the boring as well as concreting operation in order to keep the hole stabilised as well as to avoid concrete getting mixed up with thicker suspension of the mud. The bentonite solution shall be used at least from the level of subsoil water and hole shall then be always kept almost full with bentonite solution, which shall preferably be kept in motion. Where the Engineer-in-Charge is satisfied that it is necessary to do so, he can permit the contractor to use a suitable casing, which may not be left, in place. Such permission shall be given only on the application of the contractor and after the other methods have failed to produce satisfactory results. No extra payment shall be made to the contractor for such alternate method. The bottom of the boreholes shall be cleaned of the spoils and sediments before placing of concrete and after placing of cage reinforcement so that the base of the pile shall be free from loose material.

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

18.9 Concreting :-

(i) Concreting of boreholes shall start as soon as possible after its completion. Should a borehole, which is not caged, be left un-concreted for more than two hours, it shall be cleaned thoroughly before concreting. The concreting under water shall be done in one operation. Where concreting under water, a temporary casing should be installed to the full depth of the borehole or 2 metres into the non-collapsible stratum, so that fragments of ground cannot drop from the sides of the hole into the concrete as it is placed.

(ii) Concrete shall be placed by means of a tremie pipe (Sec. IS 456-2000, Para 14-2-4a). It shall be ensured that concrete entering the tremie pipe does not get mixed up with the slurry. One of the methods of achieving this is by pouring ¼ Kg, of granulated vermiculite in the tremie pipe before pouring concrete. The vermiculite granules will form a plug separating concrete from the fluid below. Any other approved method of plugging may also be adopted. The tremie pipe shall extend up to the bottom of the bore hole at the start and may be withdrawn in sections as the level of concrete rises in the bore holes, but the discharge end shall at all times be kept at a level below the top of concrete in the bore holes to a minimum depth of one metre. The placing of concrete should be continuous and the tremie pipe should be held concentric in the hole.

18.10 Withdrawal of Casing :-

(i) Extraction of casing (if used) shall be done in such a way that no knocking or shearing of the concrete in the shaft takes place. Care should be taken to ensure that water does not enter the tremie pipe. At all times, after concreting is started, the lower end of the casing pipe shall remain below the tremie pipe at least 60 cm, till concreting is completed.

(ii) During the extraction of casing, slumping of concrete shall be observed and when required, additional quantity of concrete shall be poured so that the pile is formed, above the cut off level as per Clause 7.7 and 7.8 of IS – 2911 (Part-I/ Sec. 2) 1979 or latest edition for which nothing extra shall be paid. During extraction of the casing, special slump records shall be maintained. The slump in any case shall not exceed the permissible limit as laid down in IS-2911 (Part-I/Sec 2)/1979 with amendments or latest edition.

18.11 Splicing of Reinforcement of Piles :-

(i) The longitudinal reinforcement and spiral/ rings of the piles should be provided in pile (as per drawing.) for entire length of piles. The splicing of longitudinal reinforcement should have full development length/bond length of 46 x d. where “d” is the diameter of the bar or as shown in drawing.

(ii) When the splicing of longitudinal reinforcement is provided in lap joints with necessary arc welding as per I.S. 9417-1989 or latest edition, the development length/bond length should be provided for a length of 15 X d or 200 mm whichever is more. The welding in lap joints of reinforcement of pile should be strictly done as per provision of para 10.5 to para 14 of I.S 9417-1989 or latest edition. Prior to production of welding in the aforesaid reinforcement, "Initial tests" as per para 12.1 and "Quality control tests" as per para 13.2, 13.2.1 and 14 of I.S 9417- 1989 or latest edition should be carried out at any approved laboratory and the results of testing should be submitted to the Engineer-in-charge.

18.12 The longitudinal reinforcement of the piles should be anchored to the pile cap for a length of 41 times the diameter of reinforcement or as shown in drawing, from top of pile.

18.13 The piles shall be measured from the underside of the pile cap to the bottom of tip of the pile. The length of the pile embedded in the pile cap shall not be measured as a part of the pile for the purpose of payment. No deduction, however, shall be made from the pile cap due to length of pile embedded in the pile cap. This should include all cost of labour and materials required for installation of the piles including the length of pile to be embedded in the pile cap for which no extra payment will be made but excluding the cost of reinforcement.

18.14 The contractor shall have to satisfy the Engineer-in-Charge for every pile that is concreted by making accurate observations of the consumption of cement and quantity of concrete that has actually gone into the pile and record for the same shall be maintained by the contractor indicating the reduced level of the bottom and top of the pile. All other data about boring of the pile shall be recorded as directed by the Engineer-in-Charge. Concreting of each pile shall be done on the same day. Concreting in water shall not be carried out without written permission of the Engineer-in-Charge.

18.15 When concrete is placed by tremie method, Concrete shall be cast to the piling platform level to permit overflow of concrete for visual inspection or to a minimum of one metre above cut off level. No payment will be made for this concrete over the cut off level.

18.16 Cost of dismantling the concrete of pile from GL upto the cut-off level of the pile and the cost of removal of the dismantled concrete shall be done by the contractor from the site and no payment shall be admissible on this account. No extra payment for the empty boring from the average ground level to the cut-off level of the pile shall be entertained.

18.17 No extra payment for empty boaring if any shall be paid to the contractor.

18.18 **LOAD TEST :**

18.18.1 Initial Load Test :-

Contractor shall carry out such load test before execution of the main piling work outside the pile layout as per the direction of the Engineer-in-Charge. The rate for initial load test shall include the construction of test cap and cost of all items of works necessary for testing and dismantling the test cap after the test is completed.

18.18.2 Routine Load Test :-

Routine load test shall be carried out on any particular pile or group of piles in the pile layout, selected by the Engineer-in-Charge. The rate of routine load test shall include construction of test cap and all items of works necessary for testing and dismantling the test cap after the test is completed.

18.18.3 All the records of load test data as per agreement item and quantities should be submitted to the Engineer-in-charge as soon as the tests are completed. The related structural drawings shall be released for execution in phased manner after 3 weeks from the date of respective tests reports i.e. pile layout details after receipt of initial load test reports and details of pile cap after receipt of routine load test reports. The time specified in clause-5 of schedule "F" for execution of work is inclusive of the aforesaid time schedule for issue of structural drawings.

18.18.4 The load test on pile/piles of standard length shall not be carried out earlier than 4(four) weeks from the time of casting of the piles. Initial load test and routine load test shall be carried out as per IS 2911 (Part-IV) of latest edition. For the purpose of load test, the pile shall be kept free from any lateral contact with the soil upto a depth of 2000 mm below the ground level/formation level i.e. approximately upto cut off level. The test cap for such tests shall be so constructed that even when the pile had settled fully under load test, the cap would not touch the ground surface below it. The Engineer-in-Charge will have the liberty to direct the contractor to conduct the load test at any stage of piling work.

18.18.5 Rate for testing shall include the extra length of pile required to be constructed for carrying out the tests and any other work considered necessary for that test and the Department will not incur any expenditure in this regard.

18.18.6 Before any load test is carried out the proposed apparatus and loading structure to be used for the load test shall be got approved by the Engineer-in- Charge. The dial gauges and pressure gauge shall be got calibrated through National Test House, Calcutta. The calibration certificate in original should be submitted to the Engineer-In-Charge which shall be returned after verification.

18.18.7 The contractor shall arrange the necessary kentledge and RSJ's etc. for applying the load in the load test and shall remove the kentledge, RSJ and bags of ballast etc. from the site after the test is completed to the satisfaction of the Engineer- in-Charge. Rate quoted for testing shall include the cost of all the items of the work necessary for such test and submission of the test report as per the direction of Engineer- in-Charge.

18.18.8 Determination of safe load carrying capacity of piles shall be governed by the provision of IS 2911 (Part-IV) latest edition.

18.18.9 The contractor shall be paid for the load tests at his quoted rates. If the results of such tests are found to be erratic and inconclusive, the contractor will be required to carry out additional tests at his own cost to prove the satisfactory performance of the piles.

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

If it is found that the length of pile is to be installed at a lesser length than that of specified in the respective item of works, necessary deduction will be done on prorata basis from the quoted rates in the relevant item of works.

18.18.11 In case the piles which fail in the load test does not come upto the stipulated load capacity, the contractor shall submit his proposal for bringing up the load capacity of the foundation upto the required level by providing extra piles or other corrective measures which shall be provided by the contractor at his own risk and expense. For all such modifications for strengthening and corrective measure, the contractor shall obtain prior approval of the Engineer-in-Charge before execution.

18.18.12 If the safe load bearing capacity of the piles based on the load test data is found to be lower than the designated load capacity guaranteed in tender, the contractor shall modify the foundation system by increasing the length of the pile or by increasing the numbers of pile or by combination of both for which necessary load, moments etc., of the columns shall be supplied by the Engineer-in-charge. The additional payment on account of such strengthening due to revision of design shall be limited to the amount arrived at by multiplying the number of piles "N" (Where "N" is the number of piles required by providing piles of capacity guaranteed by tender) the permissible increase of ten percent in the length "L" specified in the description of the item in the contract at the rate "R" quoted for such type of pile. (That is the additional payment shall be limited to N x L x 1R/10).

Any extra cost over and above, the permissible increase shall be borne by the contractor and the Department shall not be required to pay for the same.

18.18.13 Testing of piles of different categories shall be done in presence of Engineer- in-Charge or his authorized representative.

18.18.14 The agency has to make the full arrangement for non destructive integrity testing of piles (NDT) as per IS 14893:2001 and it shall be carried out on selected piles atleast on 5% of total piles or as decided by the Engineer-in-Charge, in case of doubt regarding soundness of cement concrete work (RCC work) on piles as per direction of Engineer-in-Charge and his dicision shall be final and binding. However, testing charges shall be born by the department provided test results meet the acceptance criteria otherwise payment for testing as well as cost of pile shall be born by the agency.

18.18.15 (A) Maintenance of Register of Tests –

(I) 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.

(II) 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 he contractor. Cost of sample materials is to be borne by the contractor and he shall be responsible for safe custody of samples to be tested at site.

(III) All the test in field lab setup at Construction Site shall be carried out by the Engineering Staff deployed by the contractor which 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. For outstations the percentage of tests to be witnessed by JE, AE & EE are to be decided by NIT Approving Authority and should form part of QA Plan.

(IV) 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.

(V) Contractor shall be responsible for safe custody of all the test registers.

SPECIAL CONDITION FOR PAINTING WORKS

1. The Contractor shall take prior approval from Engineer-in-Charge before procurement of putty and paint (Internal and External)
2. The Contractor shall procure paint materials with valid GST invoice and submit to JE/AE CPWD for record.
3. All empty cans and bags of paint materials used for work shall be preserved at site till approval for CPWD for removal.
4. The Contractor shall inform CPWD after procurement of paint for necessary checks.
5. JE & AE shall perform 100% test check for painting works and EE shall perform 25% test check for painting works.
6. No kaccha bill or non-GST bill shall be accepted by CPWD from Contractor.
7. Batch nos. of paints shall be submitted by Contractor for record/M.A. S to CPWD.

8. Guarantee/Warranty certificate from manufacturer shall be obtained by contractor and shall be submitted to CPWD with Final bill.
9. Minimum 50% quantity of painting materials shall be brought at site by contractor before start of work.
10. All Painting works shall be done using roller only as per manufacturer's specification. No painting works using brush shall be allowed and payable.

PREFERRED MAKES FOR CIVIL WORK

(1) The Contractor shall obtain approval from the Engineer-In-Charge before placing order for any specific material or engaging any of the specialized agencies.

(2) Wherever applicable. The Engineer-In-Charge may approve any material equivalent to that specified in the tender subject to proof being offered by the Contractor for equivalence to his satisfaction.

(3) Unless otherwise specified, in the tender document all the materials which are ISI Marked shall be used in the work and if the ISI marked materials are not available, materials conforming to IS shall be used, and for the materials which are neither ISI marked nor conform to IS, the manufacturer's Specification shall be followed.

SL. NO.	MATERIALS	APPROVED MAKE
1.	OPC (43 Grade)/PPC	ACC / ULTRATECH /AMBUJA / JK CEMENT / BIRLA/DALMIA/NUVOCO
2.	White Cement	BIRLA WHITE / J. K WHITE
3.	Reinforcement Steel (TMT Bars)	SAIL / TISCO / RINL / JINDAL PANTHER** / JSW**/ TISCO** / VIZAG
4.	Parallel Threaded Couplers	DEXTRA / G-TECH / SANFIELD
5.	Re-barring Chemical	HILTI / 3M INDIA
6.	Structural Steel	TATA/ JSW STEEL LTD/ SAIL/ JINDAL STEEL & POWER LTD./ RINL / APOLLO/ UTKARSH
7.	Plasticizer, Super Plasticizer, Admixtures, Other construction chemicals	FOSROC / ASTRAL/SIKA / MAPEI/ PIDILITE / HOME PRIDE / BERGER / ASIAN PAINTS / STP LIMITED/ FERROUS CRETE
8.	AAC Block	ULTRATECH / KONCRETE / BILTECH / JK LAXMI / MAGICRETE / XTRALITE / SIPOREX/NUCON/RENACON
9.	AAC Block Adhesive	ULTRATECH / FERROUS CRETE / BAL ENDURA / KONCRETE / HOME PRIDE / SIKA BLOCK JOINTING MORTAR/ MAPEI / FEVICOL/CICO/ BERGER
10.	Polymer modified cementitious grout	BAL ENDURA / HOME PRIDE/ BERGER / MYK LATICRETE / GROWEL/ FERROUS-CRETE/ ASTRAL/ MAPEI
11.	List of RMC producers	ULTRATECH / ACC READYMIX/ RIGHT CHOICE / PRISM/ INFRA.MARKET/ LAFARGE (NUVOCO) / L&T
** Note :- Subject to approval for competent authority and prior approval given to the contractor from Engineer – in – Charge.		

AE (P) EE (P)

SL. NO.	MATERIALS	APPROVED MAKE
12.	Plasticiser & Super Plasticiser	CONTRAMENT, POWER FLOW / MYK SCHOMBURG / HOME PRIDE / CONPLAST / ASIAN PAINTS / BERGER / OPTIMA / SIKA / CICO
13.	Curing Compound	FOSROC / SIKA / PIDILITE/ HOME PRIDE / STP/ ASIAN PAINTS / MAPEI / FERROUS CRETE/ BERGER
14.	Expansion Joint- modular	HERCULES / HOME PRIDE / SANFIELD/ KANTA FLEX (INDIA) PVT. LTD./ FERROUS CRETE
15.	Expansion Joint Bitumen Board	DURA BOARD HD 100 / STP / DURAFILL / BERGER
16.	Shuttering Ply	MERINO/GREENLAM/CENTURY / ARCHIDPLY /KITLAM
17.	Grout	ARDEX / GROWEL / SIKA / FOSROC GP2 / ASIAN PAINTS / MAPEI / HOME PRIDE / DR.FIXIT / BERGER / ASTRAL
WATERPOOFING :		
18.	Waterproofing Self Adhesive (HDPE) Membrane	FOSROC / MAPEI /ASIAN PAINTS / STP LIMITED / PIDILITE/ BIRLA OPUS /FERROUS CRETE/ DR. FIXIT/ HOME PRIDE /ASTRAL/ BERGER
19.	Single Component Liquid PU Elastomeric Membrane (spray applied) for Deck Waterproofing	SIKA / FOSROC/ MAPEI /ASIAN PAINTS / GROWEL / STP LIMITED / PIDILITE / FERROUS CRETE /DR. FIXIT/ ACCO PROOF/ ASTRAL/ BERGER
20.	Two component liquid Elastomeric Polyurea Polyurethane hybrid membrane	SIKA / FOSROC/ MAPEI/ ASIAN PAINTS/ STP LIMITED / PIDILITE / GROWEL / DR. FIXIT/ HOME PRIDE / ASTRAL/ BERGER
21.	Waterproofing Compound (Crystalline) and Swellable Bar	XYPEX / KRYTON / PENETRON / MAPEI / SIKA / FOSROC / ASIAN PAINTS / GRACE/ VENDEX / STP LIMITED/ FERROUS CRETE/ DR. FIXIT/ ACCO PROOF/ ASTRAL/ BERGER
22.	Polymeric Cementitious Coating	FOSROC/ MAPEI /HOME PRIDE /STP LIMITED /PIDILITE / BERGER / BIRLA OPUS /ASIANPAINTS / GROWEL / ASTRAL
23.	Elastomeric Acrylic UV resistant liquid applied coating	FOSROC/ SIKA / MAPEI/ STP LIMITED / GROWEL / BIRLA OPUS /ASIAN PAINTS /ASTRAL/ BERGER/ HOME PRIDE

SL. NO.	MATERIALS	APPROVED MAKE
24.	Chemical water proofing system	SIKA / DR. FIXIT / ASIAN PAINTS / HOME PRIDE / BIRLA OPUS / ASTRAL / MAPEI /FOSROC / ADREX ENDURA/ BERGER
25.	Water stops	GROWEL / MAPEI /ASIAN PAINTS / DR. FIXIT/ BIRLA OPUS /ARDEX ENDURA/ ASTRAL/ BERGER
26.	Structural Sealant	ASIAN PAINTS / ASTRAL / MAPEI / GE / FOSROC / SIKA/ BERGER
27.	Actactic Polypropylene (APP) Modified Water proof Membrane	STP / PIDILITE / ASTRAL /ARDEX ENDURA / ASIAN PAINTS / BERGER
DOOR, WINDOWS & WOOD WORK :		
28.	Laminated Particle Board / Particle board / Laminates / Plywood	MERINO / GREENLAM / CENTURY / EUROPLY / DUROVA/VIRGO / DURIAN/ARCHIDPLY /KITMICA/SUNMICA/CROSSBOND/GREEN PLY
29.	Pre-laminated Particle board Exterior Grade / HDF Pre-laminated board	MERINO / VIRGO/CROSSBOND / TESA ACTION CO. / ECOBOARD / ARCHID PLY / CENTURY / GREEN LAM / GREEN PLY
30.	Gypsum Board	GYPROC SAINT GOBIAN / LAFARGE / KNAUF
31.	Veneered Particle Board	MERINO / DUROVA / GREENLAM
32.	SS Mesh	GKD / WMW
33.	FRP door & frame	NYFLEX/CENTURY/ECO DOOR / MEENA FIBRE GLASS / POLYLINE / RAJSHRI
34.	Flush door shutters	GREENPLY / BHAWANI FIRE/ MERINO / CENTURY / GREENLAM / CROSSBOND / TUFWUD/ KITPLY
35.	Glass Door Hardware	DORMA / KICH / HAFELE / OZONE / GEZE / DORSET / IMONGERY/HETTICH
36.	Hydraulic door closers / Floor springs	GODREJ / HARDWYN / DORMA / EVERITE / DORSET / IMONGERY /GEZE
37.	Locks & Latches	DORSET / GODREJ / HETTICH / HAFELE/ HARRISON / IMONGERY / LINK / GEZE
38.	Non Metallic Fire Door	NAVAIR / TUFWUD / GODREJ / KENWOOD
39.	Glass wool Insulation	UP TWIGA / POLY GLASS / LLOYDS / OWENSCORNING

SL. NO.	MATERIALS	APPROVED MAKE
40.	Rock Wool Insulation	LLOYDS / ROXUL ROCKWOOL
41.	Polycarbonate Sheet	GE LEXAN / DANPALON/ GALLINA/MG POLYPLAST / ALCOX / COXWELL/ POLYGAL/ FLUX
42.	Polycorbonate Convex Mirrors, Rubberised Road Hump	UNIQUE SAFETY SOLUTIONS
43.	Decking Steel sheet	TATA STEEL / LLOYDS / JSW
44.	Natural wood veneer	SONEAR / GREEN PLY / TRUWOOD
45.	Anti-static high-pressure laminate	FORMICA / BAKELITE HYLAM / DECOLAM / MERINO / VIRGO / DURIAN
46.	Fire Sealant	HILTI / 3M INDIA / FISCHER /KWIK
47.	Extruded Polystyrene Board	STP/SUPREME/OWNESCORNING/ SHALIMAR / BERGER
48.	Wooden / Metal / Glazed / Acoustic - Fire Rated Door Shutters	NAVAIR / BHAWANI FIRE / JC FIRE DOOR / SAINT GOBAIN / GALAXY FIRE / SHAKTHI HARMANN / TUFWUD / KENWOOD / GODREJ / TATA PRAVESH
49.	UPVC Doors & Windows	FENESTA/PROMINANCE /MARG / ENCRAFT /DUROPLAST/ GB / ASIAN PAINTS / GEALAN / SIMTA ASTRIX / KOMARLING/ YASHPOLY
50.	PVC Doors and Frames	ACCUCEL / ENCRAFT / POLYLINE / RAJSHRI
51.	Fire rated glass (2 hours fire rating)	SAINT GOBAIN/ PYROGUARD / SCHOTT / ASAHI/ PROMAT / PILKINTON
52.	Water Proof Ply wood Commercial Ply, Fire Retardant Ply and Block board	CENTURY PLY / GREENPLY / KITPLY / DUROPLY / ARCHIDPLY/ VIRGO
53.	Fire Smoke Seal	HILTI / FISCHER / 3M INDIA / ATHMER / RAVEN
54.	Fire Rated Hardware	DORMA / BHAWANI FIRE / DORSET / IMONGERY / GEZE
55.	Non Metalic Floor Surface Hardners	HARDONITE/ HOME PRIDE / FOSROC / SIKA / PIDILITE/ BERGER
FINISHING :		

SL. NO.	MATERIALS	APPROVED MAKE
56.	Melamine Polish	ASIAN PAINTS/ GROWEL /PIDILITE INDUSTRIES / DULUX / BERGER
57.	Polyester Powder Coating Shades	NEROLAC/BERGER/ AKZONOBEL (DULUX)
58.	Wall Putty	BIRLA WHITE / HOME PRIDE / JK WHITE / BERGER / GROWEL / JK MAXX / ARDEX ENDURA
59.	Oil Bound Washable Distemper	ASIAN PAINTS / BERGER / BIRLA OPUS / NEROLAC / ICI / DULUX / JK MAXX
60.	Acrylic Distemper	BERGER / BIRLA OPUS / ASIAN / ASTRAL /DULUX / NEROLAC/ JK MAXX
61.	Cement Primer	BERGER / ASIAN / BIRLA OPUS / ASTRAL /NEROLAC / DULUX / JK MAXX
62.	Steel / Wood Primer	DULUX/ NEROLAC / BIRLA OPUS /BERGER / ASIAN PAINT / ASTRAL /JENSON & NICHOLSON/ JK MAXX
63.	Pink Primer	ASIAN / BERGER / BIRLA OPUS /ASTRAL /NEROLAC / DULUX / JK MAXX / NIPPON
64.	Red Oxide Zinc Chromate Primer	ASIAN / BERGER / ASTRAL /NEROLAC / DULUX / BIRLA OPUS /JK MAXX / NIPPON
65.	Adhesives	ANCHOR / HOME PRIDE / DUNLOP / PIDILITE-FEVICOL/ JK MAXX/ ASTRAL
66.	Premium Acrylic Emulsion Paints	DULUX / NEROLAC / BIRLA OPUS / ASTRAL / ASIAN PAINTS / BERGER/ JK MAXX
67.	Acrylic Smooth Exterior paint	ASIAN / BERGER / BIRLA OPUS /ASTRAL /DULUX / JK MAXX
68.	Textured Exterior Finish	ASIAN / BERGER /ASTRAL / DULUX / NEROLAC / BIRLA OPUS / JK MAXX
69.	Synthetic Enamel Paint	ASIAN / BERGER / BIRLA OPUS /ASTRAL /NEROLAC / DULUX / JK MAXX / NIPPON
70.	Water Proof Cement Paint	ASIAN / BERGER / ASTRAL /DULUX / BIRLA OPUS / CEM COLOUR
71.	Epoxy Paint	DULUX / NEROLAC / ASIAN PAINTS / BERGER / SHALIMAR / ASTRAL /STPL LTD. / ARDEX ENDURA / GROWEL

SL. NO.	MATERIALS	APPROVED MAKE
72.	PU Enamel Metallic Paints on MS Structure & Epoxy Paints (Premium Quality)	SKK / ASIAN / BERGER / ASTRAL /MRF
73.	Epoxy Coating	SIKA / FOSROC / ASTRAL /LATICRETE / ARDEX ENDURA / MAPECOAT DW25 / GROWEL
74.	Fire Paint	ASIAN PAINT / BERGER PAINTS / SHALIMAR / TUFWUD / DULUX
75.	Gypsum Plaster	FERROUSCRETE /ULTRATECH/HOME PRIDE / INDIA GYPSUM / GYPROC/WESTERN
76.	Cement based Ready Mix Plaster	FERROUSCRETE / HOME PRIDE /ULTRATECH / SAINT GOBAIN/ MAPEI / ASIAN PAINTS
77.	Pre-Cast GRC Jali	UNISTONE / SHARDA / TERRAFIRMA / MULTIWYN / ECOVISION
78.	Polysulphide sealant	FOSROC / SIKA / TUFFSEAL / PIDILITE / MAPEI / DOW CORNING / GE / STP / DR. FIXIT/ ASTRAL/ BERGER
79.	Silicone / Weather Sealant	WACKER/DOW CORNING/GE / SIKA/ ASTRAL/ BERGER
80.	Wall Paper	EGO / VESCOM / ASIAN PAINTS / MURASPEC / MARSHALLS
81.	Vinly Graphic	3M / AVERY DENNISION / LUMAR
82.	Melamine Polish	ASIAN / MELAMINE GOLD WUDFIN / POLYCURE
83.	Fire Retardant Paint	ASIAN PAINTS / HILTI / AKZONOBEL / STPL LTD./TUFWUD
84.	Anticorrosive Bitumastic Paint	BERGER / SHALIMAR / ASIAN PAINTS
85.	Solar Studs / Median Markers	3M / AVERY DENNISON / NIKKALITE
STEEL & ALUMINIUM WORKS :		
86.	Stainless Steel	SALEM / JINDAL / SAIL/CONNECT/RAMPART
87.	Welding Electrodes	ADVANI-OERLIKON / MODI
88.	Dash / Anchoring Fasteners	HILTI / FISHER / BOSCH / AXEL / WURTH

SL. NO.	MATERIALS	APPROVED MAKE
89.	Anodised Aluminium Hardware (Heavy Duty)	HARDIMA / ALUALPHA / PULSE OFLGF / SYSMAC / HINDALCO / EVERITE
90.	Aluminium Structural Members – Windows, Door, Glazing and Partitions	JINDAL / HINDALCO / PROMINANCE /NALCO /INDALCO / DEFINE / SCHUECO / BHORUKA / VIRGO / HARDIMA / EVERITE
91.	Stainless Steel Railing, Accessories etc. (Grade SS 316)	OZONE / GEZE / KICH / DORMA / HETTICH / IMONGERY
92.	G. I Steel door frame	SYNERGY THRISLINGTON / BHAWANI FIRE / NAVAIR/GATEMET
CEILINGS :		
93.	False ceiling Grid system	GYPROC / GRIDLINE / MUTE PRO/ KNAUF/ DIAMOND CEILINGS/ ROYAL KRAFT/ AEROCEIL/ METAPRO
94.	False Ceiling – Gypsum Board and Sections	SAINT GOBAIN GYPROC / INDIA GYPSUM / METAPRO /AEROCEIL/KNAUF
95.	Metallic / Wooden Modular False Ceiling	DURLUM / HUNTER DOUGLAS / SAINT GOBAIN/ AEROCEIL/ ROYAL KRAFT/KNAUF/ MUTE PRO / DIAMOND CEILINGS/ METAPRO/VIRGO
96.	Acoustical Tile False ceiling	SAINT GOBAIN / AEROCEIL / DIAMOND CEILINGS / KNAUF / MUTE PRO / LLOYD INSULATION / ANUTONE/ METAPRO
97.	Calcium silicate ceiling tiles / Board/ GRG Ceiling	EVEREST / MUTE PRO /AEROCEIL/ DIAMOND CEILINGS/ METAPRO
98.	Aluminium Composite Panel	ALUCOBOND / CROSSBOND / ALUDECOR / REYNOBOND / EUROBOND / ALSTRONG/ VIRGO
99.	Acrylic Solid Surfaces	HANEX / LG-HIMAC / DUPONT
100.	Sandwich PUF Panelled Roofing Sheets	LLOYD INSULATION / JINDAL MECTEC / DANPALON / GE PLASTIC / LEXAN
FLOORING/ WALL TILES :		
101.	Glass Mosaic Tiles	BISAZZA / MRIDUL / OPIO / PALLADIO / ITALIA GLASS/ ASIAN (AGL)/ CORAL/PAVIT
102.	Floor & Wall Tiles :	

SL. NO.	MATERIALS		APPROVED MAKE
	(a)	Ceramic tiles	KAJARIA/ ICON GRANITO/ORIENTBELL / RAK / ASIAN (AGL)/SOMANY/JHONSON
	(b)	Vitrified tiles	KAJARIA/ ICON GRANITO /ORIENTBELL / RAK / ASIAN (AGL)/SOMANY/JHONSON
103.	PVC Flooring		ARMSTRONG / TARKETT / LG HAUSYS / GER FLOR /
104.	Grass Paver		UNISTONE / ULTRA/ SHARDA
105.	Laminated flooring		ACTION / TESA / PERGO /CROSSBOND
106.	Synthetic Sports Flooring		ARMSTRONG / LG / WONDORFLOOR
107.	Linoleum Sports Flooring		ARMSTRONG / FORBO / GERFLOR
108.	False Floor		HEWETSON / ACCESS FLOOR SYSTEM / UNIFLOOR / UNITILE / KEBAO
109.	Engineered Wood Floor		ARMSTRONG / MIKASA REAL WOOD FLOORS / ACTION TESA / WERNER / PERGO
110.	Floor Spring (For non DSR Items)		DORMA / INGERSOLRAND / OZONE / GEZE
111.	Cement Concrete Parking Tiles		NITCO / NTC / SHARDA / ULTRA
112.	Synthetic Carpet Tiles		TOLI / WELSPUN / HARRINGTON
113.	Vitrified Paving Tiles		PAVIT / JOHNSON ENDURA / NITCO / SOMANY
114.	Thermal Insulation Treatment		PIDILITE / MAPEI /ELASTOSPRAY / ROCK INDIA PVT LTD. / WEATHER KOOL & SEAL
115.	Engineered stone - Marble / Quartz		ASIAN / JOHNSON / KALINGA / QUTONE
116.	Chequered Tiles & Kerb Stone (of Non-Recycled C&D Waste)		OVILITE / UNISTONE / HINDUSTAN / KK / ULTRA / SHARDA / NITCO
117.	Interlocking Concrete Paver Blocks		DAZZLE / ULTRA / SHARDA / NITCO / ASIAN PAINTS
118.	Tile / Stone Adhesive / Tile Grout		PIDILITE / FERROUSCRETE / HOME PRIDE / BALLENDURA/ MAPEI / ASIAN PAINTS / ASTRAL/ BERGER/ ICON GRANITO
119.	Floor hardener		PIDILITE / FOSROC / SIKA / HOME PRIDE / FERROK / ASIAN PAINTS / FERROUS CRETE/ BERGER

SL. NO.	MATERIALS	APPROVED MAKE
120.	Epoxy Flooring	FOSROC / SIKA / CICO / ASIAN PAINTS / MAPEI / GROWEL/ BERGER
121.	Heat Resistant Tiles	THERMATEK//ORIENTBELL /NATIONAL/ ASIAN (AGL)/ THERMAX/ JOHNSON
122.	Floor Trap	JAYNA / CHILLI / NIRALI
GLAZINGS :		
123.	Glazing Structural / Suspended / Skylight / clear / float / frosted	SAINT GOBAIN / PYROGUARD / ASAHI / MODIGUARD / PILKINTON
124.	Frosted Glass / Mirror	ASAHI / MODIGUARD / SAINT GOBAIN / AIS
125.	Glass Spider Fittings	DORMA / HAFELE / OZONE / KICH / LEXAN GE
126.	Float Glass / Toughened Glass / Hermetically sealed performance glass	SAINT GOBAIN / MODIGUARD/ ASAHI / SCHOTT / PILKINTON
127.	Reflective Glass	SAINT GOBAIN / ASAHI / PILKINTON / MODIFLOAT
128.	Tempered Reflective / Clear Glass	SAINT GOBAIN / FUSO / GURIND / ASAHI / MODIGUARD
HARDWARE :		
129.	SS Screws	GKW / HILTI / ATUL / WURTH / KUNDAN / ALLOY / NETTLEFOLD / IMONGERY
130.	Stainless Steel bolts, washers, nults	HILTI / ATUL / KUNDAN / POOJA
131.	Stainless Steel Pressure Plate Screws	ATUL / KUNDAN / POOJA
132.	Welding Rods	Advani / Esab
133.	Metal Deck Sheet	TATA / SAIL
134.	Clamp system for dry stone cladding	HILTI / FISCHER / BOSCH / AXEL / WURTH
135.	Hinges & Brassware	EARL BIHARI / KICH / IMONGERY / HAFELE / GEZE / DORMA / DORSET / ALU ALPHA
136.	Friction Stay Hinges	EARL BIHARI / KINLONG
137.	Mild Steel Butt Hinges / Piano Hinges	JOLLY / SUPREME / SASWAT / DEEPAK

SL. NO.	MATERIALS	APPROVED MAKE
138.	Stainless Steel Butt Hinges	PRAYAG / OZONE / DORMA / IMONGERY / HAFELE / GEZE
139.	Stainless Friction Hinges	HETTICH / HAFFLE / SECURISTYLE / EBCO / ROTO
140.	MDF Board	NUWOOD / DURATUFF
141.	Concealed Tower Bolt	DORMA / DORSET / IMONGERY / ALU ALPHA
142.	Toilet Cubicles	MERINO / GREENLAM / TUFWUD/ DORMA/ VIRGO
143.	Hardware for Fire Check Door / panic bar / panic trim / door closer / hinges/ mortise lock / dead lock etc.	DORMA / GEZE / HAFELE / IMONGERY
144.	EPDM Gasket	HANU / ANAND / OSAKA / ROOP/ BOHRA / AMEE RUBBER
145.	Silicon Gaskets	SREE GAURAV
146.	Masking Tapes	3M / SUN / WONDER POLYMER / ASTRAL
147.	Anchor / SS Stone Cladding Clamps / Dash Fastners	HILTI / FISCHER / ANCHOR / NUTECH / WURTH / TRIXEL / HELFEN / BOSCH
PLUMBING & SANITARY :		
148.	Stainless Steel Pipes	JINDAL / RAMPART / J-PRESS / REMI
149.	Stainless Steel Kitchen Sink	JHONSON / DIAMOND / JINDAL / HINDWARE / NAVKAR / FRANKE / FUTURA
150.	HDPE/HDPE DWC pipes	JAIN / KAISTA / RELIANCE/ UTKARSH/BEC/ ASTRAL
151.	Polypropylene pipes	REHAU / POLOPLAST / HULIOT / ASTRAL / HINDWARE
152.	MS Pipe Tubes	SAIL / TATA / JINDAL INDIA/ UTKARSH
153.	GI Pipes	JINDAL INDIA / TATA / HISSAR / ZENITH / APPOLLO/ UTKARSH
154.	GI Fittings	UNIK / ZOLOTO / HB / ICS/ UTKARSH
155.	DI Pipes	ELECTROSTEEL / JINDAL / TATA DUCTURA / KESHORAM
156.	DI Fittings	ELECTROSTEEL / KALINGA / TATA DUCTURA / JINDAL / KESHORAM

SL. NO.	MATERIALS	APPROVED MAKE
157.	CI Double Flanged Sluice Valve	KIRLOSKAR / SONDHI / KEJRIWAL/RPMF
158.	Float Valve	LEADER / ZOLOTO / KSB/ PRIMA
159.	Water Supply Valves	ZOLOTO / LEADER / ARCO / NANDA/ PRIMA
160.	Air Release Valve	KIRLOSKAR / ZOLOTO / LEADER / KARTAR
161.	Centrifugally Cast (Spun) Iron Pipes & Fittings	JAYSWAL NECO / SKF/RPMF /BIC/ HEPCO
162.	Centrifugally Cast (Spun) Iron (Class LA) Pipes	JAYSWAL NECO / ELECTRO STEEL / TATA/ RPMF
163.	Centrifugally Caste (Spun) Iron	LANCO (SRIPIPES) / JINDAL / KESHORAM / ELECTROSTEEL
164.	Spun Cast Iron Fittings	NECO / KARTAR / ELECTROSTEEL / ZOLOTO / LEADER
165.	Hubless Pipe IS: 15905	JAYSWAL NECO / HEPCO /BIC/RPMF
166.	PE-AL-PE Composite Pipes	KITEC
167.	Spun Cast Iron Covers & Gratings	NECO / JAGANNATH / KAPILANSH / SKF
168.	CI Manhole covers, Frames & GI Gratings	JAYSWAL NECO / RPMF / BIC / HEPCO
169.	SFRC Manhole Covers & Gratings	KK / OCR / PARGATI / T-CON / RPMF / ADVENT / KUTTY / NU-TEC
170.	Stoneware Pipes and Gully Traps	PERFECT / PARRY / BURN / ANAND / RK / HIND
171.	RCC Manhole covers & Frames	KK MANHOLE / BIC / GRATING CO. (P) LTD/RPMF
172.	Gun Metal Valves, Globes	ZOLOTO / CASTLE / PRIMA/KARTAR / LEADER / SANT / AUDCO
173.	Sanitary CP Fittings & Accessories	ROCA / KEROVIT/ PRIMA/KOHLER / CERA / PARIWARE / ASTRAL / HINDWARE / EURONICS/ MARC/ ASIAN PAINTS
174.	PTMT / PVC Water Supply, Sanitary Fittings, Bib Cocks, Pillar Cock, Angle Valve, etc.	PEARL / TOPLAND / SUPREME/ PRIMA/ ASTRAL

SL. NO.	MATERIALS	APPROVED MAKE
175.	Vitreous Chinaware	HINDWARE / PRIMA /PARRYWARE / ROCA / KOHLER/ KEROVIT / CERA/ EURONICS / JOHNSON/ ASTRAL
176.	Flushing Cistern	HINDWARE/ PRIMA / PARRYWARE / CERA/ EURONICS
177.	PVC / HDPE Water Storage Tanks	SINTEX / SUPREME / SKIPPER / ORIPLAST/ UTKARSH/BEC/ ASTRAL
178.	Water Meter	ZOLOTO / LEADER / CAPSTAN/ EURONICS
179.	Brass Stop & Bib Cock	ZOLOTO / SKIPPER / L&K / TOPLAND / ASTRAL / EURONICS
180.	Water Supply Fixtures Like Bibcock, Shower Panels	JAQUAR / HINDWARE / SKIPPER / CERA / PARRYWARE / KOHLER/ EURONICS/ MARC
181.	UPVC / CPVC Pipe & Fittings	AKG / ASTRAL / PRIMA /SUPREME / FINOLEX / SKIPPER / HINDWARE / UTKARSH / TOPLAND / ASHIRWAD / FLOWGUARD
182.	SWR PVC Pipes and Fittings	ASTRAL / SUPREME / TOPLAND /PRIMA /FINOLEX/SKIPPER/ FLOWGUARD/ UTKARSH
183.	PVC Perforated Pipes	REX POLYEXTRUSION / ASTRAL / ZENPLAS PIPES / SUPREME/ UTKARSH
184.	Non-Return Valve (Check valve) and other kind of Valves	ZOLOTO / SKIPPER / LEADER / UTKARSH / KIRLOSKAR / FLUIDTECH
185.	Float Valve (Ball Valve)	PRAYAG / LEADER / ZOLOTO/ PRIMA
186.	Brass Ferrules	DHAWAN SANITARY UDYOG / KALSI / ANNAPURNA
187.	Insulation for hot water pipes	KAIFLEX / ARMAFLEX / CAREFLEX / LLOYD
188.	Insulation for external / exposed hot water pipes	KAIFLEX / ARMAFLEX / CAREFLEX
189.	Rockwool / Glasswool insulation	TWIGAFIBER / LLYOD INSULATION / KNAUF / SUPREME
190.	Pipe protection for external water supply pipes	PYPKOTE / ARMAFLEX / MAKPOLYKOTE
191.	Stainless Steel Sink	NEELKANTH / NIRALI / CERA / JAYNA / KINGSTON/ PRIMA
192.	RCC Pipes	LAKSHMI / SOOD & SOOD / JAIN & CO. / PRAGATI CONCRETE / INDIAN HUME PIPE

SL. NO.	MATERIALS	APPROVED MAKE
193.	Raised Access Flooring	UNITILE/HEWETSON/UNIFLOOR/ACCESS FLOOR SYSTEM
194.	Acoustical Wall Panelling	KNAUF/ SAINTGOBAIN/HUNTER DOUGLAS/ AEROCEIL / MUTE PRO/ DIAMOND CEILINGS
195.	Acrylic Base Polymer Emulsion (Corrosion Inhibitor)	SIKA/BASF/DOW/PIDILITE/CICO/BERGER
196.	SBR Polymer Mortar & Bonding Coat	SIKA/BASF/FOSROC/PIDILITE/CICO/ASTRAL/ BERGER
197.	Epoxy Resin Anchor Grout	SIKA/BASF/ FOSROC /PIDILITE/HILTI/ BERGER
198.	Plastic Encapsulated Foot Rest	KK INDIA / KGM / ACCURATE BUILDCON
199.	Sensor Based Auto Flush Systems	AOS SYSTEMS / CERA / HINDWARE / GROHE / JAQUAR / KOHLER/ EURONICS/ PRIMA
200.	Modular Kitchen/ Wardrobes / Hardware and Accessories	SLEEK / GODREJ / HETTICH / SPACEWOOD
201.	Mechanical coupler for Reinforcement	DEXTRA / SCINTILLA ADVANCED MATERIALS / L&T SUFIN (CSPL) / SANFIELD
202.	WPC Frames and Shutters	POLYLINE / RAJSHRI / QUTE/YASHPOLY
203.	Zinc Titanium Cladding System	HUNTER DOUGLUS / VM ZINC / VINDSIL / SILESIA / LEQSA
204.	Aluminium Sun Louver System	HUNTER DOUGLUS / WARENA RENKHOFF SE / LUTRON ELECTRONICS/ VIRGO
205.	Toilet Cubicles	GREENLAM / CENTURY / MARINO/ VIRGO
206.	Blinds/Curtains	VISTA / MAC
207.	Furniture	HARMAN MILLER / GODREJ / ROCKWORTH / DURIAN / FEATHERLITE

All fitting shall have ISI marked on its body wherever applicable.

Note :- Chief Engineer, CPWD, Kolkata reserves the right to add or delete any materials and Brands in the list of approved materials/brands on the recommendations of Engineer-in-charge. Unless otherwise specified in the tender document, all the materials which are ISI marked shall be used in the work and if the ISI marked materials are not available, materials confirming to ISI shall be used, and for materials which are neither BIS marked nor confirm to BIS, the manufacturers specification shall be used with prior approval of Engineer-in-charge.

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PART – C : ELECTRICAL WORKS

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GENERAL AND COMMERCIAL CONDITIONS FOR E & M WORKS

1.1. This section covers the various commercial conditions applicable and to be read in connection with the conditions of contract of the standard form (CPWD-7 / 8) of the department (CPWD) forming part of the tender papers. In the event of any discrepancy between these two, the requirements of the former will be followed.

1.2. These additional conditions are applicable to all E&M works in general. For specific tender some of the E&M services may not be a part of the particular tender. In such cases the conditions and specifications which are not related to the works or components thereof mentioned in the schedule of work shall not apply for that particular tender.

1.3. All the E & M works shall be carried out as per direction and to the entire satisfaction of the Engineer-in-charge.

1.4. The contractor has to be submit all the drawings to the Engineer – in – charge of the works for approval from the competent authority i.e. Layout drawing of all Sub-Head of works before execution or procurement of materials.

Unless otherwise specified in the following conditions, the work shall, in general, be carried out as per following specifications:

- **(a)** CPWD General Specifications for Electrical Works – Part-I (Internal), 2023 amended up to date.
- **(b)** CPWD General Specifications for Electrical Works – Part-II (External), 2023 amended up to date.
- **(c)** CPWD General Specifications for Electrical Works – Part III (LIFT & ESCALATOR) 2003 amended up to date.
- **(d)** CPWD General Specifications for Electrical Works – Part IV (Substations) 2013 amended up to date.
- **(e)** CPWD General Specifications for Electrical Works – Part V (Wet Riser & Sprinkler Systems) 2020 amended up to date
- **(f)** CPWD General Specifications for Electrical Works – Part-VI (Fire Alarm System), 2018 amended up to date.
- **(g)** CPWD General Specifications for Electrical Works – Part VII (D. G. Sets) 2013 amended up to date.
- ~~**(h)**~~ CPWD General Specifications for Electrical Works – Part VIII (GAS BASED FIRE EXTENGUSHER SYSTEM) 2018 amended up to date.
- **(i)** CPWD General Specifications for Electrical Works of HVAC-2024
- **(j)** Relevant BIS specifications amended up to date.
- **(k)** Indian Electricity Act 2003 and Indian Electricity Rules 1956 amended up to date.
- **(l)** Local Fire Regulations applicable at the place of installation.
- **(m)** Relevant and applicable foreign standards and specifications amended up to date.
- **(n)** Any other relevant act or rules and local byelaws.
- **(o)** Commercial and additional conditions and specifications for E & M work for this tender.

1.5. If the specifications for any item or its component are not available in the CPWD specifications cited above, relevant BIS specification as amended up to date shall be followed, whether or not the specific reference of a particular BIS specification has been made in this specification / tender document.

1.6. Wherever any reference to any Indian Standard specification occurs in the document relating to this contract the same shall be inclusive of all amendments issued thereto or revisions thereof, if any, up to the date of opening of tender.

1.7. All materials should conform to relevant BIS specifications wherever the same exists in absence of stipulation in this tender document.

1.8. Where manufacturers furnish specific instructions / recommendations relating to the materials used in this job and/or their installation, covering points not specifically mentioned in these documents, these instructions shall be followed in all cases and shall be deemed to be included in the schedule of work whether they have been specifically mentioned or not.

1.9. Manufacturer's catalogue / literature on installation, testing, maintenance and troubleshooting of major equipment shall be submitted to the department while handing over the installation.

1.10. MATERIALS TO BE USED IN THE WORK :

1.10.1. All materials used in the work shall be new and of good quality, conforming to the relevant specifications as per good Engineering practice.

1.10.2. All the materials proposed to be used in the work should be got approved from Engineer in Charge before use in work.

1.10.3. The materials to be supplied / provided by the contractor in execution of the work should be ISI marked, wherever applicable and of make as specified in the agreement. Where the make of any particular material is not specified in the contract document, the material shall be supplied as per makes desired by the Engineer-in-charge.

1.10.4. It will be the responsibility of the contractor / bidder to ensure use of genuine materials in the work. The department reserves the right to get (any / all materials / components) inspected by the manufacturer or their authorized representatives at any stage of the execution of work. If any of the materials, equipment supplied and used in work is found spurious at any stage, then the department reserves the right to ask the contractor to replace it by genuine one and make suitable recovery and / or withheld suitable amount till it is done, even if any payment against that material is already made.

1.10.5. The department may ask for any valid document like manufacturer's test certificate, document for purchase of the material, document for import / shipment of imported materials etc. as deemed fit by the engineer-in-charge to ascertain genuineness of material supplied by / used in the work by the contractor. The contractor shall remain bound to submit all such documents to the department failing which payment may not be made or if already paid may be recovered / withheld from subsequent running account payment.

1.10.6. Copies of all purchase documents for all equipments, accessories, fittings, fixtures etc. which carry guarantee / warrantee shall be handed over to the department in suitable form so that proper guarantee of materials are available to the department.

1.10.7. All the equipment and their components and all the materials to be used in the work shall be suitable for the environmental conditions at the location of the work.

1.10.8. The materials to be supplied in this work shall be scheduled in such a way that miles stones are achieved and no shortfall is there. At the same time materials should be brought at sight in phases in such a manner so that they are not brought much in advance at site and dumped in work site for long period before installation and guarantee / warrantee of the materials are available for full period i.e. from the date of beneficial use of the material / equipment as per tender conditions. If the materials / equipment are supplied at site much before actual use in work, the department shall not remain bound to accept and make payment for such items of work involving the said materials / equipment. The decision of the engineer in charge will be final and binding on all.

1.10.9. Dismantle materials, if any, should be returned to the department unless otherwise anything in contrary has been specifically stated in the tender document / BOQ.

1.11. RATES :

1.11.1. Unless otherwise provided in the schedule of quantities of the work the rates tendered by the contractor shall be all inclusive and shall apply to all heights, lifts, leads and depths of the building and nothing extra shall be payable to him on this account.

1.11.2. The rates for all items of work shall, unless clearly specified otherwise, include cost of all labours, materials and other inputs involved in the execution of the item irrespective of whether they have been specifically mentioned in the tender document or not.

1.11.3. This being an indivisible works contract, GST, ~~Excise Duty etc~~. are not payable separately. The rates tendered shall be firm and inclusive of all taxes, duties, cess and levies as applicable, and all charges for packing, forwarding, insurance, freight and delivery, installation, testing and commissioning at site, watch and ward etc. including temporary constructional storage, risks, over head charges, general liabilities / obligations and clearance from local bodies and State Fire Services, as applicable. Nothing extra shall be paid. However, fees payable to the local bodies / authorities for such clearance etc. shall be borne by the department.

1.11.4. ~~Octroi exemption certificate may be issued by the department if required by the contractor. However, the department is not liable to reimburse the octroi duty in case exemption certificates are not honoured by the concerned authorities~~.

1.11.5. The rates quoted by the tenderer, shall be firm and inclusive of all taxes (including works contract tax but excluding service tax), octroi, duties and levies and all charges for packing forwarding, insurance, freight and delivery, installation, testing, commissioning etc. at site i/c temporary constructional storage, risks, overhead charges, general liabilities/obligations and clearance from local authorities. The fee for the inspection of installation by government authorities shall be reimbursed by the department on production of receipts. The contractor has to, however, initially make the payment. Likewise service tax applicable shall be initially paid by the contractor and shall be reimbursed to him by the department after verification of payment receipts etc.

1.12. COMPLETENESS OF TENDER :

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

1.13. STORAGE AND CUSTODY OF MATERIALS:

1.13.1. The agency has to make his own arrangement for watch and ward of the stores. Their safe custody shall be the responsibility of the contractor till the final taking over of the installation by the department.

1.14. ACCIDENT: The department (CPWD) shall not have any responsibility or liability in case of any accident injury to the personnel to the contractor at work site or to the general public at the work site due to mishandling of equipment by the personnel of the contractor or any other similar reason. The responsibilities and liabilities for such accidents and incidents shall be borne in full by the contractor.

1.15. AFTER SALES SERVICE : The contractor shall ensure adequate and prompt after sales service in the form of maintenance personnel and spares as and when required with a view to minimize the break down period. Particular attention shall be given to ensure that all spares are easily available during the normal life of the installation.

1.16. All the equipment except LED fittings shall be guaranteed for a period of 12 months from the date of taking over the installation by the department or date of completion of agreement which is later against unsatisfactory performance and / or break down due to defective design, workmanship of material. The equipment or components, or any part thereof, so found defective during guarantee period shall be forthwith repaired or replaced free of cost, to the satisfaction of the Engineer-in-Charge. In case it is 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.

In order to keep balance default liability period of one year from the date of completion of work or date of taking over of installation by the Engineer – in – Charge, which is later, the contractor may have to purchase additional warranty with the same terms and conditions as the original warranty from the OEM or his authorised service partner. Nothing extra shall be payable on this account. LED fittings shall be guaranteed for at least 5 years, any defective materials and equipment shall be replaced free for cost at the direction for the engineer-in-charge. The decision of the Engineer-in-Charge in this regard shall be final.

1.17. Before completion of defect liability period of one year, the main contractor has to Submit security deposit (in addition to 2.5%) of 5% of 80% of the price of LED fittings (based on invoices) for the remaining 4 years warranty period for LED fittings in acceptable form i.e., FDR/Bank guarantee, to concerned Executive Engineer & Senior Manager (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 for total work and balance amount only will be refunded after completion of defect liability period. The LED security deposit

will be released after completion of warranty period 5 years to the main contractor.

1.18. REMOVAL OF SURPLUS MATERIALS AND TOOLS : After completion of work the agency shall remove his men, materials and debris etc. from site.

1.19. QUALITY OF WORK AND WORKMANSHIP :

1.19.1. The contractor shall be entirely responsible and answerable for all the works done by him regarding quality, adherence to the laid down specifications, terms and conditions, warranty/guarantee etc. and he shall be liable to bear any compensation that may be levied by the department under any of the clauses of the agreement.

~~1.19.2. Clause 1.15 of CPWD General Specifications for Electrical Works, Part – IV, Substation 2013 and clause 1.13 of CPWD General Specifications for Electrical Works, Part – VII (DG Sets), 2013 shall be applicable.~~

1.19.3. The materials having ISI mark shall have precedence over the one conforming to IS Specifications.

1.19.4. The contractor is advised to visit the site before quoting for his tender to apprise himself about the site environments and other conditions. Drawings and inventories can be seen in the office of the Engineer – in – charge.

1.20. SITE ORDER BOOK :The contractor or his authorized representative shall sign the site order book and comply with the remarks entered their in by the representative of the department.

1.21. WATCH AND WARD :

1.21.1. The contractor will make his own storage of his own materials. The watch and ward of the materials and of the installations would be responsibility of contractor till the work is completed / handed over to the department. Nothing extra shall be paid to the contractor on this account.

1.21.2. Making payment to the contractor in any form against supply of materials / equipments / components or execution thereof shall not absolve the contractor of his responsibility of watch and ward of the equipments / materials etc. and their satisfactory functioning until the same is taken over by the department after successful installation, testing, commissioning and running in period.

1.21.3. No separate storage space will be provided to the contractor for storage of his materials and equipments to be brought at site and used in execution. The available open site space may however be used by the contractor for storage purposes in which case he may build up temporary store at available site space at his own cost.

1.22. VARIATION IN QUANTITY :

1.22.1. Quantities shown against each item of work or supply are tentative which may vary on either side (plus or minus). This variation shall, in general, be governed by clause no. 12 of GCC. The contractor should ensure from the Engineer-in-charge and from the site condition the actual quantity required / to be used / to be supplied before bringing the materials at site. In case the actual quantity of material required at the site is less than the stipulated quantity, the contractor cannot claim to supply entire quantity stipulated in the schedule of quantities of work (Schedule – A) as well as cannot demand for payment thereof. The contractor shall therefore, be very careful about the quantity of materials to be

supplied / brought at site. The decision of the Engineer-in-charge in this regard shall be final and binding on the part of the contractor. Even if initial payment for supply of materials is made in any form for bringing material at site and if it is found at later stage that the actual requirement is less as per site requirement or as per decision of the Engineer-in-charge, the contractor shall have to take back the additional quantity brought / supplied at site and necessary adjustment shall be made from his next bill on this account. No claim in this regard shall be entertained.

1.23. NATURAL CALAMITY : No payment will be made to the contractor for any damage caused by rain, snow fall, floods, dampness, fire, sun or any other natural cause whatsoever during the execution of work. The damage to the work due to above reason, if any, shall have to be made good by the contractor at his own cost and no claim on this account shall be entertained.

1.24. INSPECTION AND TESTING :

1.24.1. The Engineer-in-charge or his authorised representative may inspect any material at manufacturers' works and may witness routine tests as per relevant Indian Standard Specifications or other relevant specifications at manufacturers' works.

1.24.2. The contractor shall give in writing advance notice to the Engineer-in-charge and arrange for such inspection / presence for testing at manufacturers work. The TA/DA etc. of the departmental personnel who will be deputed to witness the tests etc. shall be borne by the Department.

1.24.3. The Engineer-in-charge or his authorised representatives shall have, at all the reasonable times, access to the contractors premises or works or other works where manufacturing / fabrication shall be done and shall have the power, at all reasonable times, to inspect and examine the materials and workmanship during its manufacture or fabrication.

1.24.4. Inspection of imported materials at foreign works shall however not be carried out by the department. These materials shall be inspected and tested at site. Manufacturers' original test certificates and document of import / shipment should be provided to the department along with the materials without which no payment should be made to the contractor.

1.24.5. The contractor shall arrange for all the materials and labour required in connection with inspection of equipment or for any testing to be carried out at his works / manufacturers' works or at site of installation. Notice of such inspection / presence for testing shall be given by the contractor to the Engineer-in-charge at least fifteen days in advance.

1.24.6. Notwithstanding approval for such tests / inspection of equipment / components by the Engineer-in-charge or his authorised representative, the contractor shall be required to perform site tests as desired by the Engineer-in-charge and prove the correctness of ratings and performance of equipment / components and materials supplied and / or installed by him as per contract specifications and conditions at his own cost.

1.24.7. The Engineer-in-charge reserves the right to reject any equipment / machinery / material should it, on tests after installation, be found not to comply with contract specifications or its performance is not satisfactory.

1.24.8. Final inspection and testing will be done by the Engineer-in-charge or his representative as per details to be indicated by the Engineer-in-charge.

1.24.9. It shall be the responsibility of the contractor to get the installation inspected and passed by the local authorities concerned, as may be required by the local bye laws. The contractor will extend all help including test facilities to the representatives of the local bodies. In case the contractor fails to make desired facilities available during inspection, the department reserves the right to provide the same at the risk and cost of the contractor. The observation of the local authorities will be promptly attended by the contractor. The installation will be accepted by the department only after receiving clearance from the local bodies / fire authorities. The inspection charges leviable by the local / statutory authorities for the inspection shall however, be borne by the department.

1.25. COMPLETION DRAWING AND MANUAL :In addition to the mode and form of submission of completion drawings and manuals as stipulated in the relevant CPWD Specifications for various sub-heads of E&M works, the contractor shall also submit soft copy of the completion drawings in CD / DVD.

1.26. POWER SUPPLY AND WATER SUPPLY :No Power & Water Supply shall be provided by the department for the purpose of execution of the E&M work, except for testing and commissioning of installations. The contractor shall make his own arrangement in this regards. The power supply for testing and commissioning will be given at one point inside the premises and the contractor shall have to make arrangement for required cabling work and switch gears for extension of the power to the required location for testing. This will be applicable to all sub-heads of E&M works.

1.27. WORKS TO BE DONE BY THE CONTRACTOR :

1.27.1. Unless 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 – whether specifically indicated in the schedule of quantity / work or not:

1.27.2. Preparation of all layout, working drawings for execution of the work (E&M) components and submission to the Engineer-in-charge for approval within 15 days from the scheduled date of commencement of the work.

1.27.3. Foundations for equipments / structures / fuel tank / pumps including vibration isolation spring / pads.

1.27.4. All minor building works necessary for installation of equipment such as making of openings in walls / floors, either of RCC or brick masonry, foundation trench for fuel line and cable, making of opening in walls or in floors and restoring them to their original condition / finish and necessary grouting etc. as required.

1.27.5. Dismantling of brick wall, if any, for inserting / positioning / placement of equipment, Control panel / Diesel Tanks or for taking ducting / cable tray / pipes and rebuilding / making good the same to its original position / finish for the same nothing extra shall be paid by the department.

1.27.6. Making good all damages caused to the structure during installation and restoring the same to their original finish.

1.27.7. Supply and installation of all necessary angle / channel / flat iron supports and brackets etc. for installation of the substation equipment, D.G. Sets / Diesel Tanks / Exhaust Piping / Water and fuel piping / Cabling / electric Panels / bus-

trunking / pumps / accessories on floor / wall / Shaft / terrace and at other places, as may be necessary including their installations in position.

1.27.8. Responsibility to ensure safety of all materials against pilferage and damage till the installation is handed over to the department.

1.27.9. All scaffolding as may be necessary for installation of Exhaust piping / Cabling / Electric Panels / exhaust pipe / wet riser and sprinkler pipes / ducts and all other equipments and their sub-assemblies / accessories on floor / wall / Shaft / terrace and at other places during erection work and subsequent removal.

1.27.10. Painting of all exposed metal surfaces of equipment and components with appropriate / approved colour as required and as desired by the Engineer – in - charge.

1.27.11. All electrical works including cables / wires, earthingetc as specified in Schedule of work.

1.27.12. Small wiring, inter-connection etc. inclusive of all materials and accessories necessary to comply with the regulations as well as proper and trouble free operation of the equipment.

1.27.13. Closing of the cable entry points in sub-station against seepage of water rodents etc.

1.27.14. Battery and battery charging system for the DG Sets.

1.27.15. Supply of POL i.e. HSD oil and lubricating oil and coolant for diesel engine for testing & commissioning including load testing at manufacturers works as well as works site for testing & commissioning etc as required.

1.27.16. All control cables of required core and size from HT panel to Transformer, DG Set to the Control / Manual panel etc. as required.

1.27.17. Approval / clearance of the complete installation shall be obtained by the contractor from CPCB / State Pollution Control Board / Local Bodies / Central Electricity Authority (CEA) / other licensing authorities wherever required. However application shall be made by the Department and any statutory fee, as applicable, shall be paid by the department directly to the government authorities concerned.

1.27.18. Onsite training of the staff / departmental official (two persons) to be engaged in the operation of the DG Sets and maintenance of the substation equipments and air-conditioning equipments for at least 15 days.

1.28. WORKS TO BE ARRANGED BY THE DEPARTMENT :The works mentioned in clause 1.6 of CPWD General Specifications for Electrical Works Part IV (Substations) 2013 and clause 1.4 of the CPWD General Specifications for Electrical Works Part – VII (DG Sets) 2013 shall be applicable except that power supply and water supply shall not be made available by the department for erection purpose but for testing purpose. The contractor has to make his own arrangement for the same.

1.29. DATE OF TAKING OVER OF THE INSTALLATION AND DATE OF ACCEPTANCE:

1.29.1. The date of taking over of the installations under any sub-head of E&M works shall be the date of taking over the complete building (s) after due completion of the entire composite work and after complete test and trial run of all the major

equipments under all sub-heads of E&M works to the entire satisfaction of the engineer-in-charge.

1.29.2. Subject to the guarantee clause, date of taking over the installation after stipulated period of trouble free operation of all the E&M works shall be the date of acceptance.

1.30. The appointment of Arbitrator shall be governed by the relevant clause of CPWD General Condition of Contract. The condition of contracts shall be governed by GCC, CPWD.

ADDITIONAL CONDITIONS AND SPECIFICATION FOR INTERNAL EI ELECTRICAL WORKS :

1.1. The Department shall not issue any T & P and nothing extra shall be paid on account of this.

1.2. The main contractor should engage an eligible agency having valid registration in CPWD in appropriate class under category internal & external electrical installations / appropriate class under composite category for execution of electrification work. The firm should posses' valid electrical contractor license. In case the main contractor himself meets the above criteria, he shall be allowed to execute this sub-head of work after due verification by the Engineer-in-Charge of Electrical Works

1.3. The firm shall be issued tender on production of valid electrical license from competent authority in the name of the contractor. However, the contractors shall be allowed to participate in tender with an undertaking that they will either obtain valid electrical license at the time of execution of electrical work or associate contractors having valid electrical license of eligible class. In case of association of electrical contractor, the main contractor has to enter in agreement with the contractor associated and copy of such agreement shall be submitted to Executive Engineer in charge of E&M component. In case the main contractor intends to change the associated contractor during operation of the contract, he shall obtain prior approval of respective Engineer in charge. The new agency shall have to satisfy the laid down eligibility criteria. In case Engineer in charge of respective disciple is not satisfied with the performance of the agency, he can direct the main contractor to change the agency associated for execution of minor component and this shall be binding on the main contractor.

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

1.5. The tenderer shall guarantee among other things, the following vis-à-vis specifications.

(a) Quality, strength and performance of the materials used.

(b) Satisfactory operation during the maintenance period.

1.6. DEFECT LIABILITY PERIOD :

A) The entire installation in general shall be guaranteed for a period of 12 months from the date of completion. Any defective materials and equipment shall be replaced free of cost at the direction of the Engineer-in-Charge.

B) All the LED bulbs/ LED Fittings shall be Guaranteed for a period of 5 years from the date of completion of work and handing over. A letter from the manufacturer of the LED luminaries regarding the back to back arrangement for performance of this guarantee clause shall be submitted at the time of supply of LED fittings.

Completion period: The completion period indicated in the tender documents is for the entire work of supplying, installation, testing, commissioning and

handing over of the entire installation to the satisfactory of the Engineer-in-Charge.

Performance Guarantee: The tender shall guarantee among other things, the following visa-a-vis specifications.

A) Quality, strength and performance of the materials used.

B) Satisfactory operation during the maintenance period.

bi) 50% of the performance guarantee shall be refunded to the contractor soon after the completion of the work and recording of the completion certificate. 50% of the Performance Guarantee shall be retained as Security Deposit. 50% of the Performance Guarantee retained as Security Deposit plus 2.5% Security Deposit already deducted from each running bill (Total 2.5 + 2.5 =5%) shall be refunded year wise proportionately.

1.7. EXTENT OF WORK:

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

1.7.2. Minor building works necessary like making of opening in walls or in floors and restoring to their original condition, finish and necessary grouting etc as required to be undertaken.

1.7.3. Maintenance (Routine & preventive) for one year from date of completion and handing over.

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

1.9. Verification of correctness of material at Destination: 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. The contractor shall have to produce all the relevant records to certify that the genuine material from the manufacturers has been supplied and erected.

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

(a) 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

Godowns to ensure delivery of genuine materials at site. (iv) To receive materials after physical inspection at site.

1.9.2. Similarly, for fabricated equipments, 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.

1.10. INTERPRETING SPECIFICATIONS / Order of Preference: Should there be any difference or discrepancy between the description of items as given in the Schedule of Quantities, technical specifications for individual items of work (including additional and commercial conditions) and IS Codes etc., the following order of preference shall be followed:

(a) Schedule of quantities.

(b) Commercial and Additional conditions, technical specifications for this work.

(c) General Conditions of Contract for CPWD Works.

(d) Drawings (if any approved by the Engineer-in-charge)

(e) CPWD General Specifications for electrical works

(f) Relevant IS or any other International code in case IS code is not available.

1.11. Executive Engineer (Elect.) shall be the Engineer-in-Charge as far as electrical works are concerned. Separate tender form for electrical component is appended with his tender. It will be obligatory on part of the main contractor to sign the tender documents for all the component.

1.12. The main agency shall be responsible for all acts of commissions and non-commissions of the electrical contractor or sub-contractor engaged by him, even with approval of department.

1.13. Approval of the Engineer-in-charge shall be taken well in advance for all the materials to be used in the work by the contractor.

1.14. Running payment for Civil components shall be made by the EE (C) directly to the main Contractor. The main contractor shall make the payment to associated Contractor within 15 days of receipt of each running account payment.

1.15. Payments terms:-On account payments for part work (after stipulated and statutory deductions) as assessed by the Engineer – in-charge for the applicable items in the Contract shall be payable at part rates. The part rates will be decided by the Engineer-In-Charge of the work and shall be binding on the contractor.

1.16. The main contractor shall be responsible for coordinating the activities of all works and will ensure progress of works as per laid down programme.

1.17. The Associated Civil Contractor or his representative is bound to sign the site order book as and when required by the Engineer-in-charge and will comply with the remarks therein.

1.18. The contractor shall make his own arrangement at his own cost for electrical / General Tools and plants required for the work.

1.19. The connections, inter-connections, earthing and inter-earthing shall be done by the contractor wherever required to be done for energisation of the installation and nothing extra shall be paid on this account.

1.20. The contractor must be able to work on concrete slabs / walls as and when required and in complete co-ordination with the civil works. Cutting of chases in the plastered wall shall in no case be allowed. The contractor shall fix conduits and boxes in the walls soon after the brick work is completed and finish the chase to rough surface with proper cement sand mixture. Only in exceptional cases e.g. where cutting of plastered surface cannot be avoided it will be contractor's responsibility to ensure that plastering is done to match the original finish at no extra cost.

1.21. The contractor shall remove all the debris due to the electrical works from the site as soon as the work is completed.

1.22. The rupturing capacity of the MCB's shall be 10 KA. The MCB's shall have ISI marked.

1.23. All the MCCBs shall be rated for Ics=Icu.

1.24. The copper wire to be used on this work shall be FRLS type.

1.25. Make of MCB/MCCB shall be the same as the make of MCB DB.

1.26. The Electrical works shall be carried out by the contractor, side by side with the progress of the civil works.

1.27. The Contractor shall on demand by the Engineer-in-charge, furnish the proof to the satisfaction of Engineer-in-charge regarding purchase of Wires, MCBs, MCBDB, Fittings, accessories and other items, from the manufacturers authorized outlets.

1.28. Cutting of brick walls shall be with chase cutting machine only. All repairs and patch works shall be neatly carried out to match the original finish and to the entire satisfaction of the Engineer in Charge.

1.29. All the sub main and circuit wiring includes loose wire for connections inside switch boxes and MCB DB s. No payment for these loose wires shall be made. However wires within the cubicle panel will be measured and paid under relevant item of work.

1.30. The connection between incoming switch / isolator and bus bar shall be made with suitable size of thimble and cable at no extra cost.

1.31. Copper conductor of insulated cables of size 1.5 Sq.mm and above shall be stranded and terminals shall be provided with crimped lugs.

1.32. All MS pulling box cover should be of phenolic laminated sheet of thickness not less than 3mm and for which nothing extra shall be paid on the account.

1.33. All sub-main shall be terminated in the main board with suitable copper lugs and thimbles for which nothing extra will be paid on this account.

1.34. All hardware items such as screws, thimbles, GI wire etc. which are essentially required for completing an item as per specifications will be deemed to be included in the item even when the same have not been specifically mentioned.

1.35. All hardware items such as nuts/ bolts/ screws/ washers etc. to be used in work shall be zinc/ cadmium plated iron.

1.36. 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.

1.37. While laying conduit, suitable size junction boxes shall be provided for pulling the wire as per the decision of the E-in-C.

1.38. Materials to be used in work are to be ISI marked wherever applicable. The make of the materials have been indicated in the list of acceptable makes. No other makes will be acceptable. For items for which acceptable makes are not mentioned in the tender document, Engineer-In-Charge shall decide the make before bringing the material to the site by the contractor. The materials to be used in the work shall be got approved by the Engineer in Charge / his representative before its use at site. The E-in-C shall reserve the right to instruct the contractor to remove the material which, in his opinion, is not acceptable.

1.39. Quantity of various items as specified in tender document may changes during construction stage as per site condition / clients requirement, the successful bidder is advised to verify the actual requirement of items including fittings, fixtures before bringing the material to the site.

1.40. In case the same item(s) appear more than once in the schedule of work / BOQ under the same sub head or among the different subhead of works, the lowest rate quoted for that item (s) shall be considered for the particular item(s) wherever appeared in any part of BOQ/ Schedule of works for the purpose of tender evaluation although web generated e-price bid may incorporate different quoted rate for same item(s) as per the quoting pattern of the tenderer. The tendered amount thus worked out shall be final & shall be binding on the contractor.

1.41. All statutory deductions like WCT, Labour welfare cess etc. shall be made from the bills.

1.42. Testing: All testes prescribed in these General Specifications, 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.

1.43. Commissioning on Completion: After Completion of the work, it shall be ensured that the installation is tested and commissioned.

1.44. COMPLETION PLAN AND COMPLETION CERTIFICATE :

1.44.1. For all works completion certificate after completion of work shall be submitted to the Engineer-in-charge. (ii)Completion plan drawn to a suitable scale in A3 size and the same shall also be submitted. In addition to it, CAD Drawings of the layout is also to be submitted in soft mode in pen drive.

1.44.2. (a) General layout of the space.

(b) Locations of indoor units, flow of refrigerant tubes, outdoor units, main switchboard and distribution boards, indicating the circuit numbers controlled by them.

(c) Position of all points and their controls.

(d) Types of fittings, viz. LED based, pendants, brackets, bulk head, fans and exhaust fans etc.

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

1.44.3. The contractor shall submit the completion plan separately in triplicate on blue print with one set on tracing "Cloth" as per the contract within 30 days of the completion of work. In case, the contractor fails to submit the plan, he shall be liable to pay a sum equivalent to 3.5% of the value of the work subject to a ceiling of `35,000.00.

1.45 To facilitate drawing of wires, 18 SWG GI fish wire shall be provided along with laying of recessed conduit for which no extra payment shall be made. Conduits laid for other services, like fire alarm, PA etc, where wiring is not done along with EI works, fish wire shall be invariably drawn.

1.46 The connection between incoming switch / isolator and bus bar shall be made with suitable size of thimble and cable at no extra cost.

1.47 Copper conductor of insulated cables of size 1.5 Sq.mm and above shall be stranded and terminals provided with crimped lugs.

1.48 All MS junction box cover should be of phenolic laminated / good quality plastic sheet of thickness not less than 3 mm and for which nothing extra shall be paid on the account.

1.49 All sub-main/power/light wiring shall be terminated in the main board as well as in the switch boards/socket outlets with suitable copper lugs / thimbles for which nothing extra shall be paid on this account. 47. All hardware items such as screw, thimbles, GI wire etc which are essentially required for completing an item as per specifications will be deemed to be included in the item even when the same have not been specifically mentioned.

1.50 All hardware items such as nuts / bolts / screws / washers etc to be used in work shall be zinc / cadmium plate iron.

1.51 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.

1.52. While laying conduit, suitable size junction boxes shall be provided for pulling the wire as per the decision of the Engineer-in-Charge.

1.53 Materials to be used in work are to be ISI marked. The make of the materials have been indicated in the list of acceptable 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 use at site. The Engineer-in-charge shall reserve the right to instruct the contractor to remove the materials which, in his opinion, is not acceptable.

1.54 Where switches / sockets / regulator / telephone / TV / internet outlets are to be provided the same shall be of only one make.

1.55 While laying conduits for fire alarm system, sufficient junction outlets are to be provided as per the direction of the Engineer-in-charge for detectors as reqd.

1.56 Wherever light fittings are proposed to be provided on the false ceiling, the respective light / fan point wiring will have to be brought up to the terminal of

the light fittings / fans by the contractor. Flexible metal conduits shall be used for drawing wires from ceiling to fittings on false ceiling and nothing extra shall be paid to the contractor for the same.

1.57 Rate Rationalization shall be applicable in case the same item appears more than once in the schedule of work under the same sub-head or among the different subhead of works. Accordingly the lowest rate quoted for that item among all the sub-heads shall be considered for all similar items for evaluation of tender and making payment.

1.58 All statutory deductions like GST, labour welfare cess etc. shall be made from the bills.

1.59 Agency has to coordinate with the Telephone, LAN Networking, CCTV and other services vendor / officer's of GST Bhawan & CPWD for the execution of PVC cable management system in corridors and rooms wherever applicable.

1.60 Agency shall install Tap off box as per the existing rising main OEM installed at GST Bhawan (Make of material). So that there is no mismatch.

Specification of Modular Switches and socket (Ref: CPWD Specification Internal 2023)

The modular switch shall be as per following/ have features mentioned below:

- Suitable for 240V, AC, with normal gap constructions, Flush type, Screw type terminal, IP20
- Current carrying plastic parts of Nylon (PA6) with glass fibres up to 16A
- Non-Flammable insulating parts & very high Insulating resistance after Humidity test.
- Marked with IS 3854:1997
- Snap fit with Modular Plates very easy to install
- Arrow marking for correct orientation with plate.
- Double rocker mechanism to prevent visible spark.
- Bimetal Silver contact tips for less spark & longer life.
- Fire retardant and UV stabilized. The modular sockets shall be as per following/ have features mentioned below:-
- 240V, AC, Flush type, Screw type terminal, Shuttered.
- Polycarbonate material thickness ~1.5 mm to 2.5 mm
- Non-Flammable insulating parts & very high Insulating resistance after Humidity test.
- 6A, 6/16A Socket market with ISI, as per IS1293:2019
- Snap fit with Modular Plates easy to install
- Brass current carrying parts.
- Fire retardant and UV stabilized.

General Specification for VRV/VRF AC Works

1. These General Specifications cover the equipment and materials for the system, their testing and/ or inspection as may be necessary before their dispatch from their respective factory, their delivery at site, all preparatory works, assembling, installation and adjustments, commissioning, final Testing, Adjusting & Balancing putting into operation, equipment capacity computation and handing over of the complete system.

2. These General Specifications is supplemented with OEMs specifications for executing the work. The OEMs specifications wherever differ from these General Specifications, shall have over- riding value and shall be followed for this work.

3. Related Documents:

These General Specifications shall be read in conjunction with the National Building Code of India (NBC) 2016 as amended up to date and Energy Conservation Building Code of India 2017 as amended up to date, BEE Star labeling.

4. **Site Information:** The tenderer should, in his own interest, visit the site and familiarize himself with the site conditions before tendering. For any clarification, tenderer may discuss with the Engineer-in-Charge.

5. **Heat Load Calculations &Equipment Selection**:

(i) The successful bidder/ contractor should give ***detailed heat load calculations as per Appendix 'D' of CPWD General Specification of HVAC Works 2024***separately for all the seasons in which, the specified conditions are to be maintained along with various coefficients considered and the calculation of U values, R values of Roof assemblies, Walls, Windows, Doors, Fenestration etc. and other required detail immediately after award of work.

(ii) The successful Bidder/Contractor should also give the above heat load calculations wherever required separately for the areas served by each AHU in a central air conditioning/ heating system/Spilt Unit/Cassette AC system.

(iii) The equipment selection and duct design shall be made on the basis of the above heat load calculations.

(iv) The Contractor can refer and utilize the design done by the department/ consultants for the department; however, there shall be no commitment to provide the same to the contractor, nor the contractor shall be absolved of the responsibility of correct design and performance of the air-conditioning system provided by him/her, citing the design proposed by the department/consultant for the department.

6. Conformity With Statutory Acts, Rules, Standards and Codes

(i) All components shall conform to relevant Bureau of Indian Standard Specifications, wherever existing, amended up to date and Energy Conservation Act 2001 as amended up to date, Energy Conservation Rule 2018 as amended up to date and Energy Conservation Building code 2017 of India as amended up to date, BEE star labelling. A non-comprehensive list of such standards is appended in Appendix 'B'CPWD General Specification of HVAC Works 2024.

(ii) All works shall conform to relevant Bureau of Indian Standard Specifications, National Building code 2016 as amended up to date, Energy Conservation Act 2001 as amended upto date, Energy Conservation Rule 2018 as amended up to date and Energy Conservation Building code 2017 of India as amended up to date, National Electric Code 2023 as amended up to date, as well as relevant BIS codes, BEE star Labelling. All codes and Standards shall mean upto date updated the latest edition as on last date of submission or last extended date of submission of tender.

(iii) All electrical works shall be carried out in accordance with the provisions of Indian Electricity Act, 2003 and Indian Electricity Rules, 1956 amended to date, National Electrical Code of India 2023 as amended upto date. They shall also conform to CPWD General Specifications for Electrical works, Part-I: Internal, 2023 as amended/revised upto date and Part-II: External, 2023 as amended/revised upto date and Part IV (Sub Station – 2013) as revised / amended upto date.

(iv) In the case of discrepancy between the schedule of Quantities, the Specifications and/or the Drawings, the following order of preference shall be observed:

(a) Description of Schedule of Quantities, if any

(b) Particular Specification and Special Condition, if any.

(c) Drawings.

(d) CPWD Specifications.

(e) Bureau of Indian Standard Specifications

(f) ECBC 2017,

(g) National building code 2016,

All above mentioned documents amended up to date are applicable.

7. Safety Codes and Labour Regulations:

(i) All the safety procedures outlined in the safety codes listed in Appendix 'C' CPWD General Specification of HVAC Works 202***4***shall be complied with.

(ii) In respect of all labour employed directly or indirectly on the work for the performance of the air conditioning contractor's part of work, the contractor at his own expense, will arrange for the safety provisions as per the statutory provisions, B.I.S recommendations, factory act, workman's compensation act, CPWD code and instructions issued from time to time. Failure to provide such safety requirements would make the tenderer liable for penalty as provided in the labour laws/ GCC for each violation. In addition the Engineer-in-charge, shall be at liberty to make arrangements and provide facilities as aforesaid and recover the cost from the contractor.

(iii) The contractor shall provide necessary barriers, warning signals and other safety measures while laying pipelines, ducts cables etc. or wherever necessary so as to avoid accident. He shall also indemnify CPWD against claims for compensation arising out of negligence in this respect. Contractor shall be liable, in accordance with the Indian Law and Regulations for any accident occurring due to any cause. The department shall not be responsible for any accident occurred or damage incurred or claims arising there from during the execution of work. The contractor 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 contractor due to the above provisions thereof.

8. **Works to be done by the contractor:** Unless 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 whether specifically indicated in the schedule of work/ tender or not: -

(i) Foundations for equipment including foundation bolts and vibration isolation spring/pads,

(ii) Support columns and beams for cooling towers,

(iii) Suspenders, brackets and floor/ wall/Ceiling supports for suspending/ supporting ducts and pipes,

(iv) Suspenders and/ or cable trays for laying the cables,

(v) Excavation and refilling of trenches in soil wherever the pipes are to be laid directly in ground, including necessary base treatment and supports,

(vi) Sealing of all floor slab/ wall openings provided by the Department or contractor for pipes and cables, from fire safety point of view, after laying of the same,

(vii) Painting of all exposed metal surfaces of equipment and components with appropriate Making openings in the walls/ floors/ slabs or modification in the existing openings wherever provided for carrying pipe line, ducts, cables etc. In case of new construction work the opening shall be made in slab casting/ wall construction.

(ix) Providing wooden/ metallic frames for fixing grills/diffusers.

(x) Making good all damages caused to the structure during installation and restoring the same to their original finish.

(xi) Balancing of all VRV / VRF AC system in accordance with generally accepted engineering standards. A written balance report shall be provided (wherever asked for) to the Engineer-in-Charge or his representative for VRV / VRF AC system as per requirement of CPWD Specification.

(xii) A set of three copies of operations manual shall be provided to the Engineer in-Charge or his representative containing following information at a minimum-

(a) VRV / VRF AC system equipment capacity,

(b) Equipment operation and maintenance manuals,

(c) VRV / VRF AC system control maintenance and calibration information, including wiring diagrams, schedules, and control sequence descriptions,

(d) A complete written narrative of how each system is intended to operate.

(xiii) ~~In case of new construction work (EPC as well as Non EPC) involving civil work, HVAC work and other E&M services having working plant tonnage 200 & above, the Contractor shall associate the Energy modeller and carried out the energy modelling of complete building & Energy Performance Index modeling i/c all services and other active/passive factors i/c Core & shell as involved in the complete design. The cost ofthisenergy modelling deemed to include in the tendered cost and nothing extra will be paid on this account.~~

9. Power Supply, Water Supply and Drainage:

(i) In case of Standalone work of VRV / VRF AC system in the existing building, Electricity and drainage shall be provided by the Contractor for successful and satisfactory completion of work.

(ii) In case of EPC contracts the Contractor has to arrange Power, Water i/c water Softening plant, Drainage, Tube cleaner system etc. by own resources at free of Cost, until otherwise specified in the tender.

10. Machinery For Erection

All tools and tackles, heavy machinery handling equipment, etc. required for unloading/ handling of equipment and materials at site, their assembly, erection, testing and commissioning shall be the responsibility of the contractor.

11. Completeness of The Tender, Submission of Programme, Approval of Drawings and Commencement of Work:

(i) Completeness of the tender:

All sundry equipment, fittings, assemblies, accessories, hardware items, gaskets, masonry platforms/ foundation for Chilling Units, pumps, Cooling Towers etc., supports for pipes foundation bolts, supports, termination lugs for electrical connections, cable glands, junction boxes and all other items which are useful and necessary for proper assembly and efficient working of the various equipment and components of the work shall be deemed to have been included in the tender.

(ii) Submission of programme

As per milestone stipulated in schedule F of NIT, the successful tenderer shall submit his programme for submission of Design Calculation, drawings, Heat Load Calculation, Documents to be submit to Local Bodies, Air and water distribution layout and drawings, Selection of Equipment, supply of equipment, installation, testing, commissioning, getting approval from Local body, if any, any other activities as required in NIT and handing over of the installation to the Engineer-in-Charge. This execution of work to be planned keeping in view of building's interior renovation work / other related works which shall be given priority.

(iii) Submission of Drawings

The contractor shall submit the drawings to the Engineer-in-Charge as per milestone stipulated in schedule F of NIT for approval before start of work.

(iv) Commencement of Work

The contractor shall commence work as soon as the drawings submitted by him are approved.

12. Dispatch of materials to site and their safe custody

The contractor shall dispatch materials to site in consultation with the Engineer-in Charge. Programme of dispatch of material shall be framed keeping in view the building interior renovation work / other related works. Safe custody of all machinery and equipment supplied by the contractor shall be the responsibility of the contractor till final taking over by the department.

13. Co-ordination with other agencies

The contractor shall co-ordinate with all other agencies involved in the work so that the work of other agencies is not hampered due to delay in his work. Ducting, piping, cabling or any other work, which directly affect the progress of building work, shall be given priority.

14. Quality of materials and workmanship

(i) The components of the installation shall be of such design so as to satisfactorily function under all conditions of operation.

(ii) The entire work of manufacture/ fabrication, assembly and installation shall conform to sound engineering practice. The entire installation shall be such as to cause minimum transmission of noise and vibration to the building structure.

(iii) All equipments and materials to be used in work shall be manufactured in factories of good repute having excellent track record of quality manufacturing, performance and proper after sales service.

(iv) None of the equipment/ machines supplied ***shall be more than Six months*** old from date of supply at site, Copy of Excise Gate Pass/ Invoice/ Shipment /Custom Clearance certificate/ details (in case of Imported equipment)/GST Bills shall be submitted to prove the date of manufacture & genuineness of the

equipment/machines supplied. In case of whereas per NIT condition specialized agency is associated by main contractor as per agreement terms & conditions, all materials to be procured by associate specialized agency and all bills shall be in the name of associate agency in such cases.

(v) The all material dispatch shall also accompany with the acceptance test/ quality tests/performance test certificate as carried out by the Manufacture and by third party.

15. Care of the building

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

16. Inspection and testing

A) **Initial Inspection & testing**

(i) Initial inspection of materials & equipment e.g. ~~chiller, AHU, FCU, Cooling tower, Pumps,~~ VRF units& its associated equipment shall be carried out by Engineer-in-charge or his authorized representative in factory. For items requiring assembly at site, the inspection shall be for the components to be assembled. The Engineer-in-charge can ask for factory inspection of other items also and the same shall also be deemed to be included in tender cost. All main material equipment etc. as required in inspection & testing is deemed to be included in tender cost. For item/ equipment requiring initial inspection at manufacturer's works, the contractor will intimate the date of testing of equipment at the manufacturer's works before dispatch. The contractor shall give sufficient advance notice regarding the dates proposed for such tests to the department's representative(s) to facilitate his presence during testing. The Engineer-in-charge at his discretion may witness such testing. Equipment will be inspected at the manufacturer/ authorized dealer's premises, before dispatch to the site by the contractor. For equipment sourced from abroad, the contractor shall include in his bid the costs of journey & stay, other costs if any, for sending his technically competent representative to witness the performance and pre-dispatch tests at the manufacturer's works.

Evidence to this effect by way of travel documents etc. shall be produced before the payment against delivery is released. The Engineer-in-charge, at his discretion, may also witness such testing subject to Government Orders at that time.

(ii) The department also reserves the right to inspect the fabrication job at factory and the successful tenderer has to make arrangements for the same.

(iii) The materials duly inspected by Engineer-in-Charge or his authorized representative shall be dispatched to site by the contractor.

(iv) No additional payment shall be made to the contractor for initial inspection /testing at the manufacturer's works by the representative of the Engineer-in-Charge. However, the department will bear the expenses of its representative deputed for carrying out initial inspection/testing.

(v) Factory testing of VRF having aggregate capacity more than 100 HP at NABL Certified Test Bed in India. ~~Factory testing of Chillers shall be as per BIS/ BEE/ ARI.~~

B) **Final Inspection & Testing**

Final Inspection & testing will be done by the Engineer-in-Charge or his representative as per details indicated in CPWD General Specification for HVAC Works-2024.

C) **Safety measures**

All equipment shall incorporate suitable safety provisions to ensure safety of the operating personnel at all times. The initial and final inspection reports shall bring out explicitly the safety provisions incorporated in each equipment.

17. Running in period & date of acceptance

(i) After the installation work has been completed by the contractor, he will conduct tests and make adjustments as per ***chapter 17, CPWD General Specification for HVAC Works-2024*** and further as may be necessary to satisfy himself that the entire AC System is capable of continuous running. Thereafter, he will offer to the department a running-in period of 7 days subject to a minimum aggregate of 120 hrs at his cost. The duty cycle of the plant during this running in period shall be

same as that specified in the tender documents. In case of multiple compressor installations, all the compressors should be run by rotation. The plant will be operated and a log of all parameters will be maintained during this period. The contractor will be free to carry out necessary adjustments etc. during this period without stopping the plant. Record of inside conditions will be made during this period to check that the same are as per NIT requirements. The plant will be said to have successfully completed the running-in-period, if no break down or abnormal/ unsatisfactory operation of any machinery occurs during this period. After this the plant will be made available for beneficial use. After the plant has operated without any major break down/ trouble and inside conditions are maintained as per NIT requirements for the above specified running in period, it shall be taken over by the department subject to guarantee clause mentioned below. This date of taking over of plant after trouble free operation during the running in period shall be the date of acceptance.

(ii) Any loss of refrigerant or oil during the running in period shall be made good by the contractor free of charge.

(iii) Capacity test of the chilling unit & other major equipment shall be carried out as and when conditions become stabilized as per details given under **Appendix 'G'** ***CPWD General Specification for HVAC Works-2024*****.**

(iv) Seasonal testing may be carried out as & when outside conditions become suitable for the Major Season Test. When the major seasonal test cannot be carried out on commissioning of the installation due to any reason not attributable to the contractor, the installation will he handed over to the Department for beneficial use after completion of successful running in test of 7 days subject to a minimum aggregate of 120 hours. The balance payment shall be released to the contractor on his furnishing a bank guarantee in the specified format from a scheduled bank for an equivalent amount. The bank guarantee shall be valid for a period of 6 months. However, it will be extended till the successful completion of the major seasonal test. This bank guarantee shall be independent of the one furnished for performance guarantee.

The Summer or monsoon season will be the major seasonal test for the purpose of the above.

18. Guarantee:

(i) The contractor shall guarantee the complete system to maintain the specified conditions under all conditions of ambience and internal loads subject to the condition that designed outside conditions & designed internal loads are not exceeded.

(ii) All equipment shall be guaranteed for a period of 12 months from the date of acceptance and taking over of the installation by the Department or period offered by OEM; whichever is greater, against unsatisfactory performance and/or breakdown due to defective design, material, manufacture, workmanship or installation. The equipment or component or any part thereof, so found defective during the guarantee period shall be repaired or replaced free of cost to the satisfaction of the Engineer-in-Charge. In case, it is felt by the department that undue delay is being caused by the contractor in doing this, the same will be got done by the department at the risk & cost of the contractor. The decision of Engineer-in-Charge in this regard shall be final.

(iii) Any leakage of refrigerant and/or oil due to defective design, manufacture, workmanship or installation during the guarantee period shall be made good by the contractor free of charge

19. TENDER DRAWINGS, DRAWINGS FOR APPROVAL & COMPLETION DRAWINGS

Drawings for approval on award of the work:

The contractor shall prepare & submit three sets of hard copy & one Digital/ soft copy in AutoCAD format of following drawings (2D/3D) and get them approved from the Engineer-in-Charge before the start of the work. The approval of drawings however does not absolve the responsibility of contractor to supply the equipment/ materials as per agreement, if there is any contradiction between the approved drawings and agreement. In case of applicability of BIM modelling as per NIT, then all drawings and data shall be develop and extracted from BIM platform.

(i) Lay out drawings of the equipment to be installed in various spaces stated below.

(ii) Drawings including section, showing the details of erection of entire equipment including their foundations, ~~water basin for the cooling towers / air washers, etc.~~

(iii) ~~Plumbing drawings showing the layout of entire piping, dia& length of pipes, valves and isometric drawings showing connections to various equipment.~~

(iv) Ducting drawings showing sizes, locations of dampers, grilles & diffusers.

(v) Electrical wiring diagrams for all electrical equipments and controls including the sizes and capacities of the various cables and equipments,

(vi) Dimensioned drawings of all electrical and control panels,

(vii) Drawings showing the details of all insulations and vapour barrier works,

(viii) Drawings showing details of supports for pipes, cable trays, ducts etc.

(ix) Any other drawings relevant to the work.

The department shall, at its discretion, use the soft copy of such drawings to prepare and examine the integrated services layout, resolve conflicts, and advise the contractor to modify the execution drawings suiting & adjusting to all the services requirements. The contractor shall be bound to modify & execute accordingly.

20. Completion Drawings

One set of Digital/ soft Copy and three sets of the following laminated drawings shall be submitted by the contractor while handing over the installation to the Department. Out of this, one of the sets shall be laminated on a hard base for display in the A.C. plant room. In addition, one set will be given on compact disc.

(i) Plant installation drawings giving complete details of all the equipment, including their foundations,

(ii) Refrigerant tube layout drawings including insulation giving sizes and lengths of all the pipes and the sizes and locations of all types of valves, and including isometric drawings for the entire piping including the pipe connections to the various equipment and insulation details wherever required,

(iii) Duct layout drawings with their sizes and locations, and sizes and locations of all dampers, grills & diffusers,

(iv) Line diagram and layout of all electrical control panels giving switchgear ratings and their disposition, cable feeder sizes and their layout,

(v) Control wiring drawings with all control components and sequence of operations to explain the operation of control circuits,

(vi) BMS drawings (wherever applicable)

(vii) Electrical cabling layout

21. AFTER SALES SERVICES

The contractor shall ensure adequate and prompt after sales service in the form of maintenance, spares and personnel as and when required and shall minimize the breakdown period. In case of equipment supplied by manufacturer, other than the contractor, the firm shall also furnish a guarantee from the manufacturer for the same before the plant is taken over.

22. DOCUMENTS TO BE FURNISHED ON COMPLETION OF INSTALLATION

Three sets of the following documents shall be furnished to the department by the contractor on completion of work:-

(a) Completion drawings.

(b) Three set in Digital form and 03 set in printed form of manufacturer's technical catalogues of all equipment and accessories,

(c) 02 sets of digital and hard copy of Operation and maintenance manual of all major equipment, detailing all adjustments, operation and maintenance procedure.

(d) The Licenses for all software and technologies as applicable.

(e) In case of applicability of BIM modeling as per NIT then all drawings and data's shall be develop and extracted from BIM platform.

SYSTEMS AND SYSTEM REQUIREMENTS

1. DESIGN PARAMETERS

(i) **Outdoor Design Conditions**

Outdoor design conditions (where the air conditioning is to be installed) shall be accordance with Table 2.1 (***CPWD General Specification for HVAC Works-2024)***. Values of ambient dry-bulb temperatures and wet-bulb temperatures,

against the various annual percentiles, represent the value that is exceeded on average by the indicated percentage of the total number of hours. The 0.4 percent, 1.0 percent, 2.0 percent values are exceeded on average 35 h, 88 h and 175 h, respectively in a year. The 99.0 percent and 99.6 percent values are defined in the same way but are usually reckoned as the values for which the corresponding weather elements are less than the design conditions of 88 h and 35 h, respectively. The design values of 0.4 percent, 1.0 percent and 2.0 percent annual cumulative frequency of occurrence may be selected depending upon application of air conditioning system.*For normal comfort conditions, values under 1.0 percent column should be used for cooling loads and 99 percent column for heating loads. For critical applications, values under 0.4 percent column should be used for cooling loads and 99.6 percent column for heating loads.* Maximum dry bulb temperature and co-incident wet bulb temperature shall be considered for design.

(ii) Indoor design conditions:

The general design criteria for Air-Conditioning of Indian Museum Building shall be as per Indian Society of Heating Refrigeration & Air-conditioning Engineers (ISHRAE) Data Book 2017. The design & planning of installation of indoor units, refrigerant tubes and other accessories has to be in close co-ordination with the agencies executing interior renovation works of above spaces. The necessary approval of drawing / designs / layouts of entire AC system from various authorities shall be the responsibility of agency.

(iii) VARIBALE REFRIGERANT VOLUME/ FLOW SYSTEM

The system selected is a modular system, with number of indoors connected to centrally located outdoor units. The outdoor units for all the system shall be air cooled type.

(a) General Description

AE (P) EE (P)

All the VRF air conditioners shall be fully factory assembled, wired, internally piped & tested. The outdoor unit shall be pre-charged with first charge of refrigerant. Additional charge shall be added as per refrigerant piping at site. All the units shall be suitable for operation with 415 V +/- 10%, 50 Hz + 3%, 3 Phase supply for outdoor units; & 220 V +/- 10%, 50 Hz +/- 3%, 1 Phase supply for indoor units.

(b) Specifications of Outdoor units :

(i) Outdoors units of the VRV system shall be compact air-cooled type.

(ii) The outdoor unit should comprise of Inverter controlled Rotary Compressor / Scroll Compressor, minimum two compressors for above 14HP modules.

(iii) Each module of outdoor unit must have at least 100 % of Variable compressor which can work on Part load Suitable to operate at heat load proportional to indoor requirement.

(iv) The outdoor units must be suitable for up to 180 m refrigerant piping between outdoor unit & the farthest indoor units or as per OEM design. Allowable level difference between outdoor unit &indoor units shall be 50 m in case of outdoor unit on top & 40 m in case of outdoor unit at bottom **or as per OEM design**.

(v) Allowable level difference between various indoor units connected to one out door unit shall be up to 15 m **or as per OEM design**.

(vi) The outdoor units shall be suitable to operate within an ambient temperature range of 5 Deg C to 51 Deg C in cooling mode; ~~& -20 Deg C to 15 Deg C in heating mode~~ or **as per OEM design**.

(vii) The entire operation of outdoor units shall be through independent remotes of indoor units. No separate Start/ Stop function shall be required.

(viii) Starter for the Outdoor Unit compressor shall be "Direct on Line" type. Inverter compressor of the unit shall start first & at the minimum frequency, to reduce the inrush current during starting.

(ix) Complete refrigerant circuit, oil balancing/ equalizing circuit shall be factory assembled & tested.

(c) Specifications of Indoor units :

The units include pre-filter, fan section and DX coil section. The housing of units shall be light weight powder coated galvanized steel. Units shall have external casing of ABS Plastic for supply and return air.

(i) 4 Way/360 Degree airflow Cassette type indoor units

(a) These units shall be installed between the bottom of finished slab & top of false ceiling.

(b) Unit shall have provision of connecting fresh air without any special chamber & without increasing the total height of the unit (320 mm maximum).

(c) The unit must have in built drain pump, suitable for vertical lift of 750 mm.

(d) Unit must be insulated with sound absorbing thermal insulation material, Polyurethane foam. The sound pressure level of unit at the highest operating level shall not exceed 46 dB (A).

(e) The unit must have drain pump kit if. The drain pump must be suitable to lift drain up to 1000 mm from the bottom of the unit.

(ii) 4 Way/360 Degree airflow Compact Cassette type indoor units

(a) The compact cassette unit should perfectly fit into ceilings and match the standard architectural modules, without the need to cut ceiling tiles.

(b) The flaps fold tightly against the ceiling when operation stops so that the ceiling is affected only slightly even if air conditioning is installed.

(c) Designed for simple & easy installation and maintenance. It should be slim in design only 268 mm in height even when an electrical box is located inside the unit.

(d) The unit must have drain pump kit. The drain pump must be suitable to lift drain up to 1000 mm from the bottom of the unit.

(iii) Concealed duct type units

(a) These units shall be ceiling suspended with suitable supports to take care of operating weight of the unit, without causing any excessive vibration & noise.

(b) The cold air supplied by these units will be supplied to the area to be air conditioned, through duct system specified in the tender.

AE (P) EE (P)

(c) Each indoor unit must have electronic expansion valve operated by microprocessor thermostat-based temperature control to deliver cooling/ heating as per the heat load of the room

(d) The Sound Pressure level of unit at the highest operating level shall not exceed 38 dB (A), at a vertical distance of 1.5 m below the units with duct connected to the unit.

(e) The unit must have provision of adding drain pump kit if required & specified. The drain pump must be suitable to lift drain up to 1000 mm from the bottom of the unit.

(iv) Wall Mounted Units

(a) Wall mounted units must be compact & stylish design that does not detract from the decor of the room.

(b) Each indoor unit must have electronic expansion valve operated by microprocessor thermostat based temperature control to deliver cooling/ heating as per the heat load of the room.

(c) The unit must have provision of adding drain pump kit if required & specified. The drain pump must be suitable to lift drain up to 1000 mm from the bottom of the unit.

(d) The sound pressure level of unit at the highest operating level shall not exceed 46 dB(A).

(e) Refrigerant control in the indoor unit shall be through Electronic Expansion Valve.

(v) Installation

(a) The units shall be mounted on ribbed rubber pads for vibration isolation. The contractor shall supply the required charge of refrigerant, lubricant and other consumables, for commissioning and testing of the equipment.

(b) All the equipment shall be thoroughly tested and checked for leaks. All safety controls shall be suitably set and a record of all setting shall be furnished to the project supervisor.

(c) Providing and fixing M.S. structural support for condensing unit with vibration isolator pad in-between support and structure and vibration isolation suspender and pads for evaporating units shall be in scope of contractor.

(d) OEM of VRF units or authorized vendor of the OEM shall verify, validate and certify the installation and testing/commissioning of copper piping system.

(vi) Painting

Shop coats of paint that have become marred during transportation or erection shall be cleaned off with mineral spirits, wire brushed and spot primed over the affected areas, then coated with enamel paint to match the finish over the adjoining shop- painted surfaces.

(vii) Condensate Drain Piping

All pipes to be used for condensate drain shall be PVC pipe conforming to IS: 4985 -Class I& all joints should be Gluing or solvent cementing as per manufacturer recommendation.

(viii) Refrigerant Piping

(a) All refrigerant pipes and fittings shall be soft drawn/ half hard/hard drawn copper tubes and wrought copper fitting suitable for connection with silver solder.

(i) The Copper Piping & Piping Circuit should be with Minimum Number of joints to avoid the leakage probability, which shall be attained by :

(a) Using preferably less joint piping system e.g. One End Expanded Tubes.

(b) Bending the tubes instead of using elbow joints wherever 90 degree bending is required.

(i) Piping should be routed at site in such a manner, that brazed joints in the refrigeration piping are kept to a minimum.

(iii) The makes of tube fittings shall be same as that of tubes

(iv) The thickness of fittings used shall be same as that of the pipe.

AE (P) EE (P)

(c) All joints in copper piping shall be swaged joints using low temperature brazing and/ or silver solder. Before jointing any copper pipe or fittings, its interior shall be thoroughly cleaned be passing a clean cloth via wire or cable through its entire length. The piping shall be continuously kept clean of dirt etc. The nitrogen gas must be purged for protecting copper pipe during brazing operation. After brazing allow it for natural cooling.

(d) Refrigerant lines shall be sized to limit pressure drop between evaporator and condensing unit to less than 0.2 kg per Sq.cm.

(e) After the refrigerant piping installation has been completed the refrigerant piping system shall be pressure tested using, Freon mixed with nitrogen at a pressure of 20 Kg per Sq. cm. (High side) and 10 Kg per Sq. cm (Low side). Pressure shall be maintained on the system for 24 hours.

(f) The system shall then be evacuated to a minimum vacuum of 70 cm. of mercury and held for 24 hours, during which time; change in vacuum shall not exceed 12 cm of mercury.

(g) All refrigerant piping shall be installed strictly as per the instructions and recommendations of air conditioning equipment manufacturers.

(h) The refrigerant copper tubes shall be comply with ASTM B280 (Standard specification for seem less copper tube for air conditioning and refrigeration).

(i) The refrigerant Copper tube fittings shall conform to ASME B16.18/B16.22/ B 16.26/ B 16.50. However, copper tube fitting used for brazed connections in air conditioning and refrigeration system shall comply with ASME standard B 16.22. The refrigerant copper tube fitting shall be of same manufacturers as of copper tubes. The thickness of all copper tubes fitting shall be equal to or greater than thickness of copper tubes.

(j) All pipes must be tested for defects using Eddy Current Testing and other test as per ASTM B280-16.

(k) Joints in refrigerant piping should be kept as minimum as possible. The use of elbows, sockets, bends etc. shall be avoided and as per requirement the copper tubes shall be suitably bend with automatic bending machine.

(l) Each copper tube shall be marked (embossed) with manufacturer name, OD in mm, wall thickness in mm, lot number, month & year of manufacturer and conforming standard (as applicable).

(m)The copper tube fitting shall be marked (embossed) with manufacturer name, OD in mm and wall thickness in mm.

(v) Insulation work:

The insulation work shall be as per CPWD General Specification for HVAC Works-2024.

(vi) Inspection, testing, adjusting, balancing and commissioning

Final inspection

(i) After completion of the entire installation as per specification in all respects, the ACcontractor shall demonstrate trouble free running of the AC equipments and installation for a period of minimum 120 hours of running as detailed in CPWD General Specification for HVAC Works-2024.

(ii) After the trial run, the AC contractor shall offer the plant for the seasonal test, namely test for summer or monsoon season whichever occurs earlier. The test results as per Appendix G, CPWD General Specification for HVAC Works-2024 shall be furnished.

(iii) The equipment capacity computations as per notes of the Annexure 'G' shall be carried out.

(iv) The Input KW of the unit / TR at full load shall also be checked against contract requirements, if any.

(vi) All instruments for testing shall be provided by the AC contractor. These shall be as per Note 'A' of Appendix G. The accuracy of the instruments shall be as follows:

(a) Temperature: Liquid in glass thermometer having accuracy ± 1 deg. C as per IS: 4825.

(b) Wet bulb Temperature: Sling psychrometer conforming to IS:6017.

Scale Error:

For less than 0 deg. C : 0.3 deg C + 0.2 deg. C.

For over 0 deg. C: 0.2 deg. C + 0.1 deg. C.

(vii) The Testing, Adjusting and Balancing (TAB) shall be carried out during execution of work as well as at the stage of final inspection and commissioning for aggregate system capacity 100 TR and above.

(viii)**Testing, adjusting, and balancing (TAB)** is the process of checking and adjusting all HVAC systems in a building to produce the design objectives.

This process includes:

(i) adjusting the total system and Equipment
(ii) Measuring electrical performance of VRV / VRF AC Systemequipments,
(iii) establishing quantitative performance of all equipment,
(iv) verifying automatic control system operation and sequences of operation.
(v) sound and vibration measurement
(vi) Measurement of duct leakages etc.

Report forms. : Test data sheets arranged in logical order for submission and review. They should also form the permanent record to be used as the basis for any future TAB work. All tests, Adjusting and balancing shall be carried out in the presence of Engineer-in charge or his representative.

LIST OF PREFERRED MAKES OF MATERIALS ELECTRICAL		
S. No.	**Description of items**	**Preferred makes**
1	**INTERNAL ELECTRICAL INSTALLATION :**	
1.1	Steel & PVC Conduit and accessories (To be ISI marked only).	AKG / BEC / NIC / RM CON/ Konstruct
1.2	Ceiling Rose (3 Pin), Call Bell (To be ISI marked only)	Anchor / Canny / Cona / Benlo/Kinjal/HPL
1.3	MCBDB, MCB, MCB Enclosure, Isolator etc. (MCB to be ISI marked only)	LK(erstwhile L&T) / Legrand / Siemens / Havells / Schneider/ Hager/ABB
1.4	Occupancy Sensor	Hager/Legrand/Honeywell/Philips/Wipro
1.5	Brass batten / angle holder (To be ISI marked only)	Kinjal / SSK / Anchor / Benlo / Antex
1.6	Call bell / buzzer (Normal)	Anchor / Cona / Havells/ Benlo
1.7	Modular switch & socket, stepped type fan regulator, telephone socket, LAN socket and TV socket, blanking plate	Legrand Arteor, Schneider – Zencelo, Crabtree - Murano, ABB-IVIE
1.8	Light Fittings	Philips/Havells/Wipro/LT /Crompton
1.9	Ceiling Fan/Exhaust Fan/Wall Fan	Havells/Usha/EPC/Orient/Crompton/Atomberg//HPL
1.10	Rising main / bus trunking, tap off box, end feed unit, sandwich bus duct / bus trunking	LK(erstwhile L&T) / Siemens / Legrand / Schneider /C&S/ABB.
1.11	GI Race Way	OBO/Legrand/Honeywell/ BEC
1.12	PVC Trunking	OBO/Legrand/ Honeywell-MK/Konstruct
1.13	Decorative Light Pole	Bajaj/Valmont/ JK Poles/Havells/K-Lite/ Philips
1.14	Octagonal hot dip galvanized steel poles and brackets	Bajaj/ Valmont/ Aster/ J.K Poles / Utkarsh
2	**CABLES AND ACCESSORIES :**	
2.1	Single core FRLS PVC insulated copper conductor cable and copper control cable inside panel, RG 6 TV co-axial cable (To be ISI marked only).	Finolex / Polycab / Havells / RR Kabel/ KEI
2.2	PVC / XLPE insulated PVC sheathed armoured / unarmoured copper / aluminium conductor MV cable and XLPE insulated HV cable.	Finolex / Polycab / Havells / RR Kabel/ KEI
2.3	UTP 4 pair CAT 6 cable, Coaxial Cable	AMP / Legrand / Hubbel/Panduit/ Belden/Molex/Delink
	Telephone Cable	KEI/Polycab/Finolex/RR Cable/Havells
2.4	Cable tray -GI	INDMARK /FORMTECH / UCIC / KANADE ANAND / VATCO/OBO/RM-CON/ BEC
2.5	Heat shrinkable jointing kit	Raychem, 3M, CCI, M-Seal

AE (P) EE (P)

2.6	Cable lugs / glands	Dowells, Wago, Gripwel, Johnsons, Comet,
3	**SUBSTATION EQUIPMENTS :**	
3.1	11 KV HT Panel (OEM panel only)	Siemens, Schneider, Kirloskar
3.2	11 KV / 433 V cast resin dry type transformer	RPG Raychem, Kirloskar, Schneider, Voltamp (Vadodara)
3.3	Insulation Mat	Honeywell /Premier Polyfilm Ltd/Dura tuf
4	**MV PANELS & THEIR COMPONENTS:**	
4.1	Type Tested Panels (Except APFC Panel)	Schneider-Blockset/ Legrand- XL3/ Siemens- C-Pan/ LK (erstwhile L&T)-TI
4.2	Any other Panels	Schneider/ Legrand/ Siemens/ LK (erstwhile L&T)/Green Galaxy/Amit Project
4.3	APFC Panel (OEM Panel)	Schneider/ Legrand/ Siemens/ LK(erstwhile L&T)/
4.4	APFC Relays	L&T/Siemens/ Schneider/ GE/ Legrand
4.5	Annunciation window for annunciator panel (solid state type)	Minilec/ Power House
4.6	Air Circuit Breakers	Siemens - Sentron 3WL/ Schneider - Master Pact NW/ Havells- Titania Plus/ LK(erstwhile L&T)-– Omega U Power/ Legrand –DMX3
4.7	MCCB	Siemens – 3VL, L&T-D Shine, Schneider-Compact NSX, Legrand, DPX3/ABB-T-Max
4.8	SDFU / SFU / Change Over Switches	LK(erstwhile L&T), Siemens, ABB, Schneider, Legrand, GE, C&S, Havells
4.9	Rotary switches	LK(erstwhile L&T), Schneider, Siemens, GE, Legrand, C&S or as per OEM standard /ABB
4.1	Contactors	LK(erstwhile L&T), Schneider, Siemens, GE, Legrand, C&S, Hager,Havells
4.11	Automataic Transfer switch	LK(erstwhile L&T), Schneider, Siemens, ABB, GE, Legrand, C&S, Hager, Havells
4.12	Protective Relays (ISI marked only), timers, contactors	Schneider, L&T, Siemens, GE, Legrand, Havells
4.13	Meters, MF meters	AE, L&T, Conzerv, Trinity, Secure, IMP, Minilec, HPL, C&S Electric / Rishav.
4.14	Auto/Manual Changeover switch	LK(erstwhile L&T), Schneider, Siemens, GE, Legrand, Hager, Havells
4.15	Timer	LK(erstwhile L&T), Schneider, Siemens, GE, Legrand, Hager
4.16	Indication lamps, push buttons, selector switch	LK(erstwhile L&T), Siemens, Schneider, GE, BCH, C& S Electric
4.17	CTs / PTs	Kappa, AE, Savio, ECS, Pragati, Vishal, Precise, LK(erstwhile L&T)
4.18	Single phase / reverse phase preventer	Minilec / LK(erstwhile L&T)/ C&S/ HPL/ Secure/ Trinity/ Conzerv
4.19	Terminal blocks	Connect well, Elmex, Phoenix, Wago

AE (P) EE (P)

4.20	Heavy duty capacitors (To be ISI Marked only)	LK(erstwhile L&T), Siemens, ABB, Schneider, GE, Havells, Legrand
5	**D.G. SET**	
5.1	Engine for DG Set	Cummins/ Caterpillar/ Kirloskar/Mahindra/Perkins/Ashoke Leyland
5.2	Alternator for DG Set	Crompton, Kirloskar, Topland, Caterpillar, Stamford, Leroy Somer
5.3	Anti-vibration Pad	Dunlop, Cummins, Polybond, Registoflex. Reputed brand used by the OEM, OEA of DG Set is also acceptable.
5.4	SMF Batteries for DG Set and for Power Pack	Exide, Lucus, Pace Setter, AMCO, Cummins Pulselite, Prestolite Gold, Standard, Amaron
5.5	Exhaust pipe	Tata / Jindal / IISCO/SAIL
6	**Lift**	OTIS / Kone / Schindler / Mitsubishi/ Johnson
7	Dumb-Waiter	OTIS / Kone / Schindler / LT Elevator/ Johnson
8	**AUTOMATIC FIRE ALARM SYSTEM :**	
8.1	UL listed Intelligent addressable Main fire alarm control panel, repeater panel	Notifier (Honeywell) / Bosch / Tyco-simplex / Siemens Cerberus /Edward.
8.2	UL Intelligent addressable detectors, manual call point, addressable low intensity sounder, Response Indicator and other devices. (Make of detector and detector base shall be same)	Notifier (Honeywell) / Bosch / Tyco-simplex / Siemens Cerberus /Edward
8.3	Complete PA system equipment including control unit, microphone, amplifier, speaker etc.	Bosch, /TAO, BOSE, Edwards/Honeywell Evac pro.
9	**FIRE FIGHTING SYSTEM :**	
9.1	Pumps for fire fighting system including drain / dewatering pumps	Mather & Platt (Willow) / Best & Crompton / KSB / Grundfos / Topland / Armstrong/ Kirloskar / CRI
9.2	Diesel Engine for fire pump	Mather & Platt (Willo) / Best & Crompton / KSB / Grundfos / Topland / Armstrong/ Kirloskar /CRI
9.3	Motor for fire pumps	Siemens / Kirloskar / Crompton / Mather & Platt (Wilo) / Topland
9.4	MS Pipe	TATA / SAIL / Jindal India
9.5	GI Pipe	TATA / SAIL / Jindal India
9.6	Pressure switch	Danfoss / Honeywell / Indfox
9.7	Pressure gauge	Feibig / H Guru / Emerald / Taylor
9.8	Pressure Transducer	Danfoss / Honeywell / Indfox / Feibig

9.9	Flow switch	Forbes Marshall / Eureka / Rapidcool / Siemens / Johnson controls/Honeywell
9.10	Fire fighting equipments and accessories such as single headed / double headed landing valve / hydrant valve, branch pipe, nozzles, Fire service inlet, fire brigade inlet etc. (To be ISI marked only)	Newage / Minimax / Ceasefire / Omex / Vijay/Safe Guard/Karter/Life Guard
9.11	First aid hose reel (To be ISI marked only)	Newage / Minimax / Ceasefire / Omex / Vijay /Safe Guard/Karter/Life Guard
9.12	RRL hose pipe, hose coupling (To be ISI marked only)	Jayasree / Newage / Minimax / Cease fire / Omex/Safe Guard/Karter/Life Guard
9.13	Sprinkler	HD Fire / Newage / Omex / Minimax / Cease fire / Tyco / Kidde / Viking/Karter
9.14	Installation control valve	HD Fire / Mather & Platt / TYCO / Viking / Kidde
9.15	Fire Extinguishers (To be ISI marked only)	Cease Fire / Minimax / Vijay Fire / Fire Shield /Safe Guard/Karter
9.16	CIDF Butterfly valve / Sluice valve / Non-return valve / SS strainer. (Valves to be ISI marked only)	Kirloskar / Audco / Perfect(LP Valves) /Advance / Castle / SKS / CIM / Honey Well /Karter/Leder/Zoloto
9.17	Motorized Valve	Kirloskar / Audco / Perfect(LP Valves) /Advance / Castle / SKS / CIM / Honey Well /Karter
9.18	Gunmetal/SS Ball / Gate / Globe Valve (To be ISI marked only and shall be heavy type)	Leader / Zoloto / CIM / Perfect(LP Valves)/Rapidcool / Castle / Emerald / Sant / Laksmi / Honey Well
9.19	Water Pump /De-Water Pump	Mather & Platt (Willow) / Best & Crompton / Topland / Grundfos /Kirloskar/CRI
10	**AIR-CONDITIONING SYSTEM :**	
10.1	VRF/VRV Air conditioning Equipment (Indoor & outdoor Unit)	LG/ Carrier/Daikin/Mitsubishi Heavy/ Toshiba/ O-General/Blue Star
10.2	Copper pipe / copper refrigerant pipe/Refnet joint	Rajco / Mandev / Diamond / Star
10.3	G.I. Sheet	Jindal / Tata / SAIL
10.4	Factory Fabricated Aluminum Duct / GI duct	Dustech / Zeco Aircon / Technofab / Rolastar / Seven Star
10.5	Grilles / Diffuser	Caryaire / Ravistar / Airmaster / Dyna Craft / System Air
10.6	Ventilation/Exhaust/Pressurization fan	Systemair/ Kugar/ Fantech/ Howden
10.7	Nitrile Rubber insulation	K-Flex/Armaflex/Vidoflex/ Eurobatex/ Kaimanflex
10.8	TFA/AHU Unit	System Air /Zeco /Edge tech/ VTS
10.9	Motorized Fire Damper	System Air /Carryaire / Conair / Mapro/Airmaster/Daynacraft

10.10	Volume Control Damper, Fresh/Exhaust air louver	Titus / Trox / System Air /Carryaire / Conair / Mapro/Airmaster
10.11	Actuator for fire damper	Siemens/ Honeywell / Belimo/System air
10.12	Jet Fan	Systemair/Kugar/Fantech/Howden
10.13	Axial Fan & Pressurization Fan	Systemair/Kugar/Fantech/Howden
10.14	Control Panel/Starter Panel	CPRI approved Panel Builder.
11	**SOLAR SYSTEM:**	
11.1	SPV Module	TATA BP SOLAR / CEL / BEL / GE SOLAR / SANYO / PCI /PANASONIC/HAVELLS, Kirloskar, Premier Energies, HR Solar (OEM shall be MNRE approved)
11.2	Power Control Unit (PCU) String PCU	Emerson / Mitshubishi / Schneider / Pom Power /Delta / Siemens/Abb/Panasonic
11.3	UPS	APC/ /Vertiv/ Pom Power / Legrand / Schneider
11.4	Battery	Exide/Amaron / Pom Power /Panasonic/Tata Green
12	**CCTV & NETWORK**	
12.1	Camera (STQC CERTIFIED)	Honeywell/Bosch/Axis/Tyco/Pelco
12.2	NVR	Same as installed Camera make.
12.3	Surveillance SATA HDD	WD/Seagete/Toshiba
12.4	Workstation	DELL/HP/Lenovo
12.5	LED 4K Display	Samsung/ LG/ Sony/ Panasonic
12.6	Network Switch (POE &Non POE)	Allied Telesis/CISCO/Extrema/Juniper
12.7	CAT-6 Toolless Field Termination Plug	Derwiser/Belden/ RNM/Panduit/Legrand/Comscope
12.8	CAT6 UTP 24 AWG Patch Cord	Derwiser/Belden/ RNM/ Panduit/ Legrand/ Comscope
12.9	Optical Fiber	Systimax/Panduit/Siemon/Legrand/Polycab.
12.1	Network Rack	Systimax/Panduit/Siemon/Legrand.
12.11	Patch Panel	Systimax/Panduit/Siemon/Legrand
12.12	CAT6 & 6ACable & Patch Cord	Systimax/Panduit/Derwiser/Legrand
12.13	Fiber Cable	Systimax/Panduit/Derwiser/Legrand
12.14	Wi-Fi /Wireless AP	Allied Telesis/CISCO/Extream/Juniper.
12.15	Wireless controller	Allied Telesis/CISCO/Extream/Juniper.
12.16	Firewall	Sonicwall , Fortinet, Cisco, Palo alto.
12.17	IPBX system	Telesis/Matrix/Avaya/Tadiram
12.18	SIP phone	Telesis/Matrix/Avaya/Tadiram
12.19	CLI PHONE	Beetel/Panasonic
13	**BMS & ACCESS CONTOL**	
13.1	BMS Software	Honeywell/Schneider/Siemens/Johnson Controls
13.2	DDC Controller	Honeywell/Schneider/Siemens/Johnson Controls

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13.3	Sensor	Honeywell/Schneider/Siemens/Johnson Controls/Omicron
13.4	Access Controller & Software	Honeywell/Schneider/Siemens/Johnson Controls/Omicron
13.5	Reader	Honeywell/Schneider/Siemens/Johnson Controls/Suprema/Idemia
13.6	Magnetic door lock	Algatec/Dormakaba/Hikvision /Bell/Godrej
13.7	ATC Cable	Polycab/Panduit/Legrand/KEI/Havells
14	**AUDIO & VISUAL**	
14.1	Professional Panel/Interactive Display unit	Delta/ Samsung/LG/ Sony/ Panasonic/ Christie/Barco
14.2	Cable Cubby	Crestron/Extron/ Kramer/Logic/Liteware
14.3	Wireless Presentation & BYOD Conferencing Module	Crestron/ Extron/ Barco/Henrich /Barco/ BenQ
14.4	20x zoom full HD Camera	Lumens/ Aver/ Sony/ Panasonic/ Ratavideo/ Kramer
14.5	USB over Network for Camera (2x Transmitter, 1 x Receiver)	Crestron, Extron, Kramer
14.6	Microphone	Sennheiser/Clock Audio/ Rode/ Henrich/ Bosch/Shure/ Telvic
14.7	Digital Signal Processor	Xilica/ Crestron/ Extron/Henrich /ASL Audio/Ambient/OSL/BSS/Yamaha/Bosch/ Kramer
14.8	Amplifier	Xilica/ Crestron/ Extron/Henrich /ASL Audio/Ambient/British Acoustics / Sonodyne/ Bosch/Kramer
14.9	Control System with power adoptor	Kramer/ Crestron/ Extron/AMX/Liteware
14.10	Network Switch for Audio System	Cisco/ Net gear / Extron/Zyxel
14.11	Digital Interactive Podium	UNI/AHA/ People link
14.12	HDMI Spliter & Receiver i/c cables	Crestron/Extron/ Kramer/ATEN/Milestone
14.13	Speaker	Xilica/ Crestron/ Extron/Henrich/Bose /ASL Audio/Ambient/ British Acoustics Sonodyne/ Bosch/Kramer/Telvic
14.14	Conference System Controller & Discussion Unit	OSL/Televic/Stapes/Bosch/Sennheiser/Shure Sonodyne/ Crestron / Extron /Kramer/Telvic
14.15	Power Expansion Kit	OSL/Televic/Stapes/Bosch/Sennheiser/Shure/ Extron/ Telvic
14.16	Wireless Handheld Microphone	OSL/Televic/Stapes/Bosch/Sennheiser/Shure
14.17	Conference PTZ Camera	OSL/Panasonic/Lumens/Vaddio/Crestron /Sony/ Kramer
14.18	CAT-7 Cable & connector	Crestron/Extron/Kramer/Molex/Commscope / Liteware
14.19	Rack	Valrack/Netgear/APW/Palcom/Netrack
15	Mechanical Car Parking	LT Elevator/RR Parkon/Park Smart/Wohr Parking System

16	Boom Barrier	Smart Power Automation / ID Tech Solutions / R.K. Security Solution / Godrej / Park Plus
17	Metal Dectactor Door	Smart Power Automation/ iSecure India/Bioroles/Godrej
18	Signage	Prolite-autoglow/Acculite/Instamark
19	DWC HDPE pipe ISI marked	Astral / Supreme / ALOM / JAIN / KAISTA / Konstruct / RELIANCE/ TIRUPATI PLASTOMATICS (Gemini) (ISI Marked)
20	GI Pipe	Tata/Jindal India/Bansal/Sail/JKPoles/ Nezone(ISI Marked)
21	Bi-metallic/Copper/Aluminium Cable Lug	COMET/DOWELL'S (BILLER INDIA PVT.LTD.)/ HAXBRASS (COPPER ALLOY INDIA LTD.)
22	AV Switches	Aten/Lightware/Milestone/ Extron/ Creston/ Kramer
23	PTZ Camera	Aver/Sony/Lumens/Datavideo/Kramer
24	Pop-up Boxes	Logic/Extron/Creston/ Kramer/ Lightware
25	HDMI Extender	Aten/Lightware/Milestone /Extron/Creston/ Kramer
26	USB Extended Cable	Aten/Lightware/Milestone/ Extron/Creston/ Kramer
27	NUC	ASUS/HP/Dell/Lenovo/Intel
28	USB 2 x 2 Hub	Aten/Lightware/Milestone
29	Delegate Unit	Heinrich/Sennheiser/Beyerdynamics
30	Chairman Unit	Heinrich/Sennheiser/Beyerdynamics
31	Controller	Heinrich/Sennheiser/Beyerdynamics
32	17U Rack	Valrack/Netrack/President/Palcom
33	IPABX	Neron/Nec/Panasonic
34	IP Phone	Neron/CISCO/NEC
35	POE Switch	Zyxel/Cisco/Extreme/Netgear
36	**Façade Light & Accessories**	
1	RGB fittings/RGBW fittings or any other light fixture	OSRAM/Philips/Ligman/Wipro/Schreder/ Trilux/Canara Lighting
2	High Power LED	Osram/Nichia/ Cree /Lumileds
3	DMX/Ethernet Controllers	Martin/Pharos/Signify/Madrid/ ECue/ Wipro/ Schreder / Ligman/Canara Lighting
4	PoE Switches	Netgear/CISCO
5	LED Driver	OSRAM/Philips/Ligman/Wipro/Schreder / Trilux
37	**Kitchen Equipments / Appliance**	
1	Refrigerator	Whirlpool/Samsung/LG/Bosch
2	Micro-oven	Faber/LG/Samsung/IFB
3	Mini Refrigerator with freezer	Bluestar/LG/Samsung/Whirlpool

4	Electrical Chimney	Kutchina/Faber/Glen
5	Dish washer	IFB/Bosch/LG/Whirlpool
38	**UPS**	Schneider / Numeric / Pom Power / Socomec
39	**Stage lighting**	
1	PAR light	PLS/ Modern Stage Service / Canara / SHOWTEC / Optiks/Martin/Shenoy Lighting / Leksa
2	Blinder Light	PLS / Modern Stage / Canara / SHOWTEC / Optiks/ Martin/Shenoy Lighting / Leksa
3	Profile Light	PLS / Modern Stage / Canara / SHOWTEC / Optiks/ Martin/Shenoy Lighting / Leksa
4	Cyclorama Light	PLS / Modern Stage / Canara / SHOWTEC / Optiks / Martin/Shenoy Lighting / Leksa
5	Moving Head	PLS / Modern Stage / Canara / SHOWTEC / Optiks / Martin/Shenoy Lighting / Leksa
6	PC Light	PLS / Modern Stage / Canara / SHOWTEC / Optiks
7	Haze Machine	PLS / Modern Stage / Canara / SHOWTEC / Optiks
8	DMX Spliter	PLS / Modern Stage / Canara / SHOWTEC / Optiks
9	Operating Panel	PLS / Modern Stage / Canara / SHOWTEC / Optiks
10	Patch Panel	PLS / Modern Stage / Canara / SHOWTEC /Optiks
11	Wires & Cable	Havells / Polycab / Finolex / APAR / RR KABEL /KEI/ Konstruct
12	DMX Cable	Krystal / Belden / Falcon / SHOWTEC / Optiks
40	**Stage furnishing**	
1	Cyclorama screen	Zoher & Co. / Galalite / Harkness / PLS / Modern Stage / Canara / SHOWTEC / Optiks/ Martin/Shenoy Lighting / Leksa
2	Motorized Screen	Zoher & Co. / Galalite / Harkness / PLS / Modern Stage / Canara / SHOWTEC / Optiks/ Martin/Shenoy Lighting / Leksa
3	Screen Frame	PLS / Modern Stage / Canara / SHOWTEC / Optiks/ Custom made/ Martin/Shenoy Lighting / Leksa
4	Main curtain track	PLS / Modern Stage / Canara / SHOWTEC / Optiks/ Martin/Shenoy Lighting / Leksa

5	Main Valance Bar	PLS / Modern Stage / Canara / SHOWTEC / Optiks/ Martin/Shenoy Lighting / Leksa
6	Frill Bar	PLS / Modern Stage / Canara / SHOWTEC / Optiks/ Martin/Shenoy Lighting / Leksa
7	Main Balance Fabric	PLS / Modern Stage / Canara / SHOWTEC / Optiks/ Martin/Shenoy Lighting / Leksa
8	Main curtain fabric	PLS / Modern Stage / Canara / SHOWTEC / Optiks/ Martin/Shenoy Lighting / Leksa
9	Frill fabric	PLS / Modern Stage / Canara / SHOWTEC / Optiks/ Martin/Shenoy Lighting / Leksa
10	Wing fabric	PLS / Modern Stage / Canara / SHOWTEC / Optiks/ Martin/Shenoy Lighting / Leksa
41	**Step lights**	
1	Step light	Skyllo / Illumination India/Philips/Havells/Wipro
2	Emergency Exit light	Skyllo / Illumination India/Philips/Havells/Wipro
3	LED strip light	Skyllo / Illumination India/Philips/Havells/Wipro
4	Power Adopter	Skyllo / Illumination India/Philips/Havells/Wipro
42	**AUDIO SYSTEM**	
1	Single Channel Wireless Handheld Microphone	Erthpot/Clockaudio/Work Pro
2	Single Channel Wireless Lavellier Microphone	Erthpot/Clockaudio/Work Pro
3	Single Channel Wireless Headworn Microphone	Erthpot/Clockaudio/Work Pro
4	Gooseneck Microphone with Base	Erthpot/Clockaudio/Work Pro
5	Active Antenna Splitter	Erthpot/Clockaudio/Work Pro
6	Antenna Divider/Hub	Erthpot/Clockaudio/Work Pro
7	Active Wide Band Directional Antenna Amplifier	Erthpot/Clockaudio/Work Pro
8	50 Ohm Low- loss Coaxial BNC cable 20 mtr	Erthpot/Clockaudio/Work Pro
9	Wired Capsule Type Backplane polarized electret condenser Mic	Erthpot/Clockaudio/Beyerdynamic
10	Wired Microphone	Erthpot/Clockaudio/Beyerdynamic

11	Drum Kit Microphone Set	Avantone/Clockaudio/Beyerdynamic
12	In-Ear Monitoring System	Erthpot/Clockaudio/Sennheiser
13	Headphone	Clockaudio/Beyerdynamic/SHURE/SENNHEISER/ Bosch/Telvic
14	32 Channel Analog Audio Mixer	Yamaha/Midas/ Allen & Heath/Harman/Soundcraft
15	SF/UTP Cable	Krystal/ Belden / Mogami
16	Equipment rack	D-link/ HCL/ VAL
17	Snake cable	Krystal/ Belden / Mogami
18	Cable connectors	Neutrik / Krown / RS Pro

* The successful bidder shall submit minimum two alternative makes from preferred make given above for every item for approval by the Engineer-in-Charge (Electrical Work) before procurement.

** Any items for which preferred makes are not given in the list above, then the contractor shall submit three alternative reputed makes for approval by the competent authority of the department.

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