भारत सरकार/ GOVERNMENT OF INDIA

केन्द्रीय लोक निर्माण विभाग/ CENTRAL PUBLIC WORKS DEPARTMENT

विजयवाडा/ VIJAYAWADA

NIT No. 34/EE(E)(VJA)/E-Tender/2026-27

Name of Work: Supply, Installation, Testing & Commissioning of 20 KLD Effluent Treatment Plant & Sewage Treatment Plant combo unit, cold room and other related items at National Centre for Disease Control, Mangalagiri, Andhra Pradesh.

NIT Amount: Rs.71,77,842/-

(E&M: Rs.57,06,685/- + Civil: Rs.14,71,157/-)

NIT– INDEX

Name of Work: Supply, Installation, Testing & Commissioning of 20 KLD Effluent Treatment Plant & Sewage Treatment Plant combo unit, cold room and other related items at National Centre for Disease Control, Mangalagiri, Andhra Pradesh.

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*Certified that this N.I.T contains **1** to **211** **pages** only*

Notice Inviting Tender is approved for Rs.71,77,842/- (Rupees Seventy-One lakhs Seventy-Seven thousand Eight Hundred and Forty-Two only)

Assistant Engineer (E)(P) **Executive Engineer (E)**

PART – A

INFORMATION AND INSTRUCTIONS FOR BIDDERS FOR e-TENDERING

FORMING PART OF BID DOCUMENT AND TO BE POSTED ON WEBSITE

(Applicable for inviting open bids)

The **Executive Engineer(E), CPWD, Vijayawada** on behalf of the President of India invites **online percentage rate bids** from approved and eligible contractors of **CPWD (Buildings & Roads Category)** for the following work: -

Sl. No.	Description	Details
1	NIT No.	**34/EE(E)(VJA)/E-Tender/2026-27**
2	Name of Work	Supply, Installation, Testing & Commissioning of 20 KLD Effluent Treatment Plant & Sewage Treatment Plant combo unit, cold room and other related items at National Centre for Disease Control, Mangalagiri, Andhra Pradesh.
3	Estimated Cost Put to Tender (Composite)	**Rs. 71,77,842/-**
	Electrical Work (Major Component)	**Rs. 57,06,685/-**
	Civil Work (Minor Component-1)	**Rs.14,71,157/-**
4	Earnest Money (EMD)	**Rs.1,43,557/-**
5	Period of Completion	**120 days**
6	Last time & date of online submission of bid, **original EMD, copy of receipt for deposition of original EMD,** and other documents as specified in the press notice.	**Up to 15:00 Hours on 18/11/2026**
7	Time & date of online opening of documents. (Mandatory documents)	**At 15:30 Hours on 18/11/2026**
8	Time & date of online opening of financial bids.	**At 16:00 Noon on 18/11/2026**
9	Last date & time of submission of hard copies of Experience Certificates if any, Registration Certificates, Affidavit if any, Undertaking and other Documents as specified in the	**To be submitted during office hours within a week from the date of opening the Financial Bid.** In case the last day happens to be a closed holiday, these documents shall be submitted on the next working day.

Sl. No.	Description	Details
	press notice to Division Office by the **Lowest Tenderer Only**.	

*** To be filled in by Executive Engineer, CPWD, Vijayawada.**

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 items to be executed and the set of terms and conditions of the contract to be complied with and other necessary documents can be seen and downloaded from website https://etender.cpwd.gov.in or www.cpwd.gov.in free of cost.
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 Banker's Cheque or Fixed Deposit Receipts or/ and Bank Guarantee including e-Bank Guarantee (for balance amount as prescribed) from any of the Commercial Bank towards EMD in favour of ***The Executive Engineer, Vijayawada Central Division, CPWD, Vijayawada,*** receipt for deposition of original EMD to division office of any Executive Engineer (including NIT issuing EE/AE), CPWD and other documents as specified.

   (Note: EMD Shall be made/issued only from the account of the bidder/tenderer submitting the bid/tender. EMD made/issued from the account other than that of the bidder/tenderer submitting the bid, shall not be accepted).
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 available on the download section of https://etender.cpwd.gov.in.
6. The intending bidder must have a 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. **The contractor must ensure to quote rate in the prescribed column(s) meant for quoting rate in figures appears in Yellow colour and the moment rate is entered, it turns sky blue.**

   In addition to this, while selecting any of the cells a warning appears that if any cell is left blank the same shall be treated as "0" (ZERO). 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. The Existing enlisted contractor either himself or his authorized representative shall take compulsory ERP training through any of the CPWD Regional Training Institutes (RTIs) at Delhi, Mumbai, Chennai and Kolkata, National CPWD Academy (NCA) Ghaziabad, Training arranged by Graduates of ERP "Train the Trainers Programme" conducted by NCA, Ghaziabad or through any other special training arranged by ERP Unit of CPWD. Training will be valid only when participants are registered and a certificate is issued through LMS (Learning Management System) in ERP. The enlisted contractor will not be allowed to participate in the tendering process without uploading the certificate of the above training.
11. Any dispute arising out of this tender including dispute related to encashment of any Bank Guarantee/ FDR etc., shall be subject to the jurisdiction of courts of Andhra Pradesh State only.

12. **List of Mandatory Documents to be scanned and uploaded within the period of bid submission:**

1.	Insurance Surety Bonds/ Account payee Demand Draft/ Fixed Deposit Receipt (FDR)/ Banker's cheque or Bank Guarantee (as prescribed) issued by a Commercial Bank against EMD, as specified in Para 7 of CPWD – 6 for e - Tendering. ***(Note: EMD Shall be made/issued only from the account of the bidder/tenderer submitting the bid/tender. EMD made/issued from the account other than that of the bidder/tenderer submitting the bid, shall not be accepted).***
2.	Receipt for deposition of original EMD issued from division office of any Executive Engineer (Including NIT issuing EE, CPWD) (Form–C).
3.	Enlistment order of the Contractor
4	GST registration certificate of the State in which the works is to be taken up, if already obtained by the bidder. If the bidder has not obtained GST registration as applicable, then he shall scan and upload following undertaking along with bid documents. "If work is awarded to me, I/we shall obtain GST registration certificate, as applicable, within one month from the date of receipt of award letter or before release of any Payment by CPWD, whichever is earlier, failing which I/we shall be responsible for any delay in payments which will be due towards me/us on account of the work executed and/or for any action taken by CPWD or GST department in this regard".
5	Certificate secured through LMS portal of ERP for attending "Train the Trainers Programme" conducted by NCA, Ghaziabad or through any other special training arranged by ERP Unit of CPWD.
6	Electrical License issued by State of Andhra Pradesh. If the bidder has not obtained Electrical License issued by State of Andhra Pradesh, then in such a case the bidder shall scan and upload following undertaking along with other bid documents "If work is awarded to me, I shall associate any electrical contractor having valid electrical license issued by State of Andhra Pradesh or I myself shall obtain Electrical license of State of Andhra Pradesh within 7 days from date of issue of letter of acceptance."

Executive Engineer(E)
CPWD, Vijayawada.

CPWD-6 for e-Tendering

Online percentage rate bids are invited on behalf of the President of India from approved and **eligible contractors of CPWD (Building & Roads Category)** for the work of **"Supply, Installation, Testing & Commissioning of 20 KLD Effluent Treatment Plant & Sewage Treatment Plant combo unit, cold room and other related items at National Centre for Disease Control, Mangalagiri, Andhra Pradesh."**

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

1.1 The work is estimated to Cost **Rs.71,77,842/-** This estimate, however, is given merely as a rough guide.

1.2 **The Minimum eligibility criteria for Specialized work wherever applicable for Civil and E&M Works.**

Sl. No	Component of Civil and E&M works	Estimated cost only for the purpose of calculating the eligibility of association (in Rs.)	Eligibility
1.	IEI & Fans	5.89 Lakhs	The main contractor having valid Electrical Contractor license of 'B' Grade issued by State of Andhra Pradesh. or Main contractor engaging wireman/electrician having valid Electrical Contractor license of 'B' Grade issued by State of Andhra Pradesh.
2.	Access Control System	15.23 Lakhs	In case, the main contractor does not possess the requisite eligibility and experience then, the main contractor shall have to associate with agency fulfilling the following eligibility criteria having successfully completed during last seven years ending up to previous day of last date of submission of tender as given below with completion certificate issued by an officer not below the rank of Executive Engineer or equivalent duly attested. Three similar completed works each of value not less than **Rs. 6.09 Lakhs** or Two similar completed works each of value not less than **Rs. 9.14 Lakhs** or

Sl. No	Component of Civil and E&M works	Estimated cost only for the purpose of calculating the eligibility of association (in Rs.)	Eligibility
			One similar completed work of value not less than **Rs. 12.18 Lakhs** Similar work shall mean "**supply installation testing and commissioning of Access control System".**
3.	HVAC System	11.83 Lakhs	In case, the main contractor does not possess the requisite eligibility and experience then, the main contractor shall have to associate with agency fulfilling the following eligibility criteria having successfully completed during last seven years ending up to previous day of last date of submission of tender as given below with completion certificate issued by an officer not below the rank of Executive Engineer or equivalent duly attested. Three similar completed works each of value not less than Rs. 4.73 Lakhs or Two similar completed works each of value not less than Rs. 7.10 Lakhs or One similar completed work of value not less than Rs.9.46 Lakhs **Similar work shall mean "supply installation testing and commissioning of HVAC System".**
4.	ETP cum STP combo	24.10 Lakhs	In case, the main contractor does not possess the requisite eligibility and experience then, the main contractor shall associate with specialized agencies who fulfill the following requirements, if he himself does not fulfill the following requirement : - Should have satisfactorily completed the works as mentioned below during the last

Sl. No	Component of Civil and E&M works	Estimated cost only for the purpose of calculating the eligibility of association (in Rs.)	Eligibility
			seven years ending previous month of last date of submission of bids. Three similar completed works each of value not less than Rs. **9.64 Lakhs** or Two similar completed works each of value not less than Rs. **14.46 Lakhs** or One similar completed work of value not less than **Rs.19.28 Lakhs** Similar work shall mean "**Supply installation testing and commissioning of ETP or STP".**

Note:

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

ii) The main contractor 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 "G" given in Part B/C of this tender document within 15 days of award of work OR before the start of specialized Civil and / E&M work whichever is earlier.

iii) The main contractor will submit MOU signed with eligible associated contractor. The MOU in the enclosed Form "I" 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.

iv) If the main contractor fails to associate agency for execution of specialized Civil and/ E&M work within 15 days of award of work OR before start of specialized Civil and/ E&M 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.

v) 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 15 days of award of work OR before start of specialized/minor component of work whichever is earlier.

vi) Self-attested GST registration documents in respect of the associated agencies shall be submitted within 15 days of award of work OR before start of specialized/minor component of work whichever is earlier.

2. Agreement shall be drawn with the successful bidder on prescribed Form No. **CPWD 7** (or other Standard Form as mentioned) which is available at 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 120 days** from the date of start as defined in Schedule 'F' or from the first date of handing over of the site, whichever is later, in accordance with the phasing, if any, indicated in the bid documents.

4. i) The site for the work is available.

   ii) The architectural and structural drawings shall be made available in phased manner, as per requirement of the same as per approved programme of completion submitted by the contractor after award of work.

5. The bid document consisting of plans, specifications, the schedule of quantities of various types of items to be executed and the set of terms and conditions of the contract to be complied with and other necessary documents except Standard General Conditions of Contract Form can be seen on website **https://etender.cpwd.gov.in** or **www.cpwd.gov.in** free of cost. However, standard General Conditions of Contract 2023 for construction work shall also form part of the contract.

6. After submission of the bid the contractor can re-submit revised bid any number of times but or withdraw it before last date and time of submission of bid as notified. No post-tender modification is allowed by the tenderers except through negotiations, if required. In case, any tenderer does so, the tender will be debarred for future tendering in CPWD for two years by the concerned enlisting authority (in case of CPWD enlisted contactor) and by the concerned CE/SE (in case of non-enlisted contractor).

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, Vijayawada Central Division, CPWD, Vijayawada)** 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 the Executive Engineer inviting bids or the 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 as Form - C) uploaded by the tender inviting EE in the NIT.

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

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

Copy of Enlistment Order, certificate of work experience and other documents as specified in the notice inviting e- tender shall be scanned and uploaded to the e-Tendering website within the period of bid submission. However, certified copy of all the scanned and uploaded documents as specified in e- tender notice shall have to be submitted by the lowest bidder within a week physically in the office of The Executive Engineer, CPWD, Vijayawada.

Online bid documents submitted by intending bidders shall be opened only of those bidders, who has deposited EMD with any division of CPWD and other documents scanned and uploaded are found in order.

The bid submitted shall be opened on 15:30 on 18***/11/2026***

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

   i) The bidder is found ineligible.

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

   iii) If any discrepancy is noticed between the documents as uploaded at the time of submission of bid and hard copies as submitted physically by the lowest bidder in the office of bid opening authority.

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

10. The contractor, whose tender is accepted, will be required to submit an irrevocable 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 site for the work of **Supply, Installation, Testing & Commissioning of 20 KLD Effluent Treatment Plant & Sewage Treatment Plant combo unit, cold room and other related items at National Centre for Disease Control, Mangalagiri, Andhra Pradesh."** will be made available on **"as is where is"** basis.

    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 bidders 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 (enlisted or non-enlisted in CPWD) shall not be allowed to participate in the tender for work(s) in the CPWD Zone/Circle/Division/Sub-Division responsible for award and/or execution of contract(s) in which his near relative is posted as Divisional Accountant or as an officer in any capacity between the grades of the Chief Engineer and Junior Engineer (both inclusive). He shall also intimate the names of persons who are working or are subsequently employed by him and who are near relatives to any Officer

working in the CPWD. Any breach of this condition by the contractor would render him liable to be debarred for a period up to two years from tendering in CPWD as decided by the accepting authority mentioned in Schedule F and his decision will be excepted from clause 25.

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 bid for the work shall remain open for acceptance for a period of **Thirty (30) days** from the date of opening of bids. Further:

i. If any tenderer withdraws his tender or makes any modifications in the terms and conditions of the tender which is not acceptable to the department within 7days after last date and time (24 hours basis) of submission of bids, then the Government shall without prejudice to any other right or remedy, be at liberty to forfeit 50% of the earnest money absolutely irrespective of letter of acceptance for the work is issued or not.

ii. If any tenderer withdraws his tender or makes any modifications in the terms and conditions of the tender which is not acceptable to the department after expiry of 7days after last date and time (24 hours basis) of submission of bids, then the Government shall without prejudice to any other right or remedy be at liberty to forfeit 100% of the earnest money absolutely irrespective of letter of acceptance for the work is issued or not.

iii. Withdrawal of the tender, by the tenderer, shall only be made through e-tender portal. Any other method i.e., though letter / e-mail etc. shall not be considered. The tender inviting authority gets intimation through SMS and email in this regard.

iv. In case of forfeiture of earnest money as prescribed in para (i) and (ii) above, the bidder 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 7 days from the stipulated date of start of the work, sign the contract consisting of : -

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

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

19. **For Composite Tenders**

20. The Engineer-in-Charge of the major competent will call bids for the composite work. The cost of bid document and Earnest Money will be fixed with respect to the combined estimated cost put to tender for the composite bid.

20.1 The bid document will include the following five components:

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

Part B: - Special conditions, Particular specifications and a list of preferred makes applicable to major component (E&M works) & Civil.

Part C: - Schedule A to F for minor component (Civil) of the works, special additional conditions and list of preferred makes applicable to minor component(s) of the work.

Part D: - Schedule of quantities for E&M & Civil component(s) of the work.

Part E: - ~~Tender drawings, 3D Views, Soil Investigation &~~ List of modifications / corrections to General Conditions of Contract - 2023 .

20.2 The bidder must associate himself, with agencies as per NIT conditions.

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

20.4 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.

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

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

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

20.8 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 respective Engineer-in-charge/ DDH of relevant specialized component(s).

The new agency/ agencies shall also have to satisfy the laid down eligibility criteria. In case Engineer-in-charge is not satisfied with the performance of any agency, he can direct the contractor to change the agency executing such items of work and this shall be binding on the contractor.

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

20.10 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.

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

20.10.2. Final bill of whole work shall be finalized and paid by the EE of major component. Engineer(s) in charge of minor component(s) will prepare and pass the final bill for their component of work and pass on the same to the EE of major component for including in the final bill for composite contract.

21 The intending bidders are required to update their profile in CPWD e- tender portal and to upload their bids well in advance of last date of submission of tender. Any issue related to updating profile/uploading tender can be resolved through the concerned Executive Engineer/ Assistant Engineer (Phone no *....., e- mail Id *.....) or ERP helpline no. 18001803286 or e-mail id cpwd.support@techmahindra.com. The e-tendering bidders are also advised not to wait to raise any issues till the last date of submission of bid in their own interest.

Executive Engineer(E)
CPWD, Vijayawada.
(For& on behalf of President of India)

<u>(Form – C)</u>

Receipt of deposition of original EMD

(Receipt No………………… / date…………………)

1. **Name of work: Supply, Installation, Testing & Commissioning of 20 KLD Effluent Treatment Plant & Sewage Treatment Plant combo unit, cold room and other related items at National Centre for Disease Control, Mangalagiri, Andhra Pradesh.**

2. **NIT No. : 34 /EE(E)/(VJA)/E-Tender/2026-27.**

3. **Estimated Cost : Rs. 71,77,842/-**

4. **Amount of Earnest Money Deposit : Rs.1,43,557/-**

5. **Last date of submission of bid : 18 /11/2026**

(**to be filled by Executive Engineer, CPWD, Vijayawada)*

1. **Name of Contractor: ……………………………………………………….……#**

2. **Form of EMD ………………………………………………………….………………#**

3. **Amount of Earnest Money Deposit…………………………….…………….#**

4. **Date of Submission of EMD……………………………………………………..#**

Signature, Name and Designation of
EMD Receiving officer (EE/AAO)
Along with Office Stamp

(# to be filled by EMD receiving EE or
NIT issuing EE, as the case may be)

C.P.W.D – 7

GOVERNMENT OF INDIA

CENTRAL PUBLIC WORKS DEPARTMENT

STATE : Andhra Pradesh **ZONE: CE, Vijayawada**

BRANCH : B& R **Division: EE, Vijayawada**

PERCENTAGE RATE TENDER & CONTRACT FOR WORKS

Tender for the work of **"Supply, Installation, Testing & Commissioning of 20 KLD Effluent Treatment Plant & Sewage Treatment Plant combo unit, cold room and other related items at National Centre for Disease Control, Mangalagiri, Andhra Pradesh."**

(i) To be uploaded online by 15:00 hours on 18/11/2026 through website https://etender.cpwd.gov.in or www.cpwd.gov.in

(ii) To be opened in presence of tenderers who may be present at 15:30 hours on 18/11/2026 in the office of O/o Executive Engineer, CPWD, Vijayawada.

T E N D E R

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 respects with the specifications, designs, drawings 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 respects in 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 bid and not to make any modification in its terms and conditions.

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

ln respect of portion of EMD prescribed in the shape of BG, the scanned copy of original Bank Guarantee including e-Bank Guarantee (as applicable) of any commercial bank having validity for a period of 90 days for single bid ~~and 180 days for two bid systems~~ or more from the last date of receipt of bids (strike out as the case may be), is to be 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.

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 ____________________ Signatures of Contractor

Postal Address

Witness:
Address:
Occupation:

ACCEPTANCE

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

Rs……………………..…………

(Rupees …………………………………………………………………………………………)

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: ** Designation: **

**** To be filled in by Executive Engineer, CPWD, Vijayawada.**

PROFORMA OF SCHEDULES A to F

SCHEDULE 'A'

Schedule of Quantities : **Pages from 201-227**

Estimated Cost Put to Tender : **Rs.71,77,842/-**

E&M work (Major Component) **: Rs.57,06,685/-**

Civil Work (Minor Component) : **Rs.14,71,157/-**

SCHEDULE 'B'

Schedule of materials to be issued to the contractor

Sl. No.	Description of item	Quantity	Rates in figures & words at which the material will be charged to the contractor	Place of Issue
1	2	3	4	5

----------NIL----------

SCHEDULE 'C'

Tools and plants to be hired to the contractor

Sl. No.	Description	Hire charges per day	Place of Issue
1	2	3	4

SCHEDULE 'D'

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

a. Special& Additional Conditions : attached

b. Particular specifications : attached

c. Guarantee Bonds : attached

SCHEDULE-'E'

Reference to General Conditions of contract: **GCC 2023 for Construction Works** as amended/modified up to the last date of submission of tender.

Name of Work: Supply, Installation, Testing & Commissioning of 20 KLD Effluent Treatment Plant & Sewage Treatment Plant combo unit, cold room and other related items at National Centre for Disease Control, Mangalagiri, Andhra Pradesh.

Estimated Cost Put to Tender	: **Rs. 71,77,842/-**
E&M work (Major Component)	**: Rs.57,06,685/-**
Civil Work (Minor Component)	: **Rs.14,71,157/-**
(i) Earnest money	: **Rs. 1,43,557/- (**To be returned after receiving Performance Guarantee).
(ii) 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.**
(iii)Security Deposits	: 2.5%of tendered / accepted value.

SCHEDULE 'F'- General Rules & Directions:

Officer inviting tender:	:	Executive Engineer, CPWD, Vijayawada.
Maximum percentage for quantity of items of work to be executed beyond which rates are to be determined in accordance with Clauses 12.2 & 12.3	:	See below under Clause 12.
Definitions		
2(v) (i) Engineer-in-Charge (For Major Component)	:	Executive Engineer(E), CPWD, Vijayawada or his successor thereof.
(ii) Engineer-in-Charge/ (For Minor Component)		Executive Engineer (C) , CPWD, Vijayawada or his successor thereof.
2(viii) Accepting Authority	:	Chief Engineer, CPWD, Vijayawada or his successor thereof.

2(x)	Percentage on cost of materials and labour to cover all overheads and profits.	:	15% (7.5% for Profits + 7.5% for overheads)
2(xi)	Standard schedule of Rates	:	Delhi Schedule of Rates 2023 for Civil component, DSR 2025 for E&M component and DSR 2025 with up-to-date correction Slips and Market Rates
2(xii)	Department	:	Central Public Works Department.
9(ii)	Standard CPWD contract Form GCC 2023, CPWD-7 as modified & corrected up to	:	GCC 2023 for Construction works & CPWD - 7 as amended/ modified up to the last date of submission of e-tender.

Clause I

(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.	:	7 days.
(ii)	Maximum allowable extension with late fee at 0.1% per day of performance Guarantee amount beyond the period as provided in (i) above	:	3 days.

Clause 2

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

Clause 2A

Whether clause 2A shall be applicable	:	Not Applicable

Clause 5

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

MILESTONE (S) FOR E&M & CIVIL COMPONENTS AS PER TABLE GIVEN BELOW

Milestones for All E&M Works			
S. No	**Description of Milestone (Physical)**	**Time allowed in percentage of days (from the date of start)**	**Amount to be withheld in case of non-achievement of milestone (% of tendered amount of respective E & M Component)**
1	Submission of drawings and obtaining approvals from the department	10 days	0.5%
2	Submission and obtaining approvals of all items from the department	20 days	1.0%
3	Supply of all materials	60 days	1.5%
4	Installation, testing and commissioning of all items	105 days	1.5%
5	submission of as-built drawings, obtaining approvals from local bodies and handing over of all items to the client department	120 days	0.5%

Time Period allowed for execution of Work: - 120 days.

i)	Authority to convey the decision of shifting of milestones and extension of time	:	Executive Engineer(E), CPWD, Vijayawada **o**r his successor thereof.
ii)	Authority to decide rescheduling of milestone and extension of time	:	Executive Engineer(E), CPWD, Vijayawada **o**r his successor thereof.
iii)	Shifting the date of start in case of delay in handing over of site	:	Executive Engineer(E), CPWD, Vijayawada **o**r his successor thereof.

Clause 5.4 Recovery per day for delay in submission of revised programme		**Rs. 10,000/- per each day**
Clause 6: Computerized Measure Book (CMB) / Electronic Measurement Book (EMB) Mode of Measurement:		**EMB**
Clause 7 (for Major Component) 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.	:	**15.00 lakhs.**

Clause 7 (for Minor Component-1) 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.		**3.75 Lakhs** or as per direction of Engineer-in-charge.
Clause 7A Whether clause 7A shall be applicable:	:	Yes.
Clause 7B Whether clause 7B shall be applicable:	:	Yes.
Clause 8A Authority to decide compensation on account if contractor fails to submit completion plans	:	Executive Engineer (E), CPWD, Vijayawada or his Successor thereof
Clause 10A List of testing equipment to be provided by the contractor at site lab.	:	attached
Clause 10 B(ii) Whether clause 10 B(ii) shall be applicable	:	Applicable
Clause 10C (for Major & Minor Component) Component of Labour expressed as percent of value of work.	: :	Material – 85% Labour – 15%
Clause 10CA (for Major & Minor Component) Whether clause 10CA shall be Applicable	:	Not Applicable
Clause 10CC (for Major & Minor Component)	:	Not Applicable
Clause 10CC to be applicable in contracts with stipulated period of completion exceeding the period shown in next column. The base rate of all material shall be taken for the month of the Last date of tender opening. Normal Pozzolana cement base rate shall be considered for all cement. Normal mild steel rate shall be taken as a base rate for all TMT items.	:	12 months
Total Construction Period	:	**120 days**
Clause 11		
For Major Component + Minor Component 2 (Specifications to be followed for execution of work and Horticulture & Landscaping work)	:	CPWD Specifications 2019 Vol. - I & II with up-to-date correction slips. Particular specifications included in this Bid document, Energy Conservation Building Code (ECBC)-

		2017, NBC-2026 and all relevant BIS codes of practice modified and corrected up to the last date of submission of Bids & CPWD specifications 2025 for Horticulture & Landscaping work with correction slips issued up to last date of submission of tender.
For Major Component -1 (Specifications to be followed for execution of E&M works)	:	CPWD General specifications for Electrical Works, Part–I: Internal, 2023, Part-II: External, 2023, Part-III (Lifts & Escalators), 2003 Part-IV: Substation, 2013, Part –V: Wet Riser & Sprinkler System 2020, Part-VI: Fire Detection and Alarm System – 2018, Part -VII: DG Sets 2013, HVAC Works-2024 with correction slips issued up to last date of submission of tender. Energy Conservation Building Code (ECBC)-2017, NBC-2026 and all relevant BIS codes of practice modified and corrected up to the last date of submission of tenders.
Clause 12	:	The Completion of Cost including extra items, deviations and admissible escalation shall, in no case, exceed 1.50 times the contract amount. Contractor has to devise a system to keep a watch on quantum of work taken up vis-à-vis balance items required to complete defined scope of work and will give the alerts to Engineer-In-Charge before taking up extra items, deviations so that completion cost including extra items, deviations and admissible escalation does not exceed 1.50 times the contract value. Work executed beyond above limit will neither be recorded nor be paid.
12.2 C Deviation Limit beyond which clauses 12.2 (c) shall apply for building work.	:	100% (Hundred percent)
(i) Deviation Limit beyond which clauses 12.2 (c) shall apply for foundation work (except items mentioned in earth work subhead in DSR and related items)	:	100% (Hundred percent)
(ii) Deviation Limit for items mentioned in earth work subhead of DSR and related items	:	100% (Hundred percent)
Clause 16	:	

Competent authority for deciding the reduced rates		Chief Engineer, CPWD, Vijayawada or his Successor thereof
Clause 18 List of mandatory machinery, tools & plants to be deployed by the contractor at site	:	Refer Page.no. 171

Clause -19C: - Authority to decide penalty for each default : Executive Engineer (E), CPWD, Vijayawada.

Clause -19D: - Authority to decide penalty for each default : Executive Engineer(E), CPWD, Vijayawada.

Clause -19G: - Authority to decide penalty for each default : Executive Engineer(E), CPWD, Vijayawada.

Clause -19K: - Authority to decide penalty for each default : i. Executive Engineer(E), CPWD, Vijayawada
:ii. Rs.1000/- per tradesman per day

Clause 25

i. Conciliator for settlement of Disputes	Additional Director General, Region Hyderabad, CPWD, Hyderabad or his successor thereof.
ii. Arbitrator Appointment Authority	Chief Engineer, CPWD, Vijayawada or his Successor thereof

Place of Conciliation: Hyderabad

Clause 32: Requirement of Technical Representative(s) and recovery rates

Sl. No.	**Requirement of Technical Staff**		**Minimum experience (Years)**	**Designation of technical staff**	**Rate at which recovery shall be made from the contractor in the event of not fulfilling provision of clause 32**
	Qualification	**Number (Of Major/ Minor Component)**			
1	Graduate Engineer Or Diploma Engineer	**1 of major component**	2 or 5 respectively	Project Manager cum planning/Quality/Site/billing Engineer	Rs.60,000/- per month per person.

Note : 1 Assistant Engineers retired from Government services those are holding Diploma will be treated at par with Graduate Engineers.

Note : 2 - Diploma holders with minimum 10-year relevant experience with a reputed construction co. can be treated at par with Graduate Engineers for the purpose

of such deployment subject to the condition that such diploma holders should not exceed 50% of requirement of degree engineers.

Clause 38

(i) Schedule/statement for determining theoretical quantity of cement & bitumen on the basis of Delhi Schedule of Rates 2023 printed by CPWD with correction slips up to the last date of submission of bids.

(ii) Variations permissible on theoretical quantities.

(a)	Cement for works with estimated cost put to tender more than 25 lakhs	: **2**% plus/minus
(b)	Bitumen for 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

Executive Engineer
CPWD, Vijayawada

Annexure I

On Non – Judicial stamp paper of minimum Rs. 100/-

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

Form for Bank Guarantee for Earnest Money Deposit/Performance Guarantee / Security Deposit / Mobilization Advance.

1. Whereas the Executive Engineer …… (Name of Division) ……, CPWD on behalf of the President of India (hereinafter called "The Government") has invited bids under …… (NIT Number) …… dated ……. for ……. (Name of work …… …… ……. The Government has further agreed to accept irrevocable Bank Guarantee for Rs. ……. (Rupees …… Only) valid up to (date) * ……. As **Earnest Money Deposit** from ……. (Name and Address of Contractor) …… (herein after 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") as entered into an agreement bearing number ……. With …… (name and address of the contractor) ……. (Hereinafter called "the Contractor") for execution of work ……. (Name of work) .....……. The Government has further agreed to accept an irrevocable Bank Guarantee for Rs. ……. (Rupees ……. only) valid up to ……. (date) ……. As **Performance Guarantee / Security Deposit / Mobilization Advance** from the said Contractor for compliance of his obligations in accordance with the terms and conditions of the agreement.

2. We, ……. (Indicate the name of the bank) …… (hereinafter referred to as "the Bank"), hereby undertake to pay to the Government an amount not exceeding Rs. …….. (Rupees ……. Only) on demand by the Government within 10 days of the demand.

3. We,…….. (Indicate the name of the Bank) ……, do here by undertake to pay the amount due and payable under this guarantee

without any demur, merely on a demand from the Government stating that the amount claimed is required to meet the recoveries due or likely to be due from the said amount due from the said Contractor. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this Guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. …………………. (Rupees ……………………………………………. only).

4. We, …………………………….. (Indicate the name of the Bank) ……………………….., further undertake to pay the Government any money so demanded notwithstanding any dispute or dispute 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 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 any manner our obligation here under to vary any of the terms and conditions of the said agreement or to extend time of performance by the said Contractor from time to time or to postpone for any time or from time to time any of the powers exercisable by the Government against the said contractor and to forbear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such variation or extension being granted to the said Contractor or for any forbearance, act of omission on the part of the Government or any indulgence by the Government to the said Contractor or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

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

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

8. We, ……………………………………. (Indicate the name of the Bank) ……………………., undertake not to revoke this guarantee except with the consent of the Government in writing.

9. This Bank Guarantee shall be valid up to ………………………………. Unless extended on demand by the Government. Notwithstanding anything mentioned above, our liability against this guarantee is restricted to Rs. ………………………………….. (Rupees ……………………………………………………….………………. only) and unless a claim in writing is lodged with us within the date of expiry or extended date of expiry of this guarantee, all our liabilities under this guarantee shall stand discharged.

Date ……………………….

Witness:

1. Signature ……………………………….. Name and address

Authorized signatory
Name
Designation
Staff Code no.

2. Signature ……………………………….. Name and Address

Bank Seal

Note:

1. *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.

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

PART – B

Name of Work: Supply, Installation, Testing & Commissioning of 20 KLD Effluent Treatment Plant & Sewage Treatment Plant combo unit, cold room and other related items at National Centre for Disease Control, Mangalagiri, Andhra Pradesh.

SPECIAL CONDITIONS FOR ALL SPECIALIZED/E & M COMPONENTS

1. The applicant should either himself meet the eligibility conditions for the respective E&M components or otherwise he will have to associate with agencies, fulfilling the eligibility requirements and hence consent letter from at least **One** eligible Associate Agency of the respective components of E&M work shall also be submitted as per attached **Proforma asper Form "H".**

   In case the main contractor is himself eligible (as per eligibility criteria) for executing any specific minor component and intends doing the job himself, he may not be required to associate with another agency for that minor component of work. In such cases the main contractor also has to submit the documents as per eligibility criteria mentioned for associated agency of individual E&M component.

   However, the Composite category contractor shall also be eligible to carry out himself any or all of these works without associating any specialized agency provided:
   (a) He fulfills the prescribed eligibility criteria respectively for these work(s)
   Or
   (b) He directly procures the equipment of approved make from manufacturer and gets it installed from authorized agency/service provider of the manufacturer/specialized agency, all as per the eligibility criteria mentioned in NIT.

2. The main tenderer has to submit the following documents for association of contractor within 15 days of award of work.

(i) In support of the eligibility conditions of the proposed Associated Contractor, copy of their registration documents, Electrical License, GST Documents duly attested by the applicants (Main Contractor) shall be submitted to the EE(E), CPWD, Vijayawada who will submit these documents to the **Executive Engineer(C), CPWD, Vijayawada**, for deciding the eligibility. Each such Associated Contractor will certify that they are not debarred as on the day of application for sale of tender. Proposal for associating agency for minor components of work shall be submitted in Form- "G" of this tender document from each associate independently for all electrical and mechanical components.

(ii) The main contractor will submit an Affidavit of MOU signed with eligible associated. The Affidavit of MOU in the enclosed Form 'I' shall be signed by both the parties' main contractor i.e.as 1st party and associated contractor as 2nd party. Independently for all electrical and mechanical components.

3. In the event of the concerned E&M agency not performing satisfactorily or failure of associate contractor to complete the E&M work, the main contractor on written directions of the department, shall remove the Associate contractor deployed on the work and shall submit name of new associate who fulfil the conditions mentioned in NIT to execute the left-over work without any loss of time or variation in cost to the department. **Such associates shall also give an undertaking along with the main tenderer but both of**

them together will stand guarantee for the equipment already supplied for which payment has been released by the department in part. If any equipment supplied for the work, during the currency of the earlier Associate contractor and paid partly by the Dept., becomes redundant /not in a position to be installed and commissioned and put to beneficial use due to change in agency for execution of E&M work, the main contractor shall be liable for replacement of the equipment(s) at no cost to Department. No change of Associated Contractor will be allowed without prior approval of the Engineer-in-charge of the work.

In respect of all works **"Supply, Installation, Testing & Commissioning of 20 KLD Effluent Treatment Plant & Sewage Treatment Plant combo unit, cold room and other related items at National Centre for Disease Control, Mangalagiri, Andhra Pradesh.**" the materials shall be procured only from the original equipment manufacturers/authorized dealers of OEM. The contractor shall submit all documentary details in fulfillment of this conditions regarding procurement of materials including relevant test certificates.

4. Executive Engineer (C) shall be the Engineer-in-charge as far as civil works are concerned. Separate tender schedule abbreviated CPWD-7 and Special Conditions for civil Work are appended with this tender. It will be obligatory on the part of the contractor/tenderer to sign the tender documents for all the component parts.

5. The main contractor shall be responsible and liable for proper and complete execution of the civil work and ensure coordination and completion of both E & M and civil work.

6. The main contractor has to enter into agreement with contractor associated by him for execution of minor component. Copy of such agreement shall be submitted to Executive Engineer (C) in charge of minor component as well as EE(E) in charge of major component. If, the main agency does not satisfy the eligibility criteria.

7. The associate contractor shall attend the inspection of the work as per the directions of Engineer-in-Charge of civil works as and when required.
8. In case of LED fittings, all LED bulbs and BLDC fans shall be guaranteed for a period of 5 years. Before completion of the defect liability period of one year, the main contractor shall submit a security deposit of 5% of the quoted cost for SITC of LED fittings for the remaining 4-year warranty period, in an acceptable form such as FDR/Bank Guarantee, in favour of the concerned Executive Engineer, CPWD, Vijayawada. The Security Deposit deducted from the contractor's bills shall be released only after submission of the above security deposit for LED fittings, failing which 5% of the LED work value shall be retained from the overall Security Deposit, and only the balance amount shall be refunded after completion of the defect liability period. The LED Security Deposit shall be released on a pro-rata basis every year.

Executive Engineer (E)(Vijayawada)

FORM –G

PROPOSAL FOR ELIGIBLE ASSOCIATING AGENCIES FOR MINOR COMPONENTS OF WORK

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

Sl. No	Name of Associated Contractor	Category and Class of registration	Enlistment copy/completion Certificates attached	Monetary Limit of work	Validity of registration	Consent letter attached (Yes/No)
B1 : IEI & Fans, Street lighting						
B2: Access control system						
B3: HVAC system						
B-4: Sewage Treatment Plant						

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

Signature of contractor

FORM –H

CONSENT LETTER FROM ELIGIBLE ASSOCIATE AGENCY OF MINOR COMPONENT OF WORK

Name of work: Supply, Installation, Testing & Commissioning of 20 KLD Effluent Treatment Plant & Sewage Treatment Plant combo unit, cold room and other related items at National Centre for Disease Control, Mangalagiri, Andhra Pradesh. etc.

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

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

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

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

Date:

Signature with date of Major component	Signature with date of Associate/ Minor Component
Contractor	Contractor
Address	Address
Witness with address (From major component contractor side)	Witness with address (From minor component contractor side)

FORM- "I"

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 Up to:
   (Henceforth called the main Contractor)

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

For the execution of E & M Work

Name of work: Supply, Installation, Testing & Commissioning of 20 KLD Effluent Treatment Plant & Sewage Treatment Plant combo unit, cold room and other related items at National Centre for Disease Control, Mangalagiri, Andhra Pradesh.

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, CPWD, Vijayawada. 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.
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:
Place:

SIGNATUREOF ASSOCIATED CONTRACTOR

Date
Place:

1. Witness with address

(From major component contractor side)

2. Witness with address

(From minor component contractor side)

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

C-1 :GENERAL & COMMERCIAL TERMS AND CONDITIONS APPLICABLE FOR ALL E&M COMPONENTS

1 GENERAL

1.1 The work shall be generally carried out in accordance with tender/bid specifications and the following specifications / rules with up-to-date amendments.

- **a)** CPWD General Specifications for Electrical work Part I Internal – 2023, as amended up to date
- **b)** CPWD General Specifications for Electrical work Part II External– 2023, as amended up to date
- **c)** CPWD General Specifications for Electrical work Part V (Wet Riser & Sprinkler System) - 2020 as amended up to date.
- **d)** CPWD General Specifications Part-VI: Fire Alarm System– 2018 as amended up to date.
- **e)** CPWD General Specifications for Electrical Works Part-IV (Substation) – 2013 as amended up to date.
- **f)** CPWD General Specifications for HVAC-2024 as amended up to date.
- **g)** Commercial and Additional conditions for this work.
- **h)** The Indian Electricity Act, 2003, as amended up to date.
- **i)** Indian Electricity Rules 1956 amended up to date.

1.2 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)** Description of Schedule of quantities.
- **b)** Commercial and Additional conditions for this work.
- **c)** Drawings.
- **d)** CPWD General Specifications of that particular work.
- **e)** Relevant IS or any other international code in case IS code is not available.

Commercial and Additional conditions of that particular work are to be read in conjunction with above and in case of variations, specifications given in these additional conditions shall apply. However, nothing extra shall be paid on account of these additional specifications and conditions, as the same are to be read along with schedule of quantities for the work.

1.3 This specification covers manufacture, testing as may be necessary before dispatch, delivery at site, all preparatory work, assembly and installation, commissioning putting into operation of equipment of all E&M components of the tender.

1.4 The tenderer should in his own interest visit the site and get familiarize with the site conditions before tendering.

1.5 No T&P shall be issued by the Department and nothing extra shall be paid on account of this.

2 COMMERCIAL CONDITIONS

Type of Contract: The work to be awarded by this tender shall be treated as indivisible works contract.

Income tax, GST, labour cess & other statutory deductions etc. shall be made at source as per the prevalent laws. The deductions of Security Deposit, Income-Tax etc. shall be done as applicable on the gross payments and net payment shall be paid accordingly.

3 RATES

The quoted rates shall be inclusive of all taxes, GST (including Works Contract Tax, if applicable), duties, levies, and all charges incidental to the work such as packing, forwarding, insurance, freight, and delivery at site for materials to be supplied by the contractor, as well as watch and ward of all materials (including those, if any, supplied by the Department) at the worksite, general liabilities/obligations and clearance from CEA. However, the fee for the CEA inspections shall be reimbursed/ borne by the department. EPF & ESI contributions are to be made by the contractor. The department will not issue Octroy exemption certificate.

4 DEFECT LAIBILITY PERIOD

4.1 The contractor has to carry out maintenance as per CPWD General Specifications / manufacturer's standards for a period of **one year** or as decided by the Engineer –in – Charge from the date of handing over. Nothing extra shall be paid on this account.

4.2 For Specialized E&M works if Engineer-in-charge desires, the tenderer should submit the following documents from OEM for that particular component

a) Authorization certificate.
b) The OEM is unconditionally support the lowest tenderer technically throughout the execution of contract as well as for Maintenance/Comprehensive Maintenance Contract for the useful life of the system, and
c) OEM is providing all the spares required for healthy functioning of the equipment for at least seven years from the date of supply of equipment.

4.3 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, the lowest rate quoted for that item elsewhere shall be considered for other items also during evaluation of tender.

5 COMPLETENESS OF TENDER

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.

6 STORAGE AND CUSTODY OF MATERIALS

The agency has to make his own arrangements. No storage accommodation shall be provided by the department. Watch and ward of the stores and their safe custody shall be

the responsibility of the contractor till the final taking over of the installation by the department/client.

7 CARE OF THE BUILDING:

Care shall be taken by the contractor while handling and installing the various equipment 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.

8 COMPLETION PERIOD

The completion period indicated in the tender documents is for the entire work of planning, designing, approval of drawings etc., arrangement of materials &equipment, delivery at site including transportation, installation, testing, commissioning and handing over of the entire system to the satisfaction of the Engineer-in-charge.

9 GUARANTEE

9.1 All equipment shall be guaranteed for a period of **one year** from the date of taking over of the installation by the Department against any defect in design, workmanship, materials, and unsatisfactory performance. However, LED fittings and BLDC fans shall carry a minimum guarantee of 5 years, and exhaust fans, pumps, and motors shall be guaranteed for a period of 2 years from the date of taking over. Any equipment, components, or part thereof found defective during the guarantee period shall be repaired or replaced free of cost by the contractor to the satisfaction of the Engineer-in-Charge. In case of undue delay by the contractor in attending to such defects, the same shall be rectified by the Department at the risk and cost of the contractor. The decision of the Engineer-in-Charge in this regard shall be final and binding on the contractor

9.2 The tender shall guarantee among other things, the following:

a. Quality, strength and performance of the materials used as per manufacturers standards.
b. Safe mechanical and electrical stress on all parts under all specified conditions of operation. Satisfactory operation during the maintenance period.

10 POWER SUPPLY:

The contractor has to make its own arrangement for power supply required for execution of the work.

11 WATER SUPPLY:

The contractor has to make its own arrangement for water supply required for execution of the work.

12 ACCEPTABLE MAKES OF VARIOUS EQUIPMENT:

The acceptable makes of various equipment/components/accessories have been indicated in "Acceptable Makes" appended with the tender documents. The tenderer shall work out the cost of the offer on this basis. Alternate makes are not acceptable.

13 DATA MANUAL AND DRAWINGS TO BE FURNISHED BY THE TENDERER:

After award of work

The successful tenderer would be required to submit the following drawings after award of work for approval as per mile stones of tender.

a) General arrangement drawing, including detailed shop drawings of all E&M components, conduit size and route layout, Panel Drawing, Light Fitting Distribution Drawing, Fire Alarm and Fire Fighting Layout, HVAC/VRF AC Distribution Layout and other drawings of all E&M components to be submitted by the agency well in advance to get the approval from the JE(E)/AE(E)/EE (E) and care shall be taken not to avoid any delay in the slab casting for all individual E&M component.
b) Details of foundations for the equipment and the weights of assembled equipment.
c) Any other drawings necessary for the job.
d) Reflected Ceiling Plan (RCP) for all floors by incorporating all equipment likely to come in ceiling/false ceiling shall be submitted for approval before casting of slabs by considering all E&M components.

14. The successful tenderer should furnish well in advance of start of work, three copies of detailed instructions and manufacturer's manuals of all equipment regarding installation, operation and maintenance, preventive maintenance & trouble shooting with all the relevant data sheets, spare parts catalogue, etc.

15. EXTENT OF WORK

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

15.2 The cables and all other items shall be brought to site only after taking correct measurements as per actual requirement of work. Excess quantities shall not be accepted and paid. i.e., Quantity of item brought to site and used in work as per actual requirement shall only be measured and paid irrespective of quantities of BOQ / work schedule. **The item brought at site and paid, if not used in the project have to be taken back by the contractor and deductions in the payment shall be adjusted in subsequent bills.** The decision of the Engineer-in-charge in this regard shall be final & binding on the contractor.

15.3 In addition to supply, installation, testing and commissioning, of all E&M equipment, following works shall be deemed to be included within the scope of work to be executed by the tenderer.

a) Minor building works necessary for installation of equipment, foundation, making of opening in walls or in floors and restoring them to their original condition finish and

necessary grouting etc. as required.

b) All necessary supports may be arranged.

c) Testing of PTs/CTs for metering & protection purpose & relay calibration & setting.

d) Getting inspection done & obtaining approval from Central Electrical Authority and local fire authority for energizing the installation. However, necessary fees for inspection shall be borne by the Department.

16 Exclusion and work to be done by other agencies:

The following shall be excluded from the scope of the work:

a) Major dismantling of any existing building work.

INSPECTION AND TESTING

1. All major equipment like LT panels/HVAC Equipment/Lifts etc (as per the guidelines of **Quality Assurance Policy & Check List of E & M Services/specifications)** shall be offered for initial inspection contractor will intimate the date of testing of equipment at the manufacturer's works before dispatch. The successful tenderer shall give advance notice of minimum two weeks regarding the dates proposed for such tests to the department's representative to facilitate his presence during testing.

   The Engineer-in-charge or his representative may witness such testing. The cost of the Engineer's visit to the factory will be borne by the Department. Equipment will be inspected at the manufacturer/ Authorized Dealers premises, before dispatch to the site by the contractor if so desired by the Engineer-in-charge. Engineer-in-charge at his discretion may waive off inspection at factory /at the manufacturer's works before dispatch.

2. Copies of all documents of routine and type test certificates of the equipment, carried out at the Manufacture's premises shall be furnished to the Engineer-in-charge. The decision of the Engineer-in-charge in this regard shall be final & binding on the contractor.

3. After completion of the work in all respects the contractor shall offer the installation for testing and operation. The contractor should submit all the related documents of completed E&M equipment to the department for further handing over to client department.

COMPLIANCE WITH REGULATIONS AND INDIAN STANDARDS

18.1 All works shall be carried out in accordance with relevant regulation, both statutory and those specified by the Indian Standards related to the works covered by this specification.

In particular, the equipment and installation will comply with the following:

i) Factories Act.

ii) Indian Electricity Rules.

iii) B.I.S. & other standards as applicable.

iv) Workmen's compensation Act.

v) Statutory norms prescribed by local bodies like CEA, Power Supply Co., Fire authorities, etc.

18.2 After completion of the installation, the same shall be offered for inspection by the representatives of the Central Electricity Authority if required and local fire authority. The contractor will extend all help including test facilities to the representatives of CEA/Local fire authority. The observations of CEA/Local fire authority will be attended to by the contractor. The installation will be commissioned only after getting clearance from CEA/Local fire authority. Contractor should get inspection done & obtain approval from Central electrical Authority and local fire authority.

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

INDEMNITY:

The successful tenderer shall at all times indemnify the department. Consequent on this works contract, the successful tenderer shall be liable, in accordance with the Indian Law and Regulations for any accident occurring due to any cause and the contractor shall be responsible for any accident or damage incurred or claims arising there during the period of erection, construction and putting into operation the equipment and ancillary equipment under the supervision of the successful tenderer to the extent the latter is responsible. The successful tenderer shall also provide all insurance including third party insurance as may be necessary to cover the risk. No extra payment would be made to the successful tenderer on account of the above.

ERECTION TOOLS:

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

COOPERATION WITH OTHER AGENCIES:

The successful tenderer shall co-ordinate with other contractors and agencies engaged in the construction of buildings, if any, and exchange freely all technical information so as to make the execution of this work/contract smooth. No remuneration should be claimed from the department for such technical cooperation. If any unreasonable hindrance is caused to other agencies and any completed portion of the work has to be dismantled and re-done for want of cooperation and coordination by the 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 tenderer himself.

The work will be carried out with least disturbance during shifting & shut down taken in consultation with the client department.

INSURANCE AND STORAGE:

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

VERIFICATION OF CORRECTNESS OF EQUIPMENT AT DESTINATION:

The contractor shall have to produce all the relevant records to certify that the genuine equipment from the manufacturers has been supplied and erected to the satisfaction of the Engineer-in-charge.

PAINTING:

This shall include cost of painting of the entire installation. The major equipment like HT panel, transformers, L T panel, bus duct, cable trays, HVAC equipment, etc. shall be factory final finish painted. The agency shall be required to do only touching to the damages caused to the painting during transportation, handling & installation at site, if there is no major damage to the painting. However, hangers, supports etc. of bus trunking& cable tray etc. shall be painted with required shade including painting with two coats of anticorrosive primer paint at site.

TRAINING:

The scope of works includes the on job technical training of two persons of Department at site as decided by Engineer – in - charge. Nothing extra shall be payable on this account.

Approval of drawings, makes and models of equipment/materials for all E&M components:

26.1 The agency shall submit drawings and details such as makes and models of the equipment/materials offered by him along with specifications for all E&M components to the Engineer-in-charge of the work, before ordering the equipment/materials for approval of the department.

26.2 The Engineer-in-charge shall scrutinize the proposal and approve the makes and models which are acceptable as per the schedule, specifications, conditions of the agreement and inform the agency for procurement.

26.3 After approval of the equipment/materials by the department the agency shall procure the equipment/materials from the OEM/authorized distributor/dealer as the case may be.

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

i. Material will be ordered & delivered at site only with the prior approval of the department to ensure timely delivery.

ii. As and when the order is placed for the fittings/ fixtures, cables, switchgears, poles, other main items etc, its copy shall be endorsed to the Engineer-in-charge of work.

iii. The contractor will submit makes & brands of electrical fittings wires & cables, conduits and switchgears, rising mains, poles, outdoor fittings etc. of preferred make list as per tender documents for approval of Engineer-In-Charge, whose decision will be final in the matter.

iv. The firm will be required to procure material directly from the manufacturer/ authorized dealers to ensure genuineness & quality and as per the approved makes only. Proof in this regard shall be submitted by the contractor if required by the department.

v. Inspection at factory or at godown, as required, shall be arranged by the firm for a mutually agreed date.

vi. Delivery of material shall be taken up only with the consent of department, after clearance of the material.

vii. Department shall reserve the right to waive off inspection in lieu of suitable test certificate, at its discretion.

viii. All the materials to be supplied by the contractor shall be procured & brought to site as per requirement at site of work in consultation with department so that these materials are not damaged & their manufacturer's warrantee.

Safety Codes & Statutory Regulations:

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

b. Successful tenderer shall arrange for compliance with statutory provisions of safety regulations and departmental requirements of safety codes in respect of labour employed on the work by the tenderer. Failure to provide such safety requirement would make the tenderer liable for penalty of Rs.1000/- for each default. In addition, the department will be at liberty to make arrangement for the safety requirements at the cost of tenderer and recover the cost thereof from him.

Executive Engineer (E)(Vijayawada)

C-1: ADDITIONAL, COMMERCIAL & TECHNICAL CONDITIONS FOR IEI

1. General:

The work shall be generally carried out in accordance with schedule of quantities and the following specifications and conditions.

a) CPWD General Specifications for Electrical work Part I Internal – 2023, as amended up to date.
b) CPWD General Specifications for Electrical work Part II External – 2023, as amended up to date.
c) Commercial and Additional conditions for this work.
d) The Indian Electricity Act, 2003 as amended up to date.
e) Indian Electricity Rules 1956 amended up to date.

2. Guarantee & Defect Liability Period:

As per Sl.no.4 & 9 of General & Commercial Terms and Conditions Applicable for All E&M Components

Data and Programme to be furnished by the tenderers:

General arrangement drawing (including detailed shop drawings) of all conduit route layout for all related E&M components to be submitted by the agency well in advance to get the approval from the competent authority and care shall be taken not to avoid any delay in the slab casting for all individual E&M component.

The Contractor shall prepare the programme chart for the execution of the work showing clearly all activities from the start of work to the completion required for the completion of the work within the stipulated period and submit the same to the Engineer-in-Charge within fifteen days after the issue of letter for commencement of the work. The Contractor shall also submit monthly programme and progress reports and update / re-schedule the same every month. These shall be submitted by the contractor in soft copy also besides forwarding hard copy of the same.

(i) **Extent of work:**

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.

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.

(ii) **Verification of correctness of material at Destination:**

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

3 The main contractor shall also enter into an Affidavit of 'Memorandum of understanding' with the approved associated contractor on Non-Judicial Stamp Paper as per the enclosed proforma and submit this 'MOU' duly completed (duly signed by him and the associated Contractor) before commencement of work.

4. Executive Engineer (E) shall be the Engineer-in-Charge as far as E & M works are concerned. Separate tender form for E & M component is appended with this tender. It will be obligatory on part of the main contractor to sign the tender documents for all the components.

5. The main agency shall be responsible for all acts of omissions and submissions of the Associated Contractor engaged by him, even with approval of department.

6. Approval of the Engineer-in-charge shall be taken well in advance for all the materials to be supplied and used in all the works by the contractor.

7. The contractor has to make his own arrangements for stores and watch and ward and no extra claim for this will be entertained.

8. Running payment for Electrical/Mechanical components shall be made by the EE (E) 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.

9. **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 not exceeding the percentage indicated against the stages of work.

A) Items connected with point wiring, circuit wiring, sub-main wiring, power point wiring and light plug wiring.

S.No	Stage of work	Percentage of Rate
A	On laying of conduits with accessories, switch boxes, etc.	30%
B	On drawing of wires i/c terminations, switches, sockets, cover plates etc.	50%
C	On completion of item and after testing and commissioning.	15%
D	At the time of payment of final bill	5%

B) Supply DB's, MCB's, MCCB's, RCCB's, Isolators, Loose wire boxes, call bell, Occupancy sensors, Race-ways, LT panels, LED fittings, BLDC fans, LED Street lights, UG cables, DWC Pipes, Rising mains, Tap off boxes, End feed Unit, cables, Earthing Materials, Pumps, water coolers, signages, Lighting Conductor, Exhaust Fans, Metering Panels, Street Light Poles and Pole Foundations etc. in coordination with civil work.

S.No.	Stage of work	Percentage of Rate
a	On initial inspection of material and delivery at site in good condition on pro-rata basis.	70%
b	On completion of installation on pro-rata basis.	15%
c	On completion of testing and commissioning.	10%
d	At the time of payment of final bill.	5%

For other items, the part rates will be decided by the Engineer-In-Charge of the work and shall be binding on the contractor.

10. The main contractor shall be responsible for coordinating the activities of all works and will ensure progress of works as per laid down programme.

11. The main contractor and / or his Associated 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.

12. The contractor shall make his own arrangement at his own cost for electrical / General Tools and plants required for the work.

13. The connections, inter-connections, earthing and loop earthing shall be done by the contractor wherever required to be done for energization of the installation and nothing extra shall be paid on this account.

14. The contractor must be able to work on concrete slabs / walls as and when required and in complete coordination 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.

15. The contractor shall remove all the debris due to the E & M works from the site as soon as the work is completed.

16. The wiring and conduit route shall be marked by the contractor in the drawing first, and shall be got approved from the Engineer-in-charge.

17. The rupturing capacity of the MCBs shall be 10 KA minimum. The MCBs shall have ISI mark. Quantities of MCBs of different rating of 6 amps to 32 amps shall be brought in consultation with the Engineer-in-Charge or his representative.

18. All the MCCBs shall be rated for Ics only, as specified.

19. The copper wire to be used on this work shall be FRLS type and ISI marked.

20. a. The make of switch boxes shall be the same as that of switches. Only the required knockouts of the switch boxes are to be removed for terminating the conduit pipes with PVC glands / check nuts.

    b. Make of MCB/MCCB shall be the same as the make of MCB DB.

    c. All the switch boxes, MCBDBs are to be covered with plastic sheet / petroleum gelly when installed in brick work till the plastering / painting is done to avoid sticking of cement plaster/ splashes of the paint. Cement plaster / paint are to be cleaned immediately after plaster to avoid rusting of switch boxes and MCB DBs. The plastic sheet is to be removed at the time of handing over.

    d. If two module sockets are used, one blanking plate is to be fixed by the side of socket to avoid interference of larger size plug. Nothing will be paid extra for blanking plate.

21. The E & M works shall be carried out by the contractor, along with the progress of the civil works.

22. The Contractor shall furnish documentary proof like delivery challans of purchasing Wires, Modular switches & accessories, MCBs, MCBDB, Fittings, accessories and other items from the manufacturers or their authorized dealers to the satisfaction of the Engineer-in-charge.

23. All PVC conduits accessories shall be of the same make as conduits. The Conduits shall be terminated at switch boxes/metallic junction boxes with suitable PVC glands/check nuts. Black color PVC conduits shall not be used.

24. 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.

25. All the sub main and circuit wiring includes loose wire for connections inside switch boxes and MCBDBs. 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.

All the circuits / sub-main wiring are to be suitably numbered with stickers / marker pen at LT panel, MCBDBs, switch boards (on backside of cover plate) for ease of maintenance. Nothing shall be paid extra on this account.

26. The contractor shall submit the completion plan separately in triplicate on as per Clause-8 of the contract within 15 days of the completion of work. In case, the contractor fails to submit the plans aforesaid, he shall be liable to pay a sum equivalent to 2.5% of the value of the work subject to a ceiling of Rs. 15,000/- (Rupees Fifteen Thousand Only) or limit prescribed in Schedule-F, 'whichever is more' as may be fixed by the Engineer-in-charge concerned and in this respect the decision of the Accepting Authority is final & binding on the contractor.

27. 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 IEI works, fish wire shall be invariably drawn.

28. The connection between incoming switch / isolator and bus bar shall be made with suitable size of thimble and cable at no extra cost.

29. Copper conductor of insulated cables of size 1.5 Sq.mm and above shall be stranded and
terminals provided with crimped lugs.

30. All MS junction box cover should be of phenolic laminated / good quality plastic sheet of thickness not less than 3mm and for which nothing extra shall be paid on the account.

31. All sub-main wiring shall be terminated in the main board with suitable copper lugs and thimbles for which nothing extra will be paid on this account.

32. The rising main shall comprise of sheet metal enclosure, bus bars, tap-off points, tap-off boxes, end feed units, fire barriers, expansion joints, thrust pads, end covers and fixing brackets etc.

33. The rising main shall conform to IS/IEC 61439-1 2011 and IS/ IS/IEC 61439: Part 6: 2012 and shall be suitable for 415 V, 3 phase, 50 Hz supply and insulation of rising mains shall be capable of withstanding the voltage of 660-volt AC. Degree of IP protection and short circuit rating shall be specified.

34. Tap-off arrangements shall be provided on the rising mains with tap-off boxes.

35. 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.

36. All hardware items such as nuts/ bolts/ screws/ washers etc. to be used in work shall be zinc/ cadmium plated iron.

37. 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.

38. While laying conduit, suitable size junction boxes shall be provided for pulling the wire as per the decision of the E-in-C.

39. The make of the materials has 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 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.

40. Where switches/ sockets/ regulator/ telephone/ TV / internet outlets including metal boxes are to be provided, the same shall be of only one make.

41. 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 required, for which no extra payment shall be made.

42. Wherever light fittings are proposed to be provided on the false ceiling, the respective light / fan point wiring will have to be brought upto the terminal of the light fittings / fans by the contractor. Flexible metal conduits shall be used for drawing wires from PVC conduits on ceiling to fittings on false ceiling and nothing extra shall be paid to the contractor for the same. The height from false ceiling to ceiling is about 1.2 meters or as per site conditions. The switch boards are to be fixed at heights in all locations in accordance with CPWD specifications / as per the directions given by Engineer-in-charge.

43. After installation, all accessible surfaces of metallic accessories shall be painted.

44. For circuit/sub-main/point wiring of copper conductor cables shall be terminated on the ends with lugs/thimbles.

LED Luminaire Specifications

S.No	Criteria	Specification
1	Luminaire configuration/ technical requirement	As per the description mentioned in BOQ
2	Housing/ body of fitting	CRCA/ Pressure Die cast Aluminium/ Polycarbonate as specified in Schedule of work
3	Cover/ Diffuser	Poly carbonate/ Acrylic UV protected/ PMMA for indoor and Toughened glass / PMMA for outdoor.
4	Finish	Aesthetically designed housing with corrosion resistant powder coating.
5	Protection (minimum)	IP 20 for indoor & IP 65/IP 66 for outdoor
6	Operating Voltage	150V to 270V universal electronic driver with internal surge protection.
7	Frequency	50 Hz
8	Fixture Ambient	+ 40 deg. Centigrade
9	Operating temperature	Range 0 to +55 deg. Centigrade
10	Power factor	>0.9
11	Optical assembly	Array of medium power LEDs/ COB

S.No	Criteria	Specification
		for Indoor Array of medium power LEDs for Outdoor
12	Luminous flux	As per BOQ
13	Efficacy of luminaire (including power loss)	As per the description mentioned in BOQ
14	Efficacy of LED	As per the description mentioned in BOQ
15	Co-related colour temperature	5700 deg. Kelvin to 6500 deg. Kelvin
16	C.R.I.	Not less than 80
17	Heat dissipation/ Heat sink	Well-designed thermal management system with aluminium heat sink.
18	LED drive current	Not more than 750 mA
19	Driver efficiency	> 85%
20	Make of LED	As per the manufactures standard
21	Certificates to be submitted	LM 79 and LM 80

TECHNICAL SPECIFICATIONS OF MV / LT PANELS

40 **Scope**

This Section covers the detailed requirements of medium voltage switch Panel for 433V, 3 phase 50 Hz 4 wire system. All switchgears shall be fully rated at an ambient of 40° C.

41 **Type of Panel**

The medium voltage switch board panel shall comprise of anyone of the following types of switchgears or combination thereof as specified.

a) Air Circuit breakers shall be draw out type.

b) MCCBs of suitable Ics ratings. MCCBs shall invariably be Current Limiting type. Features like Double Break, Positive Isolation functions shall be preferred.

The Panel shall be indoor /outdoor type having incoming sectionalization and outgoing switchgears as specified. The design shall be cubical type. The degree of enclosure protection shall be **IP** 42 for indoor and IP 54 for outdoor panels as per IS: 13947 (Part-I).

42 **M. V. Panel**

42.1 **General Construction**

The switchboard shall be floor mounted free standing totally enclosed and extensible type. The switch board shall be dust & vermin proof and shall be suitable for the climate conditions as specified. The design shall include all provisions for safety of operation and maintenance personnel. The general construction shall conform to IS: 8623/1993 for factory assembled switch board.

42.2 **Cubicle Type Panels**

42.2.1 Cubicle type panels shall be fabricated out of sheet steel not less than 2.0 mm thick. Wherever necessary, such sheet steel members shall be stiffened by angle iron frame work. General construction shall employ the principle of compartmentalization and segregation for each circuit. Unless otherwise approved, incomer and bus section panels or sections shall be separate and

independent and shall not be mixed with sections required for feeders. Each section of the rear accessible type panel shall have hinged access doors at the rear. Overall height of the panel shall not exceed 2.4 meters. Operating levers, handle etc. of highest unit shall not be higher than 1.7 meters.

Multi-tier mounting of feeder is permissible. The general arrangement for multi-tier construction shall be such that the horizontal tiers formed present a pleasing and aesthetic look. The general arrangement shall be approved before fabrication. Cable entries for various feeders shall be either from top or bottom. Through cable alleys located in between two circuit sections, either in the rear or in the front of the panel. All cable terminations shall be through gland plates. There shall be separate gland plate for each cable entry so that there will not be dislocation of already wired circuits when new feeders are added. Cable entry plates shall therefore be sectionalized. The construction shall include necessary cable supports for clamping the cable in the cable alley or rear cable chamber.

Cubicle panels with more than 1000 Amps BUS shall be made of tested structural modular sections.

44.2.2 **Bus Bar and Connections**

The bus bars shall be of copper of high conductivity electrolytic quality and of adequate section. Current density Aluminium shall not exceed 130 amps for Aluminium/sq. cm. The bus bar system may comprise of a system of main horizontal bus bars and ancillary vertical bus bars run in bus bar alleys on either side of which the circuit could be arranged with front access cable entries. In the case of rear access, horizontal bus system shall run suitably either at the top or bottom. All connections to individual circuits from the bus bar shall preferably be solid connections; however flexible connections shall also be permitted as per recommendations of the Panel Manufacturer. All bus bars and connections shall be suitably sleeved / insulated in approved manner.

Busbar should be 100% Neutral

44.2.3 Incomer / Termination

Incomer termination shall be suitable for receiving bus trucking / underground cables. Cable terminations shall invariably be through terminal blocks (Polyamide or superior) or brought out solid terminals.

44.2.4 Instruments

All voltmeters, ammeters and Multi-function meters shall be flush mounted as specified in schedule of work, conforming to class 1.5 of IS:1248 for accuracy. All meters shall be protected with MCB

44.2.5 Indicating Lamps

On all the incomers of M.V panels, ON/OFF indicating LED lamps shall be provided and shall be suitable for operation on AC supply.

44.2.6 Small Wiring

All small wiring for Controls, Indication etc. shall be of with suitable HFFR (halogen free fire retardant) copper conductor cables. Wiring shall be suitably protected within switch board. Runs of wires shall be neatly bunched, suitably supported and clamped. Means shall be provided for easy identifications of the wires. Where wires are drawn through steel conduits, the works shall conform to CPWD General Specifications for Electrical works (Part 1- Internal) - 2005 and IS:

732 as the case may be. Identification ferrules shall be used at both ends of the wires. All control wiring meant for external connections are to be brought out of terminal board.

The equipment shall be designed to confirm to the below requirements for LT Panels.

Sl.No	Name of equipment	IS Code
1.	Air circuit breakers/MCCB	IS: 60947 (Part-II) & IEC 60947(2)
2.	Fuse switch and switch fuse units	IS: 13947 (Part-3) & IEC 947(3)
3.	HRC fuse links	IS: 13703
4.	Current Transformers	IS: 2705
5.	Voltage Transformers	IS: 3156
6.	Indicating instruments	IS: 1248
7.	Integrating instrument	IS: 722
8.	Control switches and push buttons	IS: 6875
9.	Auxiliary contactors	IS: 13947 (Part4/Sec-I) & IEC 947(4/1)
10	Relays	IS: 3231

OPERATIONAL REQUIREMENTS

The indoor/outdoor type MV panel shall conform to the following:

a) The panel shall comprise of incomers, outgoing feeders and bus coupler as specified. The incomer shall be either a double break / contact repulsion MCCB or an Air Circuit Breaker. The bus coupler shall be either a circuit breaker or a double break / contact repulsion MCCB as specified. The outgoing feeders shall be circuit breakers/MCCBs as specified.

b) Bus bars for phase and neutral shall have a rating as per specifications.

c) The entire switch panel shall be cubical type generally conforming to IS: 86231-1993 for factory assembled switch board.

d) The incomer panel shall be suitable for receiving bus trucking or MV cable of size specified either from top or from bottom.

e) All incoming AIRCIRCUIT BREAKER/MCCB shall have suitable adjustable tripping current and the time delay settings.

f) The entire panel shall have a common earth bar of size as specified with two terminals for earth connections.

A suitable size of brick / cement concrete plinth shall be provided for out door panels at site as specified and to suit easy access and operational convenience.

45 Rating and Requirements

45.1 Air Circuit Breaker

All Air Circuit Breakers shall be 3/4 pole with minimum 50 KA breaking capacity (35 MV A at 433V) conforming to IS/IEC 60947-2 & IEC 60947-2. Rated current shall be as per capacities specified. The equipment shall be complete with the following:

a) Necessary circuit breaker carriage with 3 positions (isolate, test, service) draws out mechanism.

b) Necessary isolating plugs and sockets.

c) Necessary mechanism interlock and automatic safe shutters gear with arrangement for pad locking.

d) Necessary independent manual spring mechanism with mechanical On/Off indication as well as electrical On/Off indication.

e) Necessary bus bars with bolted type neutral links.

f) ACB shall be provided with microprocessor-based releases having built in over load, short circuit & earth fault protection. Microprocessor release shall be EMI(electromagnetic induction)/EMC (electromagnetic compatible) certified.

g) Necessary set of auxiliary switches.

h) Necessary set of CTs with ratios as specified

i) Necessary identification, metering requirements as specified i/c. ON/OFF indication lamps, selector switches, fuses, ammeter, voltmeter etc.

j) In case of 4 pole breaker neutral shall be fully rated with adjustable settings from 50% to 100% of In.

k) ACB terminals shall be suitable/suitably brought out for direct aluminum termination as per IS: 13947 Part-II.

45.2 MCCB

All MCCBs shall be current limiting type with features of load line reversibility and suitable for Horizontal / Vertical mounting without any derating. Beyond 300Amps capacity MCCBs shall have positive isolation and preferably double break contact repulsion & double insulation features. The MCCBs shall invariably be used with terminal spreaders. For all MCCBs, Ics= Icu.

45.3 Bus Bar Marking

Bus bars and main connections shall be marked by color or letter on MV Panels.

45.4 TESTS AT MANUFACTURERS WORK

All routine tests shall be carried out and test certificates produced to the department.

46 INSTALLATION, TESTING & COMMISSIONING

46.1 The installation work shall cover assembly of various sections of the panels lining up, grouting the units etc. In the case of multiple panel switch boards after connecting up the bus bars etc., all joints shall be insulated with necessary insulation tape or approved insulation compound. A common earth bar as specified shall be run inside at the back of switch panel connecting all the sections for connection to frame earth system. All protection and other small wirings for indication etc. shall be completed before calibration and commissioning checks are commenced. All relays, meters etc. shall be mounted and connected with appropriate wiring.

46.2 Commissioning checks and tests shall include all wiring checks and checking up of connections. Relay adjustment/setting shall be done before commissioning in addition to routine Megger tests. Checks and tests shall include the following:

i. Operation checks and lubrication of all moving parts.
ii. Interlock function checks.
iii. Continuity checks of wiring, fuses etc. as required.
iv. Insulation test: When measured with 500V Megger the insulation resistance shall not be less than 100 mega ohms.

v. Trip tests and protection gear test.

47 Earthing SYSTEMS:

Earthing system shall comprise earth electrodes in accordance with clause 8.2.1 of general specifications for elect. Works (Part I Internal) 2023. For every additional transformer 2 more separate and distinct earth electrodes shall be provided for neutral earthing. The body earthing for transformers, HV & MV panels shall be done to a common earth bus connected to two separate and distinct earth electrodes.

Note: for a single transformer sub-station, the total number of earth electrodes shall be 4 (2 for neutral and 2 for connection to a common earth bus for body earthing). For a two transformers sub-station total number of earth electrodes shall be 6 (4 for neutral earthing, two each for two transformers, and 2 for connection to a common earth bus for body earthing).

47.1 ELECTRODES

The earth electrodes shall be as per CPWD General Specifications for Electrical Works (Part I Internal) 2023.

47.2 LOCATION of EARTH ELECTRODES

Normally an earth electrode shall not be situated less than 1.5m from any building. Care shall be taken that the excavation of earth electrode may not affect the column footings or foundation of the building. In such cases electrodes may be farther away from the building.

The location of the electrode earth will be a place where the soil has reasonable chance of remaining moist.

As far as possible, entrances, pavements and road ways, are to be definitely avoided for locating the earth electrode.

47.3 WATERING ARRANGEMENT

Method of watering arrangement shall comply with CPWD General Specifications.

47.4 SIZE OF EARTH LEAD

The recommended sizes of copper earth bus lead in case of sub-stations shall be accordance with clause 8.2.2 of General Specifications for electrical works (Part-I Internal) 2023 amended upto date. The minimum size of lead shall be 25mm x 5mm copper of equivalent GI strip.

47.5 INSTALLATION

All joints shall be riveted and sweated. Joints in the earth bar shall be bolted and the joints faces tinned. Where the diameter of the bolt for connecting earth bar to apparatus exceeds one quarter of the width of the earth bar, the connection to the bolt shall be made with a wider piece of flange of copper jointed to earth bar. These shall be tinned at the point of connection to equipment and special care taken to ensure a permanent low resistance contact to iron or steel.

All steel bolts, nuts, washers etc., shall be cadmium plated, main earth bars shall be spaced sufficiently on the surface to which they are fixed such as walls or the side trenches to allow for ease of connections. Copper earthing shall not be fixed

by ferrous fittings. The earthing shall suitably be protected from mechanical injury by galvanized pipe wherever it passes through wall and floor. The portion within ground shall be buried at least 60cm deep. The earthing lead shall be securely bolted and soldered to plate or pipe as the case may be. In the case of plate earthing the lead shall be connected by means of a cable socket with two bolts and nuts. All washers shall be of the same materials as the plate or pipe. All iron bolts, nuts and washers shall be galvanized.

SAFETY REQUIREMENTS, TESTING, STANDARDS& APPROVALS

48 SCOPE

1. Quality Assurance Plans- Internal Electrical Installations

a. The detailed instructions on safety procedures given in BIS code no. 5216:1982
b. "Code of safety Procedures and Practices in Electrical works" shall be strictly followed.
c. Safety procedures given in Chapter 10 of CPWD General Specifications for Electrical works Part-1(Internal) shall be followed.
d. Safety recommendation as per IE rules 1956 as per Appendix "C".
e. The materials shall be tested from 3rd Party laboratories. Expenses of testing to be borne by contractor.
f. Provisions and fixing of check-nuts for conduit work as per CPWD Specifications.
g. No. of wires in one conduit shall be ensured as per CPWD Specifications.
h. Colour coding of wires to be ensured.
i. Lugs and thimbles at cable/ wire ends in switch boxes as per CPWD Specifications. Flexible GI conduits/PVC sleeve to be provided for the wiring wherever required, particularly for the light fittings below the roof and above the false ceiling areas, with proper coupling arrangements.
j. Labeling of switch boxes shall be ensured.
k. Termination of earth terminals in earth pits, switch box, DBs and accessories to be ensured. Earth chamber to be constructed and proper marking to be done.
l. A comprehensive schematic diagram to be prepared starting from the main board up to the final DBs. All such boards are duly marked and numbered.

2. Testing:

a. After completing the work, necessary test results as envisaged in CPWD General Specifications Part-I (Internal)-2023 & CEA regulations 2023 shall be recorded and submitted to the department. The results shall be in the permissible limits. Test report forms duly signed by authorized person/owner shall be submitted to Electricity Company by the agency. It will be the responsibility of contractor to get provides electricity connections.
b. The pre-commissioning testing of the installation shall be carried out such as
   (i) Insulation resistance test.
   (ii) Polarity test of switch.
   (iii) Earth continuity test.
c. Earth electrode resistance test. All the tests at site shall be carried out for the completed installations, in the presence of and to the satisfaction of the Engineer in Charge by the contractor. All the test results shall be recorded and submitted to the Department.

d. On completion of an electrical installation (or an extension to an installation), a certificate shall be furnished by the electrical contractor, countersigned by the certified supervisor under whose direct supervision the installation was carried out.
e. This certificate shall be in the prescribed form as given in Appendix "E" of CPWD
f. General Specifications for Electrical Works Part-1(Internal) in addition to the test certificate required by the local electric supply authorities.
g. All electrical & mechanical fittings / fixtures / appliances, to be provided for the work, should have latest minimum 5-star rating (of BEE) as available in market.
h. The work of internal EI shall be carried out As per CPWD Specifications for Electrical Works Part I Internal Electrical – 2023, CPWD Specifications for Electrical Works Part II External Electrical and CPWD Specifications for Electrical Works Part IV Sub-station – 2013. Work shall be carried out with copper wires, double door DBs, steel/PVC conduit, indoor floor panels.

3. Drawings to be submitted for approval, before start of any work:

The contractor shall prepare and submit three sets of hard copy of following drawings and 2 sets in soft copy and get them approved from the Engineer – In –Charge before the start of the work. The approval of drawings however does not absolve the contractor not to supply the equipment / materials as per agreement, if there is any contradiction between the approved drawings and agreement.

(i) Layout scheme, Plan and Elevations
(ii) Conduit Layout, Circuit details with Loading
(iii) Selection of cables and wires
(iv) SLD detailed
(v) TDS of equipment/material
(vi) Drawings showing details of Foundation/Wall supports etc.
(vii) Any other drawings relevant to the work.
(viii) Data sheets of equipment

4. Drawings after completion of work

The contractor shall submit Six sets of as built drawings of hard copies and 3 sets in soft copy to the owner/ Engineer-In-Charge after completion of the work. In addition, following shall also be provided:

a. Test Certificates
b. As built conduit layout drawing copies
c. Warrantee Certificates
d. O&M Manuals of Equipment
e. Hand-on training to the client department
f. Any other information the Engineer-In-Charge may dream fit.

5. LIST OF INDIAN STANDARDS (IS) FOR INTERNAL ELECTRICAL INSTALLATION (for reference only)

IS : 374 - 1979	Ceiling fans and regulators (3rd revision)
IS : 694 - 1990	PVC insulated Electric cable for working voltage upto and including 1100 volts.

IS : 732 - 1989	Code of practice for electrical wiring and installation
IS : 1255 - 1983	Code of Practice for installation and maintenance of Power Cables upto and including 33 KV rating (Second Revision)
IS : 1258 - 1987	Bayonet lamp holders(Third revision)
IS : 1293 – 1988	Three pin plugs and sockets outlets rated voltage upto and including 250 volts and rated current upto and including 160 amps.
IS : 1646 - 1982	Electrical installation fire safety of buildings(general) Code of practice.
IS : 1885 - 1971	Glossary of items for electrical cables and conductors
IS : 1913 – 1978	General and safety requirements for fluorescent lamps luminaries Tubular.
IS : 2309 - 1989	Protection of building and allied structures against lightning
IS : 3043 - 1987	Code of practice for earthing.
IS : 3480 - 1966	Flexible steel conduits for electrical wiring.
IS : 3837 - 1976	Accessories for rigid steel conduit for electrical wiring.
IS : 4146 - 1983	Application guide for voltage transformers
IS : 4615 - 1968	Switch socket outlets.
IS : 5216 - 1982 (Part-I)	Guide for safety procedures and practices in electrical work.
IS : 8130 - 1984	Conductors for insulated electric cables and flexible cords
IS : 9537 - 1981	Rigid Steel Conduits for electrical wiring (Second Revisions)
IS : 13947 - 1993	General requirement for switchgear and control gear for voltage not exceeding 1000 Volts.

48.1 REQUIREMENTS

Safety provisions shall be generally in conformity with appendices (A) and (C) of CPWD General specifications of Electric Works (Par I Internal) 2023. In particular following items shall be provided:

(a) Insulation mats

Insulation mats conforming to IS: 15652-2006 shall be provided in front of panels as well as other control equipment as specified.

(b) First Aid Charts and First Aid Box

Charts (one in English, one in Hindi, one in Regional language), displaying methods of giving artificial respiration to a recipient of electrical shock shall be prominently provided at appropriate place. Standard first aid boxes containing materials as prescribed by St. John Ambulance Brigade or Indian Red Cross should be provided in each sub-station.

(c) Danger Plate

Danger Plates shall be provided on HV and MV equipment. MV danger notice plate shall be 200mm x 150mm made of mild steel at least 2 mm thick vitreous enameled white on both sides and with the descriptions in signal red colour on front side as required. Notice pates of other suitable materials such as stainless steel, brass or such other permanent nature material shall also be accepted with the description engraved is signal red colour.

(d) Fire Extinguishers

Portable CO_2 conforming to IS: 2878-1976/Chemical conforming to IS: 2171-1976 extinguishers, HCFC Blend A(P-IV) shall be installed in the sub-station at suitable places. Other extinguishers recommended for electric fires may also be used.

(e) Fire Buckets

Fire buckets conforming to IS: 2546-1974 shall be installed with the suitable stand for storage of water and sand.

General Specifications for Execution of Earthing System

1. Type of Earthing
   - Earthing shall be provided with copper/G.I plate electrode asa per BOQ of size 600 mm × 600 mm × 3.15 mm (minimum) as per CPWD/IS:3043 norms.
2. Earth Pit Construction
   - Earth pit shall be excavated to the required depth ensuring that the plate is placed vertically and fully surrounded by charcoal and salt/earthing compound as per CPWD standards.
   - Pit depth shall ensure the electrode is placed at a minimum 3.0 m below ground level, or as per CPWD/IS 3043 recommendations.
   - Masonry chamber with RCC cover and GI frame to be provided.
3. Backfilling Material
   - Alternate layers of charcoal and salt or approved earthing compound shall be filled around the plate to improve conductivity.
4. Earth Lead / Earth Strip
   - Earth lead from electrode to earth bar shall be copper/G.I strip of adequate size (minimum 25 mm × 3 mm or as specified).
   - All joints shall be brazed or exothermic-welded and protected against corrosion.
   - The earthing strip/wire shall be taken out through a GI protection pipe up to ground level.
   - Above ground, the strip shall be fixed using clamps and protected with GI/ PVC conduit as per site requirement.
5. Watering Arrangement
   - 40 mm GI watering pipe with perforations shall be provided for regular watering.
   - Funnel, mesh and cover to be provided for protection and ease of maintenance.
6. Earth Pit Marking & Identification
   - Earth pits shall be properly numbered, labelled, and recorded in site layout.
   - "UPS EARTH PIT – DO NOT REMOVE" marking to be provided.
7. Testing of Earth Resistance
   - Earth resistance value shall be tested with Earth Megger and recorded.
   - Achieved resistance shall be below the permissible limit (generally ≤ 1 ohm to 5 ohms depending on the system).
   - Test results must be submitted for approval before commissioning.
8. Bonding & Connectivity
   - UPS system panel, distribution boards, metallic enclosure, and equipment body shall be directly bonded to the UPS earthing network.
   - All joints shall be mechanically and electrically secure.
9. Compliance with Standards
   - Work shall comply with CPWD Specifications, IS 3043, Indian Electricity Rules, and manufacturer's guidelines.
   - All materials shall be ISI-marked wherever applicable.

10. Safety and Workmanship
- All work to be carried out by skilled personnel with proper PPE.
- Ensure that the earthing system is free from mechanical damage, corrosion and accidental disconnection.

11. Documentation
- The agency shall submit:
    - As-built drawings showing earth pit location.
    - Earth test reports.
    - Material test certificates for copper plate, copper strip etc.

General Execution Points for Lightning Conductor System

1. Standards & Codes
    - The Lightning Protection System (LPS) shall be designed and executed as per IS/IEC 62305, IS 2309, and relevant CPWD specifications.
    - All materials shall conform to IS standards for copper/aluminium conductors, earthing electrodes, and accessories.

2. Site Survey & Drawing Approval
    - Contractor shall verify site conditions and submit shop drawings indicating conductor layout, down conductors, air terminals, earthing pits, and interconnections.
    - Work shall commence only after approval of Engineer-in-Charge.

3. Materials & Components
    - Air termination rods (lightning rods), down conductors, tapes, saddles, clamps, test links, and earthing components shall be of approved make and as per CPWD List of Approved Materials.
    - Conductors shall be of adequate cross-section (copper/aluminium) as per design.
4. Installation of Air Termination System
    - Air terminals shall be installed at the highest points of the building and other vulnerable locations.
    - Interconnection of air terminals to form a complete mesh shall be ensured as per accepted practices.
5. Down Conductors
    - Down conductors shall be routed through approved paths to minimize bends and shall be fixed using non-corrosive saddles/clamps.
    - The minimum number of down conductors shall be as per IS 2309 specifications and drawing requirements.
6. Earthing System
    - Each down conductor shall be connected to a dedicated earth electrode such as copper-bonded rod/pipe or plate earthing as specified.
    - Earthing pits shall be constructed with chamber, cover, and watering arrangements.
    - Earth resistance shall be maintained as per standard CPWD norms (generally below 1 ohm for LPS).
7. Bonding & Interconnection

- Metal bodies, rooftop equipment, railings, HVAC units, solar structures and service lines shall be bonded with LPS conductors to avoid potential differences.
- Equipotential bonding shall be created as per CPWD safety requirements.

8. Corrosion Protection
   - All exposed joints shall be suitably protected against corrosion.
   - Dissimilar metal joints shall be avoided or treated with bi-metallic connectors.
9. Testing & Measurement
   - Earth resistance testing shall be done using an earth tester and results recorded in the presence of the Engineer-in-Charge.
   - Continuity testing of conductors shall be carried out before commissioning.
10. Documentation & Certification

- Contractor shall submit as-built drawings, and test reports.
- System shall be handed over after successful testing and certification.

11. Safety Measures

- All work at height shall be carried out with proper PPE, scaffolding, and safety arrangements as per CPWD safety guidelines.
- Contractor shall follow electrical safety norms during installation and testing.

12. Guarantee & Maintenance

- The contractor shall guarantee the system against defects for the defect liability period.
- The contractor must provide instructions for periodic inspection and maintenance as per IS/IEC guidelines.

CABLEWORKS

1. SPECIFICATIONOFCABLE

a. 11KVgradeXLPEinsulatedPVCsheathedarmouredAluminum/Coppercableshall be 3 core earthed of sizes as specified. The cable shall conform to IS 1554, Part II

b. KV grade XLPE insulated PVC sheathed armoured Aluminum / Copper cable shallbe3½/4coreofsizesasspecified.ThecableshallconformtoIS1554 Part I.

c. Allcontrolwiresshallbe650VgradecopperconductorHalogenfreefireretardantor FRLS PVC insulated, conforming to IS 1554-Part I. The minimum size of the control wires shall be 1.5 sq. mm.

2. INSTALLATION

i. Cable shall be laid in ground, trenches, cable trays and on walls as specified. Installation shall include all supports and clamps as required. The complete work shall be in accordance to CPWD General Specifications for Electrical Works - Part II (External) 2023 amended upto date. As far as possible cables shall not be fixed on walls directly but laid on cable trays.

3. JOINTING FOR 11KV GRADE CABLEG LANDS

i. Jointing work shall be carried out only by licensed experienced cable jointer andshall be in accordance to CPWD General Specifications for Electrical Works - Part II (External) 2023 amended upto date.

4. EARTHING FOR 11KV GRADE CABLE GLANDS

i. All HV cable glands shall be connected to the earth with 2 Nos. 38.6 mm copper or equivalent G.I. conductors.

ii. Selection shall be made as per tables given under Table V of CPWD General Specifications for Electrical Works Part-II (External) - 2023 amended upto date.

5. TESTING

i. Testing of the complete cable installation shall be as per clause 2.8.2 and 2.8.3 of CPWD General Specifications for Electrical Works - Part II (External) 2023 amended upto date.

6. POWER DISTRIBUTION SYSTEM LOSSES

i. The power cabling shall be adequately sized as to maintain the distribution losses not to exceed 1% of the total power usage. Record of design calculation for the losses shall be maintained.

ii. The cables be designed as per the voltage drop regulations at peak load, and the losses be calculated on the basis of the assessed load during the day, week and year and should not be limited to the peak load.

Executive Engineer (E)(Vijayawada)

ANNEXURE – A

(To be furnished on a "Non-Judicial" stamp paper worth of Rs. 100/- at the time of supply of material)

Name of work: Supply, Installation, Testing & Commissioning of 20 KLD Effluent Treatment Plant & Sewage Treatment Plant combo unit, cold room and other related items at National Centre for Disease Control, Mangalagiri, Andhra Pradesh.

We hereby agree that

a) All the LED fittings supplied by us are guaranteed for five years including drivers from the date of handing over.

b) In case of discontinuation of model and non-availability of spares, we will replace the fittings with equivalent/ high end model in case of manufacturing defect during the warranty period of 5 years.

For M/S ……..,

…….

(Authorized signatory of manufacturer of LED luminaries)

Counter Signature,

Major contractor

ANNEXURE – B

(To be furnished on a "non-judicial" stamp paper worth of Rs. 100/- at the time of supply of material)

Name of work: Supply, Installation, Testing & Commissioning of 20 KLD Effluent Treatment Plant & Sewage Treatment Plant combo unit, cold room and other related items at National Centre for Disease Control, Mangalagiri, Andhra Pradesh.

We hereby agree that

c) All the BLDC Fans supplied by us are guaranteed for five years from the date of handing over.

d) In case of discontinuation of model and non-availability of spares, we will replace the BLDC Fans with equivalent/ high end model in case of manufacturing defect during the warranty period of 5 years.

For M/S ……..,

…….

(Authorized signatory of manufacturer of BLDC Fans)

Counter Signature,

Major contractor

C-1: LIST OF PREFERRED MAKES OF MATERIAL

(IEI & Fans, Street lighting, Pump Sets)

S.No	Product	Make
1	Wires (PVC insulated copper conductor cable HFFR – ISI marked / Telephone cables / Submersible cables / Co-axial / TV cables	Havells / Finolex / KEI / RR Kabel /LK(L&T)/AKG/Gloster/Polycab /Goldmedal
2	Steel Conduit (ISI marked)	BEC / Bharat / Gupta / AKG / RMCON / Steel krafts/Precision
3	PVC Conduit (ISI marked) (Colour of conduit: Ivory/Grey)	Avon Plast / Precision / AKG / BEC/ GM/Clipsal/Goldmedal
4	MCCBs	Legrand (DPX^3)/ Schneider Electric (Compact NSX/Easy Pact CVS /LK (D- Sine)/ABB/AKG/(T-Max) / Siemens (3VL)/C&S
5	MCB DBs / Industrial Sockets	Legrand / Schneider Electric /Havells (STADX)/ Hager / LK (L&T) / ABB/AKG/siemens/C&S
6	MCBs / RCBO / Isolators	Legrand / Schneider Electric / Havells (STADX)/Hager / LK (L&T) / ABB/AKG/Siemens/C&S
7	Cable management system	Legrand / Honeywell / OBO Betterman / Schneider / MK
8	Modular switches / Sockets / TV Socket / Telephone sockets / Data Sockets / Electronic Regulators / AC starter switch etc.	Legrand (Myrius NextGen) / MK Honeywell (Blenze Plus) / Havells-Crabtree (Signia) / Wipro North-West (Stylus+) / Panasonic (Roma Urban) / Gold medal (Curve or Air)
9	LED Luminaries including Street Light fittings (ISI marked)	Philips / Wipro / Crompton Greaves /Bajaj/ Havells/K-Lite / Osram
10	(a) Decorative street light pole	Philips / K-Lite (/ Bajaj /Disano/Twinkle
	(b) post top lantern fitting	JUNO 60W LED of K-Lite Make, Product Code: 27034-350-57-120-000-PCF-003-003 and equivalent to /Philips/Bajaj/Disano /Twinkle
11	Fans	
A)	1200 mm Sweep ceiling fan with BLDC motor	Orient / Crompton / Havells / Atomberg
12	Exhaust Fan	
A)	Exhaust fans (Plastic Body) (Medium Duty)	Havells / Crompton / Orient / Bajaj / Almonard / Atomberg
B)	Exhaust fans (Metallic Body) (Heavy Duty)	Crompton / Orient / Almonard / Bajaj / Atomberg
13	Angle Holder / Batten Holder	ISI Marked Kinjal / Emperor / Anchor/Polycab/Aristo/Antex/Prakash /Kinjal
14	Call bell / Buzzer	Anchor / Leader / Rider / Polycab.
15	Rising Main / Bus trunking (Sandwich /Air insulated) and Tap off Boxes	Schneider /Legrand /C&S/LK (L&T)/ ABB.

S.No	Product	Make
16	Floor Trunking / Raceway (GI)	Honeywell / MK / OBO Betterman / Legrand / Profab.
17	Ammeter / Voltmeter / MF Meter / Energy meter / Intelligent Meter	AE /IMP/ MECO / LK (L&T)/ SOcomec (Diris) / Schneider / HPL / C&S / Conserv / Kaycee / Crompton Graves.
18	Contactors	Seimens/ABB/ LK (L&T) /C&S/Schneider
19	Multifunction Meter / Load Managers	Secure / Schnieder / Socomec /Legrand/Siemens/Conzerv/LK (L&T) /AE/Meco/Rishab
20	Push Buttons	LK (L&T)/ Siemens / BCH / Eaton / C&S.
21	Connector and Terminal Block	Elmex / Connectwel / Essen.
22	Cable Gland	Peeco / Commet / Gripwell /Dowells / Jainsons / Prabath /Raychem / Grandlay.
23	Lugs and Thimbles	Dowells / Multi / Capital / Jainsons / Commet / Prabath / Schneider Electric.
24	Panel Board / Feeder Piller / Meter Board/MVpanel	Manufacturers having in House Facility for 7 tank process, Powder coating, CNC machine and CPRI approved for relevant or above bus bar rating.
25	G.I Pipe	Jindal-Hissar / Tata / Sail / Zenith Birla/Surya/Sail.
26	1.1 KV grade aluminum conductor, XLPE insulated armoured UG cables	CCI / Havells / KEI / Gloster / Finolex /Universal/Orbit/RR Kabel/AKG /Nakoda//Polycab
27	Hot Dip Galvanised Cable Tray	Profab Engineer / MEM / Ricoh / Slottco / Steelways / DEC / Fixotec / OBO Betterman / RMCON / Profab / Indiana /MBM/ Legrand.
28	Telephone / TV Cable	Polycab / Q flex/finolex/RR kable/L&T/ Finecab/ KEI.
29	Pumpsets	Kirloskar/KSB/Texmo/Grundfos.
30	Selector Switches for LT Panels	Kaycee / BCH / LK (L&T) /Salzer / Siemens / Schneider Electric / HPL
31	Indicating Lamps (LED type)	Secure / Schnieder / Socomec /Legrand/Siemens
32	Push Buttons	Siemens / LK (L&T) / BCH / C&S / Eaton
33	Current Transformers for LT panels	Kappa/ AE / BCH / LK (L&T) /ABB / Gilbert/ Siemens / GE / MECO /Schneider / IMP / PERFECT ELECTRICALS
34	Relays	SEGC / Crompton / Siemens / GE / ABB / Schneider / L&T
35	Cable management system	Legrand / Honeywell / OBO Betterman / Schneider / MK
36	Storage Water heaters	Havells / A.O. Smith Urbane/ Crompton / Bajaj/Racold

S.No	Product	Make
		/Crompton/V-Guard/Ion-exchange
37	Display Unit	Sony / LG / Samsung / Panasonic
38	Water dispensers	Blue Star / Voltas Mini-magic Pure/EUREKA Forbes/Kent/Ion Exchange/LG
39	Cassette/Split AC units	O-General/ Mitsubishi Electric / Mitsubishi Heavy industries /Toshiba/Daikin
40	DWC	Telerax (Astral) / Dutron / Jindal plast/ Duroline/ Veekey Plast/Sri tulasi
41	Day Light / Occupancy Sensor	Legrand/ Schneider /Johnson Control / ABB/Lutron / Hager /Wipro//Bajaj/Philips
42	CPVC / UPVC	Sudhakar/ Ashirwad / Astral / Supreme / Pressfit
43	Hand dryer	Euronics/Dolphy/Jaquar
44	All other items not covered above	The decision of the Engineer-in-charge will be final and Binding.

Note: -

i) The agency should submit makes list for approval to the concerned Assistant Engineer(E), who in turn submits the list to the division office with his recommendations.

ii) The department, reserves the right to add or delete any materials and Brands in the list of approved materials/brands subject to the recovery of financial implications.

iii) Modular Switch/Bell Push/Socket/Fan regulator shall be of same make. Similarly, MCBDB/MCBs shall be of same make. Entire installation for a particular item only one make shall be used duly getting approval from Engineer-In-Charge.

Executive Engineer (E)(Vijayawada)

C-2: COMMERCIAL AND ADDITIONAL CONDITIONS FOR ACCESS CONTROL SYSTEM

1. The Access control system will be installed at different locations of **Supply, Installation, Testing & Commissioning of 20 KLD Effluent Treatment Plant & Sewage Treatment Plant combo unit, cold room and other related items at National Centre for Disease Control, Mangalagiri, Andhra Pradesh.**

2. The work shall be executed as per CPWD General Specifications for Electrical works amended up to date & as per relevant IS and as per directions of Engineer-in-charge.

3. The tenderer should in his own interest visit the site and familiarizes himself with the site conditions before tendering.

4. No T&P shall be issued by the department and nothing extra shall be paid on account of this.

4. All the Access control system should be of compatible approved make to have better compatibility. The bid of the tenderer using different makes for different components will not be acceptable. The firm must submit a letter from equipment manufacturer that the model of Conferencing equipments including accessories quoted by them is in continuous process of manufacturing and in this respect the decision of the Engineer-in-charge is final & binding on the contractor.

5. Item must be complete with all equipments and required accessories along with necessary power systems, video connector, plugs, sockets and hardware/software as required for complete installation of the system under this contract and present scope of work.

6. The firm should visit the site before quoting their rates so as to satisfy themselves with all site working conditions, cable routes etc.

7. All software & hardware should be in upgrade version.

8. Access control products should be with minimum one year warranty / as per OEM standards & OEM must have service centre for prompt repairing and replacement at **National Centre for Disease Control, Mangalagiri, Andhra Pradesh**

9. Any damage done to the building/false ceiling/Exhibits is to be made good by the contractor with no extra cost by department.

10. For Sundry of material, the agency has to make his own arrangement. No separate storage accommodation shall be provided by the department. Watch and ward of the stores and their safe custody shall be the responsibility of the contractor till the final taking over of the installation by the department.

11. The Firm shall ensure adequate and prompt after sales service in the form of maintenance, spares and personnel are available at site of work during the guarantee period to minimize the breakdown period. The firm shall also ensure that in the event of any breakdown of the system, that area is made operational within 24 hrs. Otherwise a penalty as deemed reasonable by Engineer-in-charge shall be recovered from the firm (which will be minimum Rs 1000/- per day).

12. **DOCUMENT TO BE FURNISHED ON COMPLETION OF INSTALLATION**

Three sets of the following shall be furnished to the department by the contractor on completion of

a) Completion drawings
b) Manufacturer's technical catalogues of all equipment and accessories.
c) Operation and maintenance manual of all major equipment detailing all adjustment, operation and maintenance procedure. – 3 Sets

14. All the safety procedures outlined in the CHAPTER 10 (SAFETY PROCEDURE) of CPWD General Specifications for Electrical Works Part – I Internal 2023 shall be complied with.

15. PAYMENT TERMS

The following percentage of contract rates shall be payable against the stages of work shown here in:

S. No	Stage of work	Payment
1	After supply of equipment at site in good condition on pro- rata basis	70%
2	On completion of pro-rata installation	20 %
3	On commissioning and completion in all respects	5 %
4.	Handing over of the total installations to the department.	5%

For other items, the terms of payment will be decided by the Engineer-In-Charge and shall be binding on the contractor.

Executive Engineer (E)

- The facial recognition shall have NIST evaluation FTE evaluation & complied to ISO30107-1. 3.5" inch or more Capacitive Display with touch screen, Device shall have HD NIR and RGB cameras along with 2 IR LEDs and one white LED. Reader shall support 10k users(1:N) in device memory. Device shall Have NPU & AI based algorithm and will support Desfire, Mifare and Seos credential technology along with Seos BLE credentials. Readers will be IP65 and will offer JSON based internal API level IoT architecture and will not be required any SDK package, Support RTSP stream for video analysis, FR device shall also be able to encode face template to Seos, Mifare and Desfire cards. Device shall support FACE, Smart card technologies, Seos BLE credentials in Apple and Google wallet, Dynamic and Static QR code & PIN for authentications. certifications: Safety: EN 62368-1:2018, EN 62311:2019, Cyber Security compliant: RED DA(CE DoC), EMC: EN 55035:2017 +A11:2020, EN 301 489-1 V2.1.1, EN 301 489-17 V3.1.1,EN 50130-4:2011 +A1:2014, Spectrum: EN 55032:2015 +A11:2020, EN 300 330 V2.1.1, EN 300 328 V2.2.2, RoHS: EN IEC 63000:2018, Algorithm: iBeta Level -1 PAD, Others: FCC, UL294 certified component etc as required.

- 2-Door 2-Reader Intelligent Access Controller with MQTT cloud-native architecture, ARM Cortex-A7 Linux processor, support for 2 doors and 4 OSDP readers / 2 Wiegand readers, TLS 1.3 encrypted communication, Ethernet 10/100 Mbps, 100,000 credential capacity, 100,000 event log capacity, 12 supervised inputs, 8 relay outputs, embedded web interface, Wi-Fi Access Point mode, DHCP zero-touch commissioning, Type-C USB service port, reverse polarity & surge protection, reader power short-circuit protection, LED diagnostics, FCC/CE/RoHS compliant, complete with enclosure, power supply, mounting accessories and all necessary hardware for complete installation and commissioning. This controller should be integrated with turnstile & boom barriers the cost and accessories should be included etc as required.

- Single-board Enclosure with Power Supply & Charging Circuit, Mild Steel 16AWG (1.2 mm), Powder Coated Surface Finish, Inbuilt Tamper switch in Power Distribution Board,11x Triple Knockout (1/2", 3/4", 1" Conduit size), or M32 Cable Gland, Input Voltage-90-264 VAC / 127-370VDC, AC OK-TTL open collector output, ON: AC OK; OFF: AC Fall; Ice: max. 30mA@50VDC,Battery Fail-TTL open collector output, ON: Battery Low; OFF: Battery OK; Ice: max. 30mA@50VDC,Safety Standard (Power supply)-UL62368-1, TUV BS EN/EN62368-1, approved EAC TPTC 004, Working Temperature (Power supply)- -20 Degree to +70 Degree C, The power distribution board in the enclosure includes switches for both AC mains and battery power cut-off, making maintenance operations easier. The power circuitry is designed to be compatible with all AC mains voltage levels, making installation etc as required.

- Enterprise-level Access Control Software with the following minimum specifications: Enterprise-grade Access Control Software supporting centralized management of access control systems. Base software license shall include: Access Control Management Graphical User Interface (GUI) Global and Local Anti-Pass back Reports in Inbox Door Scheduling Time-based Access Control Event & Alarm Notifications Mobile Application for Time & Attendance Dynamic QR Code Generation Visitor Request Management The software shall support an integrated

Visitor Management System (VMS) as an optional module for future expansion without requiring replacement of the existing platform. The software shall be VAPT (Vulnerability Assessment & Penetration Testing) Certified for cybersecurity compliance. The software shall include an Artificial Intelligence (AI) and Machine Learning (ML)-based Insights Dashboard capable of: Analysing access control events and security data. Identifying anomalies and security risks. Performing root cause analysis. Providing predictive analytics and actionable recommendations to strengthen the organization's security framework. The software shall support: Unlimited Users/Cardholders, Unlimited Readers (expandable without software limitation),Unlimited Login Accounts Unlimited Event & Transaction Storage (database-dependent) Reports in Inbox Door Scheduling Time-based Access Levels System Alerts & Notifications. The software shall include Hardware Configuration and System Monitoring Modules for centralized device management. The platform shall support integration with multiple brands of access controllers through open architecture and standard communication protocols. The software shall support multiple credential technologies including: RFID Smart Cards Fingerprint Biometrics Iris Recognition Face Recognition QR Code Credentials Mobile Credentials (BLE/NFC).The software shall comply with recognized cybersecurity standards and testing methodologies including: Grey Box Web Penetration Testing ISSAF (Information Systems Security Assessment Framework) OWASP Top 10 (2013, 2017 & 2021) SANS Top 25 CERT-In Security Guidelines The software shall comply with international security and privacy standards including: SOC 2 GDPR ISO/IEC 27018 (Protection of Personally Identifiable Information in Public Clouds).The software shall support four-state supervised input monitoring, including: Normal Alarm Cable Open Circuit Detection Cable Short Circuit Detection. The system shall provide real-time monitoring, event logging, alarm management, audit trails, and centralized administration for enterprise deployments etc as required.

- Double Door Electromagnetic Lock, minimum 2 × 600 Lbs)r 1200 LBS holding force, 12/24 VDC, fail-safe type, complete with suitable mounting brackets, lock status monitoring, power supply, required accessories, cabling, installation, termination, testing, commissioning and integration with the Access Control System, including all necessary hardware and consumables, complete in all respects etc as required.

- single Door Electromagnetic Lock, minimum 1 × 600 Lbs holding force, 12/24 VDC, fail-safe type, complete with suitable mounting brackets, lock status monitoring, power supply, required accessories, cabling, installation, termination, testing, commissioning and integration with the Access Control System, including all necessary hardware and consumables, complete in all respects etc as required.

- Break Glass with Flip Cover etc as required.
- Magnetic SS type Duress/Push button Button touch less etc as required.

- Server ,CPU (Cores) 8 Cores (Physical) Processor Intel Xeon, 3.3 GHz or above RAM 32 GB Storage (SSD) 512 GB SSD Operating System Ubuntu 24.04 LTS Server Database Server Microsoft SQL Server 2025 – Edition (Express / Standard / Enterprise) selected based on the number of Users (see Section 3) , keyboard, mouse,

24 inch monitor and related cables , HDMI, power with related - Gate way controller etc as required.

- 4-Port PoE Network Switch with minimum 4 × 10/100/1000 Mbps PoE RJ-45 ports, IEEE 802.3af/at PoE support, minimum 60W PoE budget, Gigabit uplink ports, complete with power supply, accessories, installation, termination, testing, commissioning and all required consumables, suitable for Access Control/IP-based security systems etc as required.

PREFERRED MAKES LIST

S. No	Item Description	Makes
	ACCESS CONTROL SYSTEM	
1	Facial Reader	• HID • Suprema • IDEMIA • IDCUBE • INVIXIUM
2	2-Door 2-Reader Intelligent Access Controller	• HID • IDCUBE • PRINT • ELECTRONIX
3	Single-board Enclosure with Power Supply & Charging Circuit	• HID • IDCUBE • PRINT • ELECTRONIX
4	Enterprise-level Access Control Software	• IDCUBE • PROWATCH • LENELS2
5	Single/Double Door Electromagnetic Lock	• ASSABLOY • ESSL • ZKTECO
6	Break Glass with Flip Cover	• ASSABLOY • ESSL • ZKTECO
7	Magnetic SS type Duress/Push button	• ASSABLOY • ESSL • ZKTECO
8	Optical Fiber cable (Single & Multimode) and all accessories including LIU etc.	• CommScope • Panduit (Pannet) • Siemon • LEVITON
9	Cat6A Cable, Jack Panels, IO's and all accessories	• CommScope • Panduit (Pannet) • Siemon • LEVITON

S. No	Item Description	Makes
10	Access control server	• Dell • HP • Lenovo • IDCUBE
11	All other items not covered above	As per approval of the Engineer-in-charge.

Note: -

i) **The agency should submit makes list for approval to the concerned Assistant Engineer(E), who in turn submits the list to the division office with his recommendations.**

ii) The department, reserves the right to add or delete any materials and Brands in the list of approved materials/brands subject to the recovery of financial implications.

Executive Engineer (E)(Vijayawada)

C-3: COMMERCIAL AND ADDITIONAL CONDITIONS FOR HVAC SYSTEM

The work shall be carried out as per the following Tender Specifications for Air Conditioning works and generally in accordance with the following:

1.1. CPWD General Specifications for Heating, Ventilation and Air conditioning works – 2024, amended up to date.

1.2. CPWD General Specifications for Electrical Works Part I Internal – 2023, amended upto date.

1.3. CPWD General Specifications for Electrical Works Part II External – 2023, amended upto date.

1.4. Manufacturer standards (If not covered by CPWD specifications)

- COLD Room of Size 3650 x 3100 x 3150 mm with prefabricated PUF panels & Refrigeration Units consisting of Condensing unit & Evaporator Unit, with refrigeration of capacity not less than 10,000 BTU/H, suitable to maintain desired temperature of +/- 2 Degree C to + 8 Degree C, machine should consist of 2 nos. (1 No.working + 1 No. standby) of energy efficient compressor. PUF insulated panels for Wall, Ceiling, floor insulation, inner and outer face of wall should be made up of Stainless Steel-304 grade, insulated Doors, with clear opening of size not less than 195 cm x 85 cm, PUF insulation of 80 mm thick, 40kg/ cu.m density 2 nos. Stainless Steel-304 grade racks of each size 2.4 mtrs length x 0.60 mtr depth (nominal) or as per cold room design required and approved by Engineer In charge. The Stainless Steel-304 grade sheet of thickness not less than 1.6mm, using square pipe of suitable size with minimum thickness 1.6mm, having 3 Nos. Shelf's of same thickness, PUF insulation of 80 mm thick, 40kg/ cu.m density & flooring with aluminium checker plate, minimum 6 mm thickness, suitable for operation on 3 phase 415V, 50 Hz AC Supply, complete with copper piping, inter connecting cable, Refrigeration control Panel accessories, Control panel, first charge of eco-friendly refrigerant gas with stand/ wall bracket for placement of Outdoor units, Temperature controller including feature of alert message to at least 2 nos. registered mobile phones etc as per attached specifications as required with LED lights of suitable wattage and illumination inside the room.

- Supplying & Fixing air curtain, MS powder coated body having nominal air velocity of 21 m/s, size not less than 1800 mm x 230 mm x 210 mm, noise level not more than 55 db, having 6 nos. blowers and 3 nos. heavy duty motors, CFM not less than 1450, maximum speed not less than 2700 RPM, fixing above door at a height of 2.4 meters above floor level, including making good the damages connections, testing and commissioning, suitable for operation on single phase AC supply etc., complete as required.

Payment Terms:

The following percentage of contract rates shall be payable against the stages of work shown herein:

S. No.	Stage of Work	Percentage of rate
1	After initial inspection (wherever specified) & delivery at site in good condition on pro-rata basis.	75%
2	On completion of installation	15%
3	On testing, commissioning and handing over to the department for beneficial use	10%

EXECUTIVE ENGINEER (E)

C-3: LIST OF PREFERRED MAKES OF MATERIAL HVAC SYSTEM

Sr. No.	Product	Make
1.	Cold room	Carrier/Voltas/ Rinac/ Toshiba/ Mitsubishi/Bluestar
2.	Air curtain	EURONICS/MITZVAH/DOLPHY/MITASHI
3.	Refrigerant pipes	Godrej/Mehta/Rajco / Mandev / Nippon / Totaline /As per manufacturer standards
4.	UPVC / CPVC Drain Pipes	SUDHAKAR / AASHIRVAD / ASTRAL / SUPREME /Pressfit
5.	Nitrile Rubber	Thermaflex / Armaflex/ Paramount Armacell (Armacell) / Eurobatex / Vidoflex (Anavid) / Kaiflex (Kaimann) / K-Flex
6.	Centre Remote Controller	Same make as that of central / VRF / VRV AC unit
7.	PVC Insulated copper conductor cable (For control and communications)	As per C-1 makes
8.	Wires (PVC insulated copper conductor cable FRLS – ISI marked	
9.	PVC Conduit & Accessories ((ISI marked)	
10.	MCB DBs / MCCBs / DBs / MCBs / RCCBs / Industrial Socket outlets	
11.	1.1KV grade aluminium & copper conductor, XLPE insulated armoured UG Cables	
12.	GI Pipes	
13.	Cable Glands	
14.	All other items not covered above	As per approval of the Engineer-in-charge.

Note: -

i) **The agency should submit makes list for approval to the concerned Assistant Engineer(E), who in turn submits the list to the division office with his recommendations.**

ii) The department, reserves the right to add or delete any materials and Brands in the list of approved materials/brands subject to the recovery of financial implications.

Executive Engineer (E)(Vijayawada)

C-4: TECHNICAL SPECIFICATIONS FOR ETP & STP

The work shall be carried out as per the following Tender Specifications

Payment Terms:

The following percentage of contract rates shall be payable against the stages of work shown herein:

S. No.	Stage of Work	Percentage of rate
1	After initial inspection (wherever specified) & delivery at site in good condition on pro-rata basis.	75%
2	On completion of installation	15%
3	On testing, commissioning and handing over to the department for beneficial use	10%

EXECUTIVE ENGINEER (E)

C-4: List Of Preferred Makes of Material
(Sewerage Treatment Plant (STP)

S.No.	Item	Make
1	Oil And Grease Skimmer	AkarImpex/Venza/Universal/Vesel-GEPS/D-ion /REVA/Vens/Premier
2	Dosing pumps	Edose/Unique Dosing System/Verito Engineering/Positive Metering Pumps/Grosvenor Worldwide
3	Motorized agitator	REMI Process Plant and Machinery/Verito Engineering/Anuj Enterprises/Chemvap Engineering
4	HDPE Dosing/solution tanks	Sintex/Duracon/Fusion
5	CPVC/ UPVC Pipes & Fittings	Supreme/Aqurate/Prince/Astral/Finolex
6	Pipe Fittings	Zoloto/Unik/Sant
7	MS Pipe/ GI Pipe	Jindal-Hissar/ TATA/ SAIL
8	Raw Sewage Transfer Pump/Sludge Transfer pump/Filter Feed Pump/Treated Water Pump	Grundfos/Kirloskar/CRI/Crompton/Wilo
9	Air Blower	Everest/TMVT/Beta/Blowvacc/Airvacc/ KPT/KAY/A1 Blowers
10	Coarse / Fine Bubble Diffuser/Air diffuser	Universal/W2pTek/Venza/Pro Flex/Southerncogen/ Techpro/Scogen/Sreetech
11	MBBR Media	Techpro/Thaha/AB Polymers/Enviro Water Solutions/MM aqua/sreetech
12	Tube Settler Media/ Biopac Media	Venza/W2ptek/Marvelous/MMaqua/ Techpro/ Cool deck/ Thaha/ MM aqua/sreetech
13	Pressure sand filter, Activated Carbon Filter	Aventura/Pentair/Venza/Starlite
14	Filter press	A1 Blowers/ W2ptek/ Universal/ Venza/ Precision/Thorat/Sachin/Eureka Forbes/ Pharmatech/ AN Engineers
15	Electromagnetic Flow Meter	Adept/Zest/Aster
16	Ozone generator	Faraday Ozone/Chemtronics Technologies/ Ozonetek/Ozone India Technology/Eltech Ozone
17	Auto level float switch	Pune Techtrol/Radix Electrosystems/Apsan India Instruments/Sahana Engineering/Jaycee Technologies
18	Ball Valve, Butterfly Valve, Non-Return Valve, Motorized Valve, Pressure Relief Valve, Y-Strainer	Castle/Zoloto/Koro/Kirloskar/Kalpana/ SANT

S.No.	Item	Make
19	Electrical panel	As per OEM standards
20	MCCB/MCB	Legrand/ Schneider/Siemens/L&T/ABB
21	Flow Meter	Endress+Hauser/KROHNE Marshall/Forbes Marshall/Adept Fluidyne/Electronet Equipments.
22	Electrical Meters	Schneider/Siemens/Legrand / Secure/L&T Socomec/ AE / Conserv
23	Pressure Gauge	HGuru/Feibig/Gluck/Indofos/Sintex
24	Pressure Switch	INDOFOSS/ FEIBIG/ Honeywell/ SYSTEMSENSOR/ Danfoss
25	pH Sensor	Aster/Digital/AkarImpex
26	UG Cables/Control Cables	Universal / RPG Cables /Finolex / Havells/RR Kable /Gloster/Torrent/KEI/Polycab.
27	Control Panel	CPRI Panel Fabricator
28	Selector Switches	Rishabh/Conserv/Kaycee / AE
29	Motor Starters	ABB/Schneider Electric/L&T/Siemens/ BCH
30	Chemical earthing	OBO Betterman/ Cape/Dehn / ABB
31	All other items not covered above	As per approval of the Engineer-in-charge.

Note: -

1. **The agency should submit makes list for approval to the concerned Assistant Engineer(E), who in turn submits the list to the division office with his recommendations.**
2. The department reserves the right to add or delete any material/make/brand in the list of approved material/make/brand subject to the recovery of financial implications.
3. The makes shall be approved by the competent authority of CPWD and /or client department before procuring the material.

Executive Engineer (E)(Vijayawada)

PART – C

Name of Work: Supply, Installation, Testing & Commissioning of 20 KLD Effluent Treatment Plant & Sewage Treatment Plant combo unit, cold room and other related items at National Centre for Disease Control, Mangalagiri, Andhra Pradesh.

PROFORMA OF SCHEDULES A to F

SCHEDULE 'A'

Schedule of Quantities (Civil Works) : **Page no.219-226**

Estimated Cost of ***Civil* Work (Minor Component)** **: Rs. 14,71,157/-**

SCHEDULE 'D'

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

a.	Special Conditions	: attached
b.	Particular specifications	: attached
c.	Guarantee Bonds	: attached

SCHEDULE 'E'

Reference to General Conditions of contract: **GCC 2023 for Construction Works** as amended/modified up to the last date of submission of tender.

Name of Work: Supply, Installation, Testing & Commissioning of 20 KLD Effluent Treatment Plant & Sewage Treatment Plant combo unit, cold room and other related items at National Centre for Disease Control, Mangalagiri, Andhra Pradesh.

Estimated Cost of Civil Work (Minor Component)	**: Rs.14,71,157/-**
(i) Earnest money	: As per major component
(ii) Performance Guarantee	: As per major component.
(iii)Security Deposits	: As per major component.

SCHEDULE 'F'- General Rules & Directions:

Officer inviting tender:			**Executive Engineer (E), CPWD, Vijayawada.**
Maximum percentage for quantity of items of work to be executed beyond which rates are to be determined in accordance with Clauses 12.2 & 12.3		:	**See below under Clause 12.**
Definitions			
2(v)	Engineer-in-Charge	:	**Executive Engineer (C), CPWD, Vijayawada, or his successor thereof.**
2(viii)	Accepting Authority	:	**As per major component**
2(x)	Percentage on the cost of materials and labour to cover all overheads and profits.	:	**15%**
2(xi)	Standard Schedule of Rates	:	**Delhi Schedule of Rates 2025 for Civil component, and Market Rates.**
2(xii)	Department	:	***Central Public Works Department.***
9(ii)	Standard CPWD contract Form GCC 2023, CPWD-7 as modified & corrected up to	:	**GCC 2023 for Construction works & CPWD - 7 as amended/ modified up to the last date of submission of e-tender.**

Clause I

(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.	:	As per composite tender provisions
(ii)	Maximum allowable extension with late fee at 0.1% per day of performance Guarantee amount beyond the period as provided in (i) above	:	As per composite tender provisions

Clause 2

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

Clause 2A

Whether clause 2A shall be applicable	:	As per major component

Clause 5

Number of days from the date of issue of letter of acceptance for reckoning date of start	:	As per composite tender provisions

MILESTONE(S) FOR CIVIL COMPONENT AS PER TABLE GIVEN BELOW

Sl. No.	**Description of Milestone (financial)**	**Time Allowed** (from date of start)	**Amount to be withheld in case of non-achievement of milestone**
1.	Completion of 25% of the total tendered amount of the Civil work component.	25 days	**1.20%** of the total tendered amount of Civil work component.
2	Completion of 50% of the total tendered amount of the Civil work component.	50 days	**1.20%** of the total tendered amount of Civil work component.
3	Completion of 75% of the total tendered amount of the Civil work component.	85 days	**1.20%** of the total tendered amount of Civil work component.
4	Completion of 100% of the total tendered amount of the Civil work component.	95 days	**1.20%** of the total tendered amount of Civil work component.
5	Final testing of lines and rectifications, cleaning, and handing over to the Client Department	120 days	**0.20%** of the total tendered amount of Civil work component.

Time Period allowed for execution of Work: - 120 days.

Authority to decide:			
i)	Authority to convey the decision of shifting of milestones and extension of time	:	As per major component
ii)	Rescheduling of Milestones and Extension of Time	:	As per major component
iii)	Shifting the date of start in case of delay in handing over of site	:	As per major component

Schedule of handing over of site: : As per major component

Schedule of issue of Designs: : As per major component

: As per major component

Clause 5.2

Clause 5.4 Recovery per day for delay in submission of the revised programme		As per major component
Clause 6: Computerized Measure Book (CMB) / Electronic Measurement Book (EMB) **Mode of Measurement:**		**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	:	**3.75 lakhs.**
Clause 7A **Whether clause 7A shall be applicable:**	:	As per major component
Clause 7B **Whether clause 7B shall be applicable:**	:	As per major component
Clause 8A **Authority to decide compensation on account if contractor fails to submit completion plans**	:	Chief Engineer, CPWD, Vijayawada or his Successor thereof
Clause 10A **List of testing equipment to be provided by the contractor at site lab.**	:	As per the requirement or as decided by the Engineer in Charge.
Clause 10 B(ii) Whether clause 10-B (ii) shall be applicable	:	As per major component
Clause 10C **Component of Labour expressed as percent of value of work.**	: :	**Applicable** **25%**
Clause 10CC	:	**Not Applicable**
Clause 11 **Specifications to be followed for execution of work**	:	CPWD Specifications 2019 Vol. - I & II with up-to-date correction slips.
Clause 12 **Authority to decide deviation up to 1.5 times of tendered amount.**	:	Chief Engineer, CPWD, Vijayawada. The Completion of Cost including extra items, deviations, and admissible escalation shall, in no case, exceed 1.50 times the contract amount. The contractor has to devise a system to keep a watch on the quantum of work taken up vis-à-vis balance items required to complete a defined scope of work and

		will give the alerts to Engineer-In-Charge before taking up extra items, and deviations so that completion costs including extra items, deviations, and admissible escalation does not exceed 1.50 times the contract value. Work executed beyond the above limit will neither be recorded nor be paid.
12.2& 12.3 Deviation limit beyond which clauses 12.2& 12.3 shall apply.	:	100% (Hundred percent)
12.5 i) Deviation limit beyond which clauses 12.2& 12.3 shall apply for all construction works	:	100% (Hundred percent)
Clause 16 Competent authority for deciding the reduced rates	:	Chief Engineer, CPWD, Vijayawada or his Successor thereof
Clause 18 List of mandatory machinery, tools & plants to be deployed by the contractor at site	:	As per the requirement or as decided by the Engineer in Charge.

Clause -19C: -	Authority to decide penalty for each default	:	As per major component
Clause -19D: -	Authority to decide penalty for each default	:	As per major component
Clause -19G: -	Authority to decide penalty for each default	:	As per major component
Clause -19K: -	Authority to decide penalty for each default	: i. **:** ii.	As per major component As per major component

Clause 25

i. Conciliator for settlement of Disputes	Additional Director General, Region Hyderabad, CPWD, Hyderabad or his successor thereof.
ii. Arbitrator Appointment Authority	Chief Engineer, CPWD, Vijayawada or his Successor thereof

Place of Conciliation: Hyderabad

Clause 32:

Requirement of Technical Representative(s) and recovery rates: As per major component

Clause 38

(i) (a) Schedule/statement for determining theoretical quantity of cement & bitumen on the basis of Delhi Schedule of Rates 2025 printed by C.P.W.D. with correction slips up to the last date of submission of bids.

(ii) Variations permissible on theoretical quantities.

(a)	Cement for works with estimated cost put to tender more than 25 lakhs	:	As per major component
(b)	Bitumen for all works	:	
(c)	Steel Reinforcement and structural steel sections for each diameter, Section and category	:	
(d)	All other materials	:	

Executive Engineer(C)
CPWD, Vijayawada

ADDITIONAL CONDITIONS (Civil Component)

1.1 QUALITY ASSURANCE/TESTING OF MATERIALS: -

1.1.1 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.

1.1.2 With each Running Bill, the details of test carried out shall be submitted by the contractor as per Performa given in the tender document.

1.1.3 **Testing charges to be borne by Contractor.**

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. **All expenditure to be incurred for testing of samples i.e. packing, sealing, transportation, loading, unloading etc., including testing charges shall be borne by the Contractor.**

1.1.4 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.

1.1.5 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.

1.1.6 **Maintenance of Register of Tests**: -

(i) All the registers of tests carried out a Construction Site or in outside laboratories shall be maintained by the contractor which shall be issued to the contractor by Engineer-in-Charge.

(ii) 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.

(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 representative of the Engineer in Charge.

(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 Engineer in Charge or his representative.

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

1.1.7 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. or Private sector. 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. However, the outside private laboratories shall be approved in the following manner: -

1. The SDGs/ADGs will approve the private lab irrespective of distance for tests accredited by NABL or any other similarly placed accrediting government body which operates in accordance with ISO/IEC 17011 and acridities labs as per ISO/IEC 17025.

2. A lab will have to submit details of space available, equipment, staff (Technical and Non-Technical), accreditation and approval from various department/institutes. Lab must be NABL approved.

3. Initial approval of lab should for one year and can be revalidated for further one year and so on.

4. Every lab will be audited for maintenance and calibration of equipment and employment of staff prior to approval/revalidation.

However, testing of material in any Govt., Lab / Public Undertaking Lab / IIT or NIT Lab / Govt. Engineering College may be allowed by Executive Engineer without prior approval of Chief Engineer, Vijayawada or higher officers provided these labs have all necessary facility to carry out the required tests.

1.1.8 Ultrasonic pulse velocity test shall be conducted on at least 5% of the total number of RCC members in each category i.e., beam, column, 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.

1.1.9 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.

1.1.10. 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.

1.1.11 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.

1.1.12 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.

1.2 <u>FIELD LABORATORY</u>

The contractor has to establish within 21 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.Rs.5,000/-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.

For performing the above tests, the **Field Testing Equipments and Instruments as indicated in the tender document** are to be arranged and maintained by the contractor at his own cost.

1.2.1 The contractor shall ensure quality construction in a planned and time bound manner. Any sub-standard material / work beyond set-out tolerance limit shall be summarily rejected by the Engineer-in-Charge & contractor shall be bound to replace / remove such sub-standard / defective work immediately.

1.2.2 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.

1.3 SAMPLE OF MATERIALS: -

1.3.1 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 Approved 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.

1.3.2 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.

1.3.3 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.

1.3.4 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.

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.

1.3.5 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.

2.0 CEMENT & STEEL REINFORCEMENT

2.1 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.

2.2 CEMENT: -

2.2.1 The contractor shall procure 43 grade ordinary Portland Cement (OPC) conforming to IS: 269 / Portland Pozzolana Cement (PPC) conforming to IS: 1489 (Part-1) as required in the work as per specifications/particular specifications of buildings 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, CPWD, Vijayawada.** 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 Pozzolana 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 up to 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 M-30 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 fly ash mixed concrete or concrete using fly ash blended cements (PPCs) 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 fly ash 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 chemical admixtures conforming to IS : 9103. The compatibility of chemical admixtures and super plasticizers with each set of 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 fly ash admixed or PPC based concrete is recommended. In case, where structural concrete is exposed to excessive magnesium sulphate, fly ash substitution/content shall be limited to 18% by weight. Special type of cement with low C_3A 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 fly ash 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 fly ash shall be permitted.

2.2.2 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 or his authorized representative to do so. The cost of tests shall be borne by the contractor.

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

2.2.4 OPC & PPC bags shall be stored in separate godowns. 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 machine numbered and each page initialed 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 located at the 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.

2.2.5 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 the procedure prescribed in Clause-38 of the contract and shall be governed by the conditions laid therein.

2.2.6 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.

2.2.7 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.

2.2.8 Damaged 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.

2.2.9 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.

2.2.10 In case cement has been stored for over six (06) months from the date of manufacture or for any reason the stored cement shown sign of deterioration and contamination it shall be tested prior to use in the work.

The sample shall be taken within three weeks of the delivery and all the tests shall be commenced within one week of sampling and not later than 03 months from the receipt of sample for testing.

After completion of previous test if cement is stored more than 03 months, it shall be retested before use.

2.2.11 **Compressive Strength of Cement**

The average compressive strength of at least three mortar cubes (area of face 50 cm^2) composed of one part of cement, three parts of standard sand (conforming to IS 650:1996) by mass and P/4+3.0 percent (of combined mass of cement plus

sand) water, and prepared, stored and tested in the manner described in IS 4031 (Part 6): 1988, shall be as follows:

a) 72±1 hour not less than 23 MPa

b) 168±2 hour not less than 33 MPa

c) 672±4 hour not less than 43 MPa

NOTE: - P is the percentage of water required to produce a paste of standard consistency (see as below)

Compressive strength of PPC

a) 72±1 hours, not less than 16 MPa

b) 168±2 hours, not less than 22 MPa

c) 672±4 hours, not less than 33 MPa

Consistency of Standard Paste: -

The quantity of water required to produce a paste of standard consistency, to be used for the determination of the water content mortar for the compressive strength tests and for the determination of soundness and setting time, shall be obtained by the method described in IS 4031 (part 4) : 1988.

2.3 STEEL REINFORCEMENT: -

2.3.1 (a) The Contractor shall procure ISI-marked TMT bars of various grades from the approved steel manufacturers as per the list of approved makes forming part of this document or their authorized dealers having valid BIS license for IS: 1786-2008 and further confirming to the OM No. CSQ/SE (TAS)/steel/2024/262 (H), dated 14.08.2024.

The Agency has to be procured the Bar Set – I steel bars of having the following qualities:

9. In compliance of the above directions of the Hon'ble High Court at Calcutta, an Expert Committee was constituted by DG CPWD vide OM No. CSQ/SE(TAS)/EE(TAD)/Steel/2024/190-H dated 10.06.2024 for deciding the criteria for the selection of steel manufacturers for CPWD works. The expert committee has conveyed their final recommendation {enclosed as annexure I(d)} vide Minutes of Meeting dated 24th July 2024 and the same has been accepted by DG, CPWD. The brief of these recommendations are as follows:

Steel Bars shall be classified as:

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

And

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

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

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

Annexure- I(c)

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

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

A. **FOR BAR SET- I**

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

1.1 Chemical Properties

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

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

1.2 Physical Properties

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

2. **Additional requirement**

2.1 Permissible limit for Manganese and Copper as follows:

Constituent	Permissible Limit (% of cast metal quantity)		
	Fe 415 D	Fe 500 D	Fe 550 D
Manganese (Mn)			
Maximum	1.60	1.60	1.60
Copper (Cu)			
Maximum	0.80	0.80	0.80
Minimum	0.20	0.20	0.20

Notes:

The above composition shall be obtained as per latest version of IS 228

1. Manganese using Periodate Spectrophotometric Method **(Part 12),** and
2. Copper using Thiosulphate Iodide Method (**Part 15)** or Spectrophotometric (Diethyl Dithiocarbonate) Method **(Part 21)**

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

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

(B)FOR BAR SET-II

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

Annexure-I(d)

1. CRITERIA FOR CLASSIFICATION OF BARS

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

1.1 Process of Classification

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

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

(a)The test samples being collected from the manufacturing facility by the representative engineer of CPWD,

(b) The availability of the required test facility at the said laboratory, and

(c) The test being witnessed by representative engineer of CPWD.

1.2 Classification of Steel Bars

The bar shall be classified as:

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

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

2. ADDITIONAL REQUIREMENTS

Four additional requirements as specified hereunder.

2.1 Chemical Composition Requirement

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

Table 1: Permissible limits of additional elements

Constituent	Permissible Limit (% of cast metal quantity)		
	Fe 415 D	Fe 500 D	Fe 550 D
Manganese (Mn)			
Maximum	1.60	1.60	1.60
Copper (Cu)			
Maximum	0.80	0.80	0.80
Minimum	0.20	0.20	0.20

Notes:

The above composition shall be obtained as per latest version of **IS 228**:

(1) Manganese using Periodate Spectrophotometric Method (**Part 12**), and

(2) Copper using Thiosulphate Iodide Method (**Part 15**) or Spectrophotometric (Diethyl Dithiocarbonate) Method (**Part 21**).

2.2 TM Ring Requirement

The following two requirements shall be met with:

(1) Does the *Tempered Martensite(TM) Ring* satisfy the visual analysis as per **Step 1** of **Table 2**; and

(2) The thickness of the TM Ring obtained as per **Step 2** of **Table 2** shall be between 0.07f and 0.15f, where f is the *original nominal diameter* of the bar.

(a) Test Procedure

The following is the procedure:

(1) The test setup to capture the *Cross-Sectional Phase Distribution (CSPD)* of the TMT bars shall be as shown in **Figure 1**.

(2) Steel bars may be cut using handsaw or an abrasive cutter with continuous supply of coolant to limit the temperature of steel, and thereby avoid any transition or changes in *Tempered Martensite(TM)* and *Ferrite-Pearlite (FP)* phases (**Figure 2**). The sharp edges of cut bars should be smoothened using silicon carbide abrasive sheets. A metal polishing machine can be used to achieve effective smoothening.

(3) The smoothened steel specimen shall be moulded in cold setting epoxy with good surface finish. Setting time of epoxy is about 10-15 minutes.

(4) The moulded specimen surface shall be course polished using abrasive sheets of 80, 150, 220, 320, and 600 grit sizes in sequence. Specimens shall be micro-etched using Nital (5% Nitric acid in alcohol) to capture the CSPD.

(b) Measurements

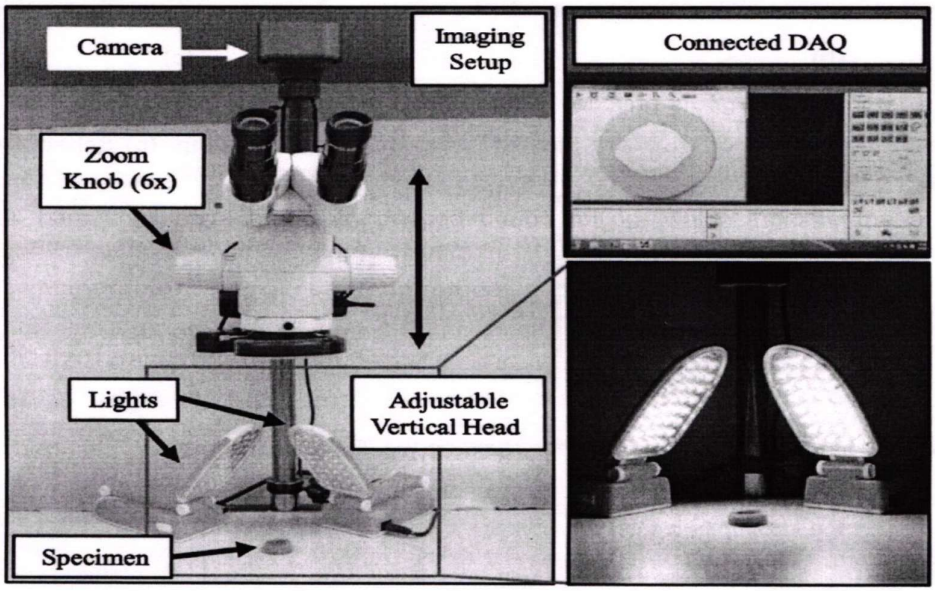
The procedure for obtaining the *CSPD* of the TM Ring along the perimeter shall be as per **Table 2**.

2.3 Marking Requirement

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

2.4 Manufacturing Process Requirement

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



(a)

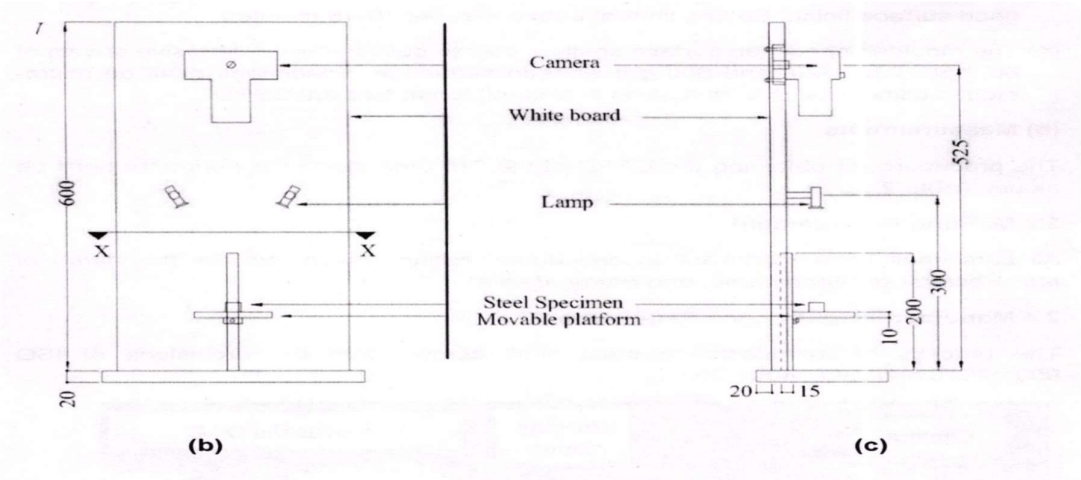


Figure 1: Test setup for CSPD of the TMT bars: (a) Imaging Setup, (b) Schematic Front View (c) Schematic Side View

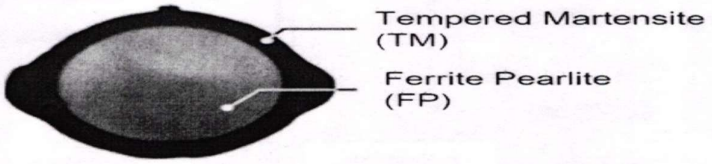
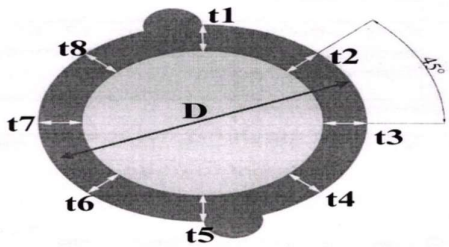


Figure 2: Cross-section of the steel bar showing the TM and FP areas

Table 2: Method of obtaining CSPD of TM Ring

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

3. GUIDELINES FOR USE OF STEEL BARS IN DIFFERENT PROJECTS

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

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

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

Table 4: List of *Normal Buildings*

Residential or Non-Residential Buildings with occupancy less than 100 persons, *excluding*:

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

Table:5 List of Standalone Normal Structures

Water Tanks and Water Sumps up to 50,000 liters, and Pump Rooms of area less than 20 m2
Septic Tanks, Sewage Treatment Plants, and Effluent Treatment Plants up to 10,000 liters/day
Bridges and Culverts of spans up to 6 m
Earth Retaining Structures up to 4 m
Compound Walls, Entry Gates, and Small Reception Rooms
Storm Water Drains
Cable Trenches
Parking Structures of single storey
Security Cabins and Sentry Post
Any other structure identified with the approval of Technical Sanctioning Authority of CPWD

i. Excellent ductility, bendability and elongation of the finished product due to possible refining technology.

ii. Consumption of steel should be accurate as per design

iii. Steel should have no brittleness problem in the finished product.

2.3.2 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.

2.3.3 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.

2.3.4 The steel reinforcement bars shall be brought to the site in bulk supply of 10tonnesor more, or as decided by the Engineer-in-charge.

2.3.5 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.

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

Size of bar	For consignment below 100tonnes	For consignment above 100tonnes
Under 10mm dia bars	One sample for each 25tonnes or par thereof.	One sample for each 40tonnes or part thereof.
10mm to 16mm dia bars	One sample for each 45tonnes or part thereof.	One sample for each 50tonnes or part thereof.
Over 16mm dia bars	One sample for each 50tonnes or part thereof.	One sample for each 75tonnes or part thereof.

2.3.7 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.

2.3.8 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 the contract 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.

2.3.9 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.

2.3.10 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.

2.3.11 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.

2.3.12 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.

2.3.13 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.

2.3.14 (a) If the Derived Weight as in sub-para (2.3.13) above is less than the Standard Weight as in Sub-para (2.3.12) above 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

Nominal Size in mm	Tolerance on Nominal mass Percent		
	Batch	Individual Sample*	Individual sample for coil**
Up to and including 10	$\pm$7	-8	$\pm$8
a) Over 10 up to and Including 16	$\pm$5	-6	$\pm$6
b) Over 16	$\pm$3	-4	$\pm$4

* For individual sample plus tolerance is not specified.

**For coils batch tolerance is not specified.

c) If the Derived Actual Weight is found more than the Standard Weight, the Standard Weight as per in sub-para (2.3.12) above shall be taken for payment. In such case nothing extra shall be paid for the difference between the Derived Actual Weight and the Standard Weight.

2.4 SAFETY IN CONSTRUCTION

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

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

2.4.3 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.

2.4.4 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.

2.4.5 Form 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.

2.4.6 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.

2.4.7 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.

2.4.8 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 those 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.

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

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

2.4.11 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.

2.4.12 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.

2.4.13 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.

2.4.14 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.

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

PARTICULAR SPECIFICATIONS

(Civil Component)

1. GENERAL

1.1 The work 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 thereto or 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 out or bailing out water if required for which no extra payment will be made. This will include water encountered from any source, such as rains, floods, 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) the rates tendered by the tenderer shall be all inclusive and shall apply to all lifts, all heights and all floor including terrace, leads and 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. In case of any difference noticed between architectural and structural drawings, the contractor shall obtain final decision of the Engineer-in-charge. In case 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 Wherever any reference to any Indian Standards occurs in the documents relating to this contract, the same shall be inclusive of all amendments issued thereto or revisions thereof, if any, up to the date of receipt of tenders.

1.8 The following additional specifications shall apply:

1.8.1 All stone aggregate and stone ballast shall be of hard stone variety and to be obtained from quarries near& around to site of work, approved by the Department of Mines, Govt. of A.P. and as per direction of the Engineer in charge

1.8.2 Coarse sand should be obtained from sand quarries of nearby rivers, approved by the Department of Mines, Govt. of A.P. and as per direction of the Engineer in charge and to be used for cement concrete work including RCC, mortar for

masonry and plaster work shall be of standard quality and screened as required. It shall be clean sand.

In case of non-availability of sand, the agency may be permitted at the discretion of Engineer-in Charge to use **crushed stone sand** on their request on production of adequate proof of non-availability of the same, provided it confirms to grading and other requirements given in CPWD specifications. The change in sand type or source would require revision of Mix Design of Concrete from the approved laboratories such as AU/Visakhapatnam or JNTU Kakinada or NCCBM Hyderabad or any Government Engineering College /Institute, for which nothing extra shall be paid nor any extra time will be granted. In case of use of crushed stone sand, all necessary precautions for CC work, RCC work, masonry work, plaster work and all other related works shall be taken by the agency as per relevant CPWD specifications and BIS codes without any extra cost.

1.9 The rates for all items of work shall unless clearly specified otherwise include 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.

1.10 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 areas shall be made good during finishing and nothing extra shall be payable on these accounts.

1.11 Product delivery, storage and handling of chemicals.

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

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

1.11.3 All the chemicals (polymers, epoxy, water proofing compound, plasticizer, Polysulphide, all exterior and interior paints, polish etc.) shall be procured in convenient packs say 20 liters/Kgs.} capacity packing only or as approved by the Engineer-in-Charge, and not in bigger capacity containers, say 200 liter (Kgs.) drums unless otherwise specifically permitted by the Engineer-in-Charge. One sample from each lot of the chemical procured by the contractor shall be tested in a laboratory as approved by the Chief Engineer.

1.11.4 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 contractor and no claim, whatsoever, on this account shall be entertained. Different containers of each chemical shall be serially numbered on packing and also consumed in that order. Day-to-Day account of receipt, issue and balance shall be regulated by the Department and proper account shall be maintained at site of work in the prescribed form as per the standard practice.

1.11.5 All the chemicals shall be procured by the contractor directly from the manufacturer. In exceptional circumstances, the contractor may be allowed to procure the materials from the authorized dealers of the manufacturers, if specifically permitted by the Engineer-in-Charge.

1.11.6 The original copies of challan / cash memos towards the quantity of various chemicals procured shall be made available by the contractor at the request from the Engineer-in-Charge and a copy of the same shall be kept in record.

1.11.7 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 each container.

1.11.8 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.

1.11.9 All filled containers shall be handled in safe manner and in a way to avoid breaking container seals.

1.11.10 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.

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

1.11.12 Contractor shall suitably advise his site Engineer and all the workers as regards safe handling of chemicals. Necessary protective and safety equipments in form of hand gloves, goggles etc. shall be provided by the contractor and be also used at site.

1.11.13 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, whatsoever, shall be entertained on this account.

1.11.14 The chemicals shall be tested in an independent laboratory as approved by the Chief Engineer at the frequency as specified. If required, more samples may have to be tested as per the directions of the Engineer-in-Charge. Nothing extra shall be payable on this account. However, all the testing charges shall be borne by the Contractor.

2 **EARTH WORK: -**

2.1 Earth work shall be executed as per CPWD specifications.

2.2 Measurement of excavation shall be done as per CPWD specification 2019 with up-to-date correction slips.

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 at his own cost all necessary arrangements for maintaining water level, in the area where works are under execution low enough so as not to cause any harm to the works or problems in carrying out with the execution and the rates for all items of work shall be considered as

inclusive of pumping out or bailing out water, if required and for which no extra payment shall be made. This will include water coming from any source, such as rains, accumulated rain water, floods, leakages from sewer and water mains subsoil water table being high or due to any other cause whatsoever. The contractor shall make necessary provision of pumping, dredging, bailing out water coming from all above sources and excavation and other works shall be kept free of water by providing suitable system approved by the Engineer-in-Charge.

2.5 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 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.

3.0 <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.

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 & SP 23. 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.

(a) The contractor has to submit design mix without use of admixtures.

(b) Admixture may be added in case of 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 IS: 456:2000. Admixtures shall not be used without approval of Engineer-in-Charge. Whenever required, the admixture of approved quality & approved make only shall be used to attain the required workability. Nothing extra on account of use of Admixture / Plasticizer shall be payable.

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 READY MIX CONCRETE (RMC) TO BE GIVEN TO THE SUPPLIER BY THE CONTRACTOR

3.2.1 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 within a week of such approval. The contractor will not be allowed to purchase ready mixed concrete without completion of above stated formalities for use in this project.

3.2.2 Notwithstanding 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.

3.2.3 The Engineer-in-charge will reserve right to inspect at any such stage and reject the concrete if he is not satisfied about quality of product. The contractor should therefore draw MOU / agreement with RMC owner / company very carefully keeping all terms and conditions / specifications forming a part of this tender document.

(i) The Engineer-in-charge reserves the right to exercise control over the ingredients, water and admixtures purchased, stored and to be used in the concrete including conducting of tests for checking quality of materials, recordings of test results and declaring the materials fit or unfit for use in production of mix.

(ii) Calibration check of the RMC.

(iii) Weight and quantity check on the ingredients, water and admixtures added for batch mixing.

(iv) Time of mixing of concrete.

(v) Testing of fresh concrete, recordings of results and declaring the mix fit or unfit for use. This will include continuous control on the workability during production and taking corrective action.

3.2.4 For exercising such control, the Engineer-in-charge shall periodically depute his authorized representative at the RMC plant. It shall be responsibility of the contractor to ensure that all necessary equipment manpower & facilities are made available to E-in-C and/ or his authorized representative at RMC plant.

3.2.5 Ingredients, admixtures & water declared unfit for use in production of mix shall not be used. A batch mix found unfit for use shall not be loaded into the truck for transportation.

3.2.6 All required relevant records of RMC shall be made available to the Engineer-in-charge or his authorized representative. The E-in-C shall, as required, specify guidelines & additional procedures for quality control & other parameters in respect of materials and production & transportation of concrete mix, which shall be binding on the contractor & the RMC plant.

3.3 Ingredients:

3.3.1 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.

(a) **Coarse Aggregate: -** As per CPWD Specifications

(b) **Fine Aggregate: -** As per CPWD Specifications

(c) **Water: -** It shall conform to requirements laid down in IS:456-2000 / Para 3.1.1 of CPWD Specifications (Vol. I 2019)

(d) **Cement: -** Portland Pozzolana Cement (Fly Ash based) conforming to IS: 1489/ OPC of grade 43 shall confirm to IS: 269, required in the work from reputed manufacturers of cement as per the approved make in 50 kg. bags bearing manufacturer's name and ISI marking, along with manufacturers test certificate for each lot. Portland Pozzolana Cement is to be used for RCC works only subject to fulfillment of conditions of circular number CDO / SE (RR) / fly ash (MAN) 02 dated 09.04.09 shall be used for design mix concrete and shall conform to IS-1489 (Part I). However, if the contractor uses higher grade of cement nothing extra shall be paid.

(e) **Admixture/ Plasticizer: -** 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 IS: 456:2000. Admixtures shall not be used without approval of Engineer-in-Charge. Whenever required, the admixture of approved quality & approved make only shall be used to attain the required workability. Nothing extra on account of use of Admixture / Plasticizer shall be payable.

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 to less than the 0.45.

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 COMPRESSIVE STRENGTH COMPLIANCE REQUIREMENT

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

Specified Grade	**Mean of the Group of 4 Non-overlapping consecutive test results in N/mm2**	**Individual Test Results in N/mm2**
(1)	(2)	(3)
M25 Or Above	≥ F_{ck} + 0.825 x established standard deviation (rounded off to nearest 0.5 N/mm²) Or F_{ck} + 3 N/mm², whichever is greater where f_{ck} is characteristic compressive strength of CC cube at 28 days.	≥ F_{ck} – 3 N/mm²
Note: (i)	In the absence of established value of standard deviation, the values given in Table as mentioned below may 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 amended upto 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 houses 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: -

The contractor shall submit at his own cost, the mix design report from approved laboratories such as AU/Visakhapatnam or JNTU Kakinada or NCCBM Hyderabad or any Government Engineering College /Institute for approval of Engineer-in-charge within 30 days from the date of issue of letter of acceptance of the tender. No concreting shall be done until the mix design is approved. Every time sources of materials/cement is changed mix design report shall be got re- done and has to be got approved from Engineer In charge.

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

In the event if all the **above** laboratories are unable to carry out the requisite design/ testing, the contractor may have it done from any other NABL accredited laboratory with prior approval of the **Chief Engineer.**

3.7 **The contractor shall submit the report on design mix from any of above approved laboratories for approval of Engineer in Charge within 30 days from the date of issue of letter of acceptance of the tender.** No concreting shall be done until the design mix is approved. 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 which nothing extra shall be payable.

3.8 In case of change of source or characteristic properties of the ingredients used in the concrete mix design during the work, the contractor as per the directions of the Engineer-in-charge shall submit a revised concrete mix design report conducted at laboratory established at site. Nothing extra shall be paid on this account.

3.9 All cost of mix designing and testing, connected therewith, 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.

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

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

3.10.2 APPROVAL OF DESIGN MIX

The design mix shall be considered satisfactory and approved if at least three preliminary test-sets individually satisfy the following strength and workability criteria:

(a) The average strength of each test-set is not less than the specified target mean compressive strength (Tck).

(b) The strength of any specimen cube is not less than 0.85 fck.

(c) The concrete mix is of required degree of workability and acceptable concrete finish.

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

3.11.1 Proportioning Concrete

In proportioning cement concrete, the quantity of both cement and aggregates shall be determined by weight. The cement shall be weighed separately from the aggregates. Water shall either be measured by volume in calibrated tanks or weighed. All measuring equipment shall be maintained in a clean and serviceable condition. The amount of mixing water shall be adjusted to compensate for moisture content in both coarse and fine aggregates. The moisture content of aggregates shall be determined in accordance with IS: 2386

(Part III). Suitable adjustments shall also be made in the weights of aggregates to allow for the variation in weight of aggregates due to variation in moisture content.

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 starter switch will automatically start the weighing operation of each material and stop automatically, when the designated weight of each material has been reached. The batching plant shall have automatic arrangement for dispensing the admixture and shall also be capable of discharging water in more than one stage. A print out from the batching plant for every lot shall be submitted. A batching plant essentially shall consist of the following components: Separate storage bins for different sizes of aggregates, silo for cement; and water storage tank.

- Batching equipment
- Mixers
- Control panels
- Mechanical material feeding and elevating arrangements

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

3.11.2.3 WATER:

1. Water to be used in manufacturing and curing of Concrete shall be tested before use. All such tests shall be submitted to the Engineer in charge for his approval before 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 herein shall have to be repeated.
3. In the event of water is drawn from tube wells or open wells, water samples shall be for seasonal fluctuations in water table or at intervals to be directed by the Engineer in charge.

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

   One test at commencement of work for approval of each source and there after change of source and

Thereafter, water from each source shall be got tested during the dry season before monsoon and again after the monsoon.

Time period between two tests shall not exceed six months.

2. 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

3.11.2.5Mixing Concrete

3.11.2.5.1 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, signaling 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

3.11.2.6.1 Mixed concrete from the batching plant shall be transported to the point of placement by transit mixers or through concrete pumps or steel closed bottom buckets capable of carrying 0.6 cum concrete. In case the concrete is proposed to be transported by transit mixer, the mixer speed shall not be less than 4 rev/ min. of the drum nor greater than a speed resulting in a peripheral velocity of the drum as 70 m / minute at its largest diameter. The agitating speed of the agitator shall be not less than 2 rev / min. nor more than 6 rev / min. of the drum. The number of revolutions of the mixing drum or blades at mixing speed shall be between 70 to 100 revolutions for a uniform mix, after all ingredients, have been charged into the drum. Unless tempering water is added, all rotation after 100 revolutions shall be at agitating speed of 2 to 6 rev / min. and the number of such rotations shall not exceed 250. The general construction of transit mixer and other requirements shall conform to IS: 5892.

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

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

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

3.12.1 The contractor shall make the cubes of trial mixes as per approved Mix design at site laboratory for all grades, in presence of Engineer in charge using sample of approved materials proposed to be used in the work prior to commencement of concreting and get them tested in his presence to his entire satisfaction for 7 days and 28 days. Test cubes shall be taken from trial mixes as follows.

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

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 a reasonable 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*
I -10	1
11 - 30	2
31 -60	3
61- 100	4
101 and above	4 plus one additional sample for each additional 50 m3 or part thereof

NOTE- *Each sample shall be adequate quantity so that a minimum of 3 specimen cubes can be made. Test of the sample is to be done in accordance with IS: 516 (Minimum Quantity : 10 cum).*

3.12.4 Test Specimen

Three test 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 formwork, 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 results of the sample shall be the average of the strength of three specimen. The individual variation shall not be more than +/- 15 percent of the average. If more, the test results of the sample are invalid. 90% of the total tests shall be done at the laboratory established at site by the contractor and remaining 10% in the laboratory as mentioned in para 3.6, or in any other NABL accredited laboratory as directed by the Chief Engineer, CPWD, Vijayawada.

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 para 3.5 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, the reinforcement has been displaced beyond the tolerances 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 underlying principle of assessing the quality of concrete is that comparatively higher velocities are obtained when the quality of concrete in

terms of density, homogeneity and 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 there are cracks, voids or flaws inside the concrete which come in the way of transmission of pulse, lower velocities are obtained.

3.12.7.2The 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 4.40	Excellent
2	4.40 to 3.75	Good
3	3.75 to 3.00	Doubtful
4	Below 3.00	Poor

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

3.12.7.3 The 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 the latest version of IS 516 (Part5/Sec-1. 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 5% of the total number of 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 Modifies Cement Mortar /Epoxy Mortaretc. 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 SPECIAL CONDITIONS FOR DESIGN MIX CONCRETE

1 The term machine batched, machine mixed and machine vibrated design mix cement concrete used in the document shall mean the concrete produced at site in fully automatic concrete batching & mixing plant (IS 4925), placed in position by the concrete pump and vibrated by surface vibrator/ needle vibrator/ plate vibrator, as the case may be to achieve required strength and durability. (However, for small elements like lintels, chajjas, shelves etc., the requirement of pumping would be dispensed with as per direction of Engineer – in – charge and placement would be done through alternative means).

2. Design mix concrete shall be used in the work for all structural members. For design mix concrete revised CPWD specifications 2019 along with relevant IS codes shall be followed in general along with the specific provisions made herein.

3. Following parameters shall be adopted for mix design.

3.1

Grade of Concrete	M25	M30	M40
(i) Nominal Max size of aggregate	20 mm angular as per CPWD specification	20mm angular as per CPWD specification	20 mm angular as per CPWD specification
ii) Degree of workability (Slump) mm a) Without Pump b) With Pump	 25 to 75mm 75 to 100 mm	 25mm to 75mm 75mm to 100 mm	 25 to 75 mm 75 mm to 100 mm
(iii) Degree of quality control	Good.	Good.	Good.
(iv) Type of exposure	Severe	Severe	Severe
(v) Max free water cement/ ratio	0.45	0.45	0.40
(vi) Minimum Cement Content	330kg/cum and as specified in the item.	350 kg/cum and as specified in the item.	390 kg/cum and as specified in the item.
(vii) Fine Aggregate	Coarse sand as per CPWD specifications.	Coarse sand as per CPWD specifications.	Coarse sand as per CPWD specifications.
(viii) Mix applicable	Plain/Reinforced cement concrete	Plain/Reinforced cement concrete	Plain/Reinforced cement concrete
(ix) Method application	Pumping	Pumping	Pumping

(x) Max Cement content	500 kg/Cum	500 kg/Cum	500 /Cum
(xi) a) Characteristic compressive strength compliance requirement. (Mean of group of 4 non-overlapping tests and consecutive test) (N/Sqmm)	Greater than or equivalent to f_{ck}+0.825xEstablished standard deviation Or F_{ck}+3whichever is more	Greater than or equivalent to f_{ck}+0.825xEstablished standard deviation Or F_{ck}+3whichever is more	Greater than or equivalent to f_{ck}+0.825xEstablished standard deviation Or F_{ck}+3whichever is more
b) Individual test (N/Sqmm)	F_{ck}-3	F_{ck}-3	F_{ck}-3

Design parameters for M 10 & M15 Design mix concrete

Following parameters shall be adopted for mix design.

Sl. No.	Grade of Concrete	M10	M15
1	Nominal Max size of aggregate	20 mm angular as per CPWD specification	20 mm angular as per CPWD specification
2	Degree of workability (Slump) mm	25 - 75	25 - 75
3	Degree of quality control	Good.	Good.
4	Type of exposure	Severe	Severe.
5	Max free water cement/ ratio	0.50	0.50
6	Type of cement used	Portland Pozzolana cement or OPC- 43 grade	Portland Pozzolana cement or OPC- 43 grade
7	Minimum Cement Content	220Kg/cum and as specified in the item.	240Kg/cum and as specified in the item.
8	Fine Aggregate	Coarse sand as per CPWD specifications.	Coarse sand as per CPWD specifications.
9	Mix applicable	Plain/Reinforced cement concrete	Plain/Reinforced cement concrete
10	Method application	Pumping	Pumping
11	Max Cement content	500 kg/Cum	500 kg/Cum
12	(A) Characteristic compressive strength compliance requirement. (Mean of group of 4 non-overlapping tests and consecutive test) (N/Sq.mm)	Greater than or equivalent to fck+0.825xEstablished standard deviation Or Fck+3whichever is more	Greater than or equivalent to fck+0.825xEstablished standard deviation Or Fck+3whichever is more
	(B) Individual test (N/Sq.mm)	Fck-3	Fck-3

Sl. No.12 above is added for the purpose of operation of Clause 16 of IS 456 - 2000.

(1) Approved admixtures conforming to IS-9103 shall be permitted to be used. The chloride content in the admixture shall satisfy the requirement of BIS 5075. The total amount of chloride content in the admixture mixed concrete shall satisfy the requirement of IS 456-2000.

(2) The concrete mix design with and without admixture will be carried out by the contractor through the laboratory to be approved by the Engineer-in- Charge.

(3) The various ingredients for mix design/ laboratory tests shall be sent to the lab/test houses through the Engineer-in-Charge and the samples of such ingredients sent shall be preserved at site till completion of work or change in Design Mix whichever is earlier. The sample shall be taken from the approved materials, which are proposed to be used in the work.

(4) The contractor shall submit the mix design report from approved laboratories such as Andhra University Visakhapatnam or JNTU Kakinada or NCCBM Hyderabad or any Government Engineering College /Institute for approval of Engineer-in-charge within 30 days from the date of issue of letter of acceptance of the tender. No concreting shall be done until the mix design is approved.

(5) The contractor shall make cubes of trial mixes as per approved mix design at site laboratory for all grades of concrete in presence of the Engineer-in-charge using same ingredients as adopted for design mix, prior to commencement of concreting and get them tested in presence of Engineer-in – Charge for 7 days and 28 days. For each design mix, a set of six cubes shall be prepared from each of the three consecutive batches. Three cubes from each set shall be tested at the age of 7 days and three cubes at the age of 28 days. The cubes shall be made, cured, transported and tested strictly in accordance with CPWD specification. The average strength of nine cubes at the age of 28 days shall exceed the specified target mean strength for which design mix has been approved.

(6) Tests shall be done at the laboratory as approved by the Engineer-in-charge.

(7) For each change of source or quality / characteristic properties of the ingredients during the work, from that approved & used in the concrete mix a fresh mix design shall be got done by the contractor. Revised trial mix test shall be conducted and shall be submitted by the contractor as per the direction of the Engineer-in-charge.

(8) The cost of packaging, scaling, transportation, loading, unloading cost of samples and the testing charges for mix design in all cases shall be borne by the contractor.

(9) The mix design shall be done considering the degree of quality control as 'good' in all cases.

(10) The Item of design mix cement concrete shall be inclusive of all the ingredients including admixtures it required labour, machinery, T&P etc. (Expect shuttering which will be measured & paid for separately)

required for a design mix concrete of required strength and workability. The rate quoted by the agency for the mix design items shall be net & nothing extra shall be payable on account of change in quantities of concrete ingredients like cement, sand, aggregates and admixtures etc. as per the approved mix design until unless specified elsewhere in the Notice Inviting Tender Documents.

(11) No fly ash shall be allowed to be added in the Design Mix at site

3.14. 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 fiber reinforced concrete with 6mm downgraded aggregate. Shape & size shall be as decided by Engineer-In-charge.

Cover block size should be as per IS code recommendation for severe exposure conditions.

3.15. CURING:

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

ii) 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.

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

iv) Membrane curing by chemical compounds may be allowed at places which are normally inaccessible and repair works and nothing extra is payable on this account. If curing compounds are proposed for any particular use, the contractor shall obtain permission for use of any 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 centering, 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 samples have failed shall be redone at the cost of contractor. However, the Engineer-in-charge may order for additional tests (like cutting cores, ultrasonic pulse velocity test, load test on structure or part of structure, etc.) to be carried out at the cost of contractor to ascertain if the

portion of structure wherein concrete represented by the sample has been used, can be retained on the basis of results of individual or combination of these tests. The Contractor shall take remedial measures necessary to retain the structure as approved by the Engineer-in-charge without any extra cost. 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.

3.17.2 Water Cement ratio for Ordinary RCC work shall not be more than 0.5. Contractor shall 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.

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 by the **Engineer-in-Charge**.

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

3.18.4 Nothing extra shall be paid for grid beams and the corresponding slabs having clear span more than 1.20 meters.

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 centering, shuttering and casting for which nothing extra shall be paid to the Contractor except the places where different type of flooring is provided in the same room.

As per general engineering practice, level of floors in toilet / bath, balconies, shall be kept 12 to 20mm or as required, lower than general floors 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 sanders to remove any cement slurry or cement mortar or rust. Proper shuttering oil or de-bonding compound such as "Reebole" of FOSROC or equivalent shall be applied on the surface of the shuttering plates in the requisite quantity before assembly of steel reinforcement. Nothing extra shall be paid on this account.

3.18.7 Concreting of upper floor shall not be done until concrete of lower floor has set at least for 14 days but form work and reinforcement can be taken up after the concrete has set at least for three days.

3.18.8 Double steel scaffolding having two sets of vertical supports shall be provided for external wall finish, cladding etc. The supports shall be sound and strong, tied together with horizontal pieces over which scaffolding platform shall be fixed. Scaffolding shall have steel staircase for inspection of works at upper levels. Nothing extra shall be paid on this account.

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 annealed 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 spacing and correct cover of concrete to reinforcement as called for in the drawings, spacer blocks of required shape and size. Chairs and spacer bars shall be used in order to ensure accurate positioning of reinforcement. **Spacer blocks shall be cast well in advance with approved proprietary pre-packed free flowing mortars (Conbextra 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 PCC block work shall be carried out with good quality Fly ash cement blocks of class designation 7 (strength not less than 70kg/sq.cm)as per CPWD Specifications.

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 cutouts 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 overlaps. Nothing extra shall be paid for welding and overlaps.

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 with in gap between the adjoining parts of the works of the width specified.

5.1.2 The contractor shall ensure that no debris is allowed to enter and be lodged in seismic/ separation/ 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 proportion as prescribed by manufacture 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/ MARBLE OR LIKE WORKS

6.1 The granite/ marble or like stonework 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 whatsoever shall be entertained 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 material is 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 slabs used for providing and fixing in the sills, soffits and jambs of doors, windows, ventilators and similar locations shall be in single piece unless otherwise directed by the Engineer-in-Charge. Wherever stone slab other than in single piece is allowed to be fixed, the joints shall be provided as per the architectural drawings and as per the directions of the Engineer-in-Charge. 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 leveled 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 WOOD WORK

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. 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.

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 embedded in ground 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, falling 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 paneled and wire gauge shutters shall be manufactured and carried out as per CPWD specifications (Volume-I, 2019 with upto date correction slips).

7.9 The work shall be executed through specialized agencies to be approved by the Engineer –in- Charge.

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 these meet 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 7 days 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
Up to 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. A lot 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 be got approved from the Engineer in Charge before applying protective coat of primer, polish or varnish.

8.0 Flush Doors

8.1 General

The door shall be of flush type solid core marine grade with single or double shutter as the case may be.

8.2 Shutters

Flush door shutters shall have a solid core and may be of the decorative or non-decorative (Paintable type as per IS 2202 (Part I). Nominal thickness of shutters may be 30mm as mentioned in the BOQ. Thickness and type of shutters shall be as specified.

Width and height of the shutters shall be as shown in the drawings or as indicated by the Engineer-in-Charge. All four edges of the shutters shall be square. The shutter shall be free from twist or warp in its plane. The moisture content in timbers used in the manufacture of flush door shutters shall be not more than 12 per cent when tested according to IS 1708.

8.3 Core

The core of the flush door shutters shall be a marine grade block board having wooden strips held in a frame constructed of stiles and rails. Each stile and rail shall be a single piece without any joint. The width of the stiles and rails including lipping, where provided shall not be less than 45mm and not more than 75mm. The width of each wooden strip shall not exceed 30mm. Stiles, rails and wooden strips forming the core of a shutter shall be of equal and uniform thickness. Wooden strips shall be parallel to the stiles.

8.4 End joints of the pieces of wooden strips of small lengths shall be staggered. In a shutter, stiles and rails shall be of one species of timber. Wooden strips shall also be of one species only but it may or may not be of the same species as that of the stiles and rails. Any species of timber may be used for core of flush door. However, any non-coniferous (Hard wood) timber shall be used for stiles, rails and lipping.

8.5 Face Panel

The face panel shall be formed by gluing, by the hot-press process on both faces of the core, either plywood or cross-bands and face veneers. The thickness of the cross bands as such or in the plywood shall be between 1.0mm and 3.0mm. The thickness of the face veneers as such or in the plywood shall be between 0.5mm and 1.5mm for commercial veneers and between 0.4mm and 1.0mm for decorative veneers, provided that the combined thickness of both is not less than 2.2mm. The direction of the veneers adjacent to the core shall be at right angles to the direction of the wooden strips. Finished faces shall be sanded to smooth even texture. Commercial face veneers shall conform to marine grade plywood and decorative face veneers shall conform to type I decorative plywood in IS 1328.

8.6 Lipping

Lipping, where specified, shall be provided internally on all edges of the shutters. Lipping shall be done with battens of first class hardwood or as specified of depth not less than 25mm. For double leaved shutters, depth of the lipping at meeting of stiles shall be not less than 35 mm. Joints shall not be permitted in the lipping.

8.7 Rebating

In the case of double leaves shutters the meeting of stiles shall be rebated by 8 mm to 10 mm. The rebating shall be either splayed or square type as shown in drawing where lipping is provided. The depth of lipping at the meeting of stiles shall not be less than 30 mm.

8.8 Opening for Glazing

When required by the purchaser opening for glazing shall be provided and unless otherwise specified the opening for glazing shall be as per drawings. The bottom of the opening shall be at a height as shown in the drawings. Opening for glazing shall be lipped internally with wooden batten of width not less than 25 mm.

8.9 Tolerance

Tolerance on width and height shall be + 3 mm and tolerance on nominal thickness shall be ± 1.2 mm. The thickness of the door shutter shall be uniform throughout with a permissible variation of not more than 0.8 mm when measured at any two points.

Adhesive: - Adhesive used for bonding various components of flush door shutters namely, core, core frame, lipping, cross-bands, face veneers, plywood etc. and for bonding plywood shall conform to BWP type, phenol formaldehyde synthetic resin adhesive conforming to IS 848.

8.10 Tests

As per CPWD Specifications.

8.11 Fixing

As per CPWD Specifications.

8.12 Measurements

As per CPWD Specifications.

9.0. STEEL WORK

9.1 All steel work shall be carried out as per CPWD Specifications. (Volume 1) 2019 with up-to-date correction slips.

9.2 All welded steel work shall be tested for quality of weld as laid down in IS 822: 1970 before actual execution.

10.0 FLOORING

10.1 All work in general shall be carried out as per CPWD Specifications (Volume 1) 2019 with up-to-date correction slips.

10.2 Whenever flooring is to be done in patterns of tiles and 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 whatsoever shall be made for these samples.

10.5 The Marble/ Kota/ Granite or any other stone shall be fully supported by the details establishing the quarry and its location or source.

10.6 Full width Marble/ Kota/ Granite stone over kitchen platform shall be provided except to adjust for closing pieces. The marble / stone flooring in treads and risers of staircase is to be laid in single piece.

10.7 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 Chasing of required width and thickness shall be made in brick work at skirting location so as to flush the external surface of skirting with internal plastering. No extra payment towards making chases in brick work at skirting shall be made and the same is presumed to be inclusive of rate quoted for the item of providing and fixing skirting.

10.9 Proper gradient shall be given to flooring for toilets, verandah, kitchen, courtyard etc. so that the 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.

10.12 The flooring laid with stone slab / tile / marble / Granite/ Ceramic tiles / vitrified tiles etc. 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.

11.0. VITRIFIED TILES FLOORING

11.1 The tiles of various types shall be of approved make and shall generally conform to IS 15622 or any other IS code as applicable with corrections/amendments up to the last date of bid submission. The Vitrified 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) / relevant BIS Code.

11.2 The vitrified 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 and to be procured from mother plant only.

11.3 The vitrified tile flooring / ceramic tile flooring or like tile flooring 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.

12.0 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 along with 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 The entire execution of waterproofing work shall be video recorded and submitted to Engineer-in-Charge on a DVD disc. Various toilets shall be indexed and written with paint on the walls for reference and identification purpose.

12.7 GUARANTEE BOND FOR ALL WATER PROOFING ITEMS: -

Ten years Guarantee bond in prescribed proforma **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 per cent) 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 after the expiry of maintenance period prescribed in the contract, 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.

13.0. FINISHING: -

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

13.2 The quantity of paint required as per the 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 The paint shall be obtained in smaller packing (around 20 liters).

13.4 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.

13.5 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 specifications and also copy of the manufacturer's test report for the record.

13.6 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.

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

13.8 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.

13.9 All incidental charges of cartage, storage, wastage, safe custody, scaffolding, cost of samples and mock ups etc. shall be borne by the Contractor and no claim, whatsoever, shall be entertained on this account.

14.0 SANITARY INSTALLATIONS /WATER SUPPLY / DRAINAGE: -

14.1 The contractor shall be responsible for the protection of the sanitary and water supply fittings and other fittings and fixtures against pilferage and breakage during the period 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 Specifications and as shown on the drawings. This also includes any material, equipment, appliances and incidental work not specifically mentioned herein 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 work in general shall be carried out as per CPWD Specifications (Volume II) 2019 with 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 CP 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 coordinate 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 through AutoCAD System based on Architectural Drawings and site measurements within two months of the stipulated date of start of the contract, 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 These shop drawings shall contain all information required to complete the work. These Drawings shall contain details of construction, size, arrangement,

operating clearances, performance characteristics and capacity of all items of equipment, also the details of all related items of work by other contractors. Each shop drawing shall contain tabulation of all measurable items of equipment/materials/works and progressive cumulative totals from other related drawings to arrive at a variation-in-quantity statement at the completion of all shop drawings. Minimum 4 sets 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 Shop drawings shall be submitted for approval four weeks in advance of planned delivery and installation of any material to allow the Engineer In-Charge ample time for scrutiny. 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 programme.

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 mockup 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 supersede the contract requirements, nor does it in any way relieve the contractor of the responsibility or 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 for 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 (300 x 450 mm) 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 his 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 led to be used in joints of 150mm,100mm, 75mm, 50mm 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 godowns, 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 defects 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 them and 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 (1 cement: 2

coarse sand: 4 stone aggregate 20 mm nominal size) or as directed by the Engineer-in-Charge.

14.27 The ground colour shall be applied throughout the entire length of pipe. Colour bands shall be superimposed on the ground colour and shall be applied near valves, junctions, joints, service appliances, bulkheads, valves, etc. for clear identification of fluid being carried and to avoid confusion. The relative proportional widths of the first colour band to the subsequent bands shall be 4:1.The minimum width of the narrowest colour band shall be 25 mm.

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 pipelines shall be disinfected as ordered. Chlorine solution shall be applied at the charging point as the pipeline is being filled and dosing shall be continued until the pipeline is full and at least 50 parts of chlorine per million parts of water have been made available and distributed evenly. If ordinary bleaching powder is used, proportions will be 150 gms of bleaching powder to 1000 litres of water. If a proprietary brand is used, the proportion shall be as specified by the manufacturer. The treated water shall be left in pipeline for a period as directed but not exceeding 24 hours chlorine residual tests shall be taken at various points along the pipeline. The disinfection process shall be repeated until the sample of water taken from the pipelineare 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.

15.0 <u>STAINLESS STEEL RAILINGS:</u>

15.1 Providing, fabricating and fixing in position welded built-up section using stainless pipes and connecting plates, of Grade S.S. 316and 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.

15.3 Guarantee Bond: The Contractor shall submit Guarantee Bond as per Proforma given in the tender document. In addition, 5% (five percent) of the cost of this item of work shall be retained as security deposit and the amount so withheld would be released after **five** years from the **date after the expiry of maintenance period prescribed in the contract**, if the performance of the work done is found satisfactory. If any defect is noticed during the guarantee period, it shall be rectified by the contractor along with any incidental repairs to structure, flooring, finishing, fixtures and any other related damaged work within fifteen days of receipt of intimation of such defects in the work. If the defects pointed out are not attended to within the specified period, the same shall be got done from another agency at the risk and cost of the contractor and the cost of attending such repairs shall be deducted from any dues payable to the contractors

16.0 Aluminium Work

16.1.1 The work shall be carried out as per specified CPWD Specifications in general and as per directions of Engineer – in – charge.

16.1.2 Guarantee Bond: The Contractor shall submit Guarantee Bond as per Proforma given in the tender document. In addition, 5% (five percent) of the cost of this item of work shall be retained as security deposit and the amount so withheld would be released after **Five years** from the **date after the expiry of maintenance period prescribed in the contract**, if the performance of the work done is found satisfactory. If any defect is noticed during the guarantee period, it shall be rectified by the contractor along with any incidental repairs to structure, flooring, finishing, fixtures and any other related damaged work within fifteen days of receipt of intimation of such defects in the work. If the defects pointed out are not attended to within the specified period, the same shall be got done from another agency at the risk and cost of the contractor and the cost of attending such repairs shall be deducted from any dues payable to the contractors.

17.0 uPVC WINDOWS& VENTILATORS

All openable and fixed window system shall have minimum 3 hollow chambers from front to back. The sliding system frames shall have minimum 3 chambers from front to back. The Sliding system Sashes shall have minimum 2 chambers from front to back. The outer profile shall not be less than 56mm.

All sections of the frame and sash shall be reinforced in accordance with the system supplier's recommendations us in galvanized mild steel in a single continuous length.

GENERAL REQUIRMENT

Profile

The profile is to be extruded from a compound that has been blended to ensure quality and consistency. The material shall be pristine white high impact

modified window grade uPVC and shall be conform to BS EN 12608:2003 as below.

Description	Required Value
Flexural modulus of Elasticity	Shall notbelessthan2200N/mm2 not
Resistance to impact by falling massat–10°C for Class II (falling mass 1000g; falling height 1500 mm – as per BSEN 12608:2003).	more than 1 test specimen shall show rupture in wall.
Mean Breaking Stress for welded corners.	Shall not be less than 35N/mm2for compression bending testor25N/mm2 for tensile bending test.

The profile shall be a hollow 3-chamber (across depth) profile withan outer wall thickness not less than 2. 2mm.The profile shall be of first grade/quality uniform and free from foreign bodies, cracks or marks.

Fabrication of Window: -

i) The window units shall be designed with all corner joints; transom joints and mullion joints being mitred and fusion welded.

ii) All excess material is to be neatly trimmed and neatly feature grooved/raised nib finish at corners, transom joints and mullion joints.

iii. There will be no mechanical joining of the profile

iv. No polishing flush of any joints will be permitted

v) The window units shall be designed so that the route of drainage is prevented from passing through the reinforcement chamber.

vi) The finished product shall be free from all sharp edges, burrs and the like that may be hazardous to the user.

vii) The dimensional tolerances on the finished outer frame height and width shall be+3mm. Frame assemblies shall be such that they can be installed square within a maximum difference in the diagonals of4mm.Minimumoverlap of sash on frame shall be8mm.

viii) In all window units, adequate drainage should be provided to permit the escape of water from platforms or horizontal members beneath each sealed unit. The drainage slots shall not penetrate into the reinforcement chambers. Rain water Stop to be provided wherever necessary to provide barrier to excess rain water.

Reinforcement

i) Reinforcement shall be made from GI tube of not less than 1.5mm thickness as per strength requirement unless otherwise approved by Engineer-in-Charge.

ii) Steel reinforcement shall conform to IS277:2003 or equivalent. Base material of steel shall conform to IS 513:2008–Drawing Grade.

iii) The reinforcement shall be installed in accordance with the recommended actions. The reinforcement shall conform to the wind load requirements of IS 875: Part 3. The reinforcement shall be in one continuous length and should be installed minimum 5mm and maximum 10mm from the face of the profile to be welded.

iv) The reinforcement shall be secured to the profile so that it does not move or rattle and it maintains the structural integrity of the frame and satisfactory thermal separation. Reinforcement is to be fixed at a maximum of 100mm from the ends and then at a maximum of 300mm centers.

Glazing and Weather Seals

GLAZING

i) Window shall be such that glazing or re-glazing on site is possible without the need to remove the outer frames from the structure of the building.

ii) All glazing is to be packed in accordance with the system supplier's recommendations to prevent any kind of damage during handling.

WEATHER SEALS

The weather seals shall be EPDM/Silicone seals. ASTM-D412 and ASTM-D2240 are standard specifying test methods for Tensile strength and Hardness of the gasket whereas the required value shall be specified

Ultimate tensile strength min >7.5/mm2

The weather seals are to be fitted in continuous lengths and grooves. The joints in the vent weather seal are to be positioned at the bottom and in the outer frames at the top.

Security and Safety

Fasteners shall be designed so that they cannot be released from the outside by the insertion of a thin blade.

No opening light shall be openable or removable from the outside, when it is fastened in the closed position, except by use of special tools or breaking part of the window.

QUALITY CONTROL AND TESTING OF MATERIALS

Raw Material

The material from which the profiles are made shall consist substantially from white polyvinylchloride as per BSEN 12608:20003. Only those additives and pigments may be used that are needed for the manufacture of the compound and its subsequent conversion into sound, durable extrusions of good surface finish and mechanical strength, as assessed by the requirements of this specification.

Profile Properties

Appearance and Finish

The color of the profile shall be uniform and the color of all profiles in a system shall be uniform. The profile shall be free from foreign bodies, cracks or sink marks when viewed by normal corrected vision at 90o to the surface and at a distance of 1 meter in normal diffused north light.

Dimensions and Weights

The profiles shall be straight such that the longitudinal axis of the profile, as measured on the face surfaces, may deviate from the straight line by no more than 1 mm per meter.

The cross section of the profile shall conform in shape and dimensions and may deviate by no more than + 0.5mm; glazing channels and seal grooves may deviate by not more than + 0.3mm. The weight of the profile per meter shall not be more than 5% below the nominal value.

Window properties

U-Value: The total Uw–U value of complete window shall be 3.3W/m2K Resistance to wind load:

All load bearing members shall be adequately reinforced so as to resist the wind load requirements of IS875: Part 3. Calculations shall be submitted for all window designs.

AIR Tightness:

The air in filtration for windows shall not exceed 1 liters/second m2 @ 75Pa for both positive and negative pressures (certified for use in air conditioned buildings)

Water Tightness:

The water penetration for windows shall be minimum 15 minutes @ 150 Pa as per AS 4420.5.

Installation of Frame

i. Before installation the Installation Team is to make sure that the opening has been prepared and any repair work has been carried out. Allow a 5mm gap between the frame and the opening. The new window shall be set in the prepared opening. Allow for suitable packing blocks.

ii. The window shall be fixed into the aperture, by drilling and fixing through the outer frame, to the existing structure using 'Fischer' fixings, F8 S type bolts.

iii. The fixings shall be no less than 150 mm from corners or transoms/mullions and at no more than 600mm centers.

iv. When the frame is securely fixed in position then fit glass and glazing beads. Allow for any necessary glazing blocks and glass lock devices.

v. Check windows for correct operation before proceeding with making good.

vi. No fixings are to penetrate the drainage channels.

vii. The windows shall be first treated with Polyurethane Foam (P U Foam) to enhance insulation against heat and Noise. The gap between masonry and the frame is to be filled with Neutral Cure Silicon (exposed to sun surface) and/or Acrylic Sealant (only for the internal surface). The windows shall be first treated with Polyurethane Foam (PU Foam) to enhance insulation against heat and Noise.

viii. The silicone joints should be covered with Architraves/trims as per direction of Engineer-in-charge.

Making Good

i) Making good to the external surface of the window frame and finish with a compatible approved low modular silicone sealant to BS5889. All trims and quadrants are to be approved by the Engineer-in-Charge prior to fixing.

ii) Allow for making good any disturbed plaster, brick work and decorations internally and externally including color wash to brick work.

iii) Clean off excess material and check fittings and gearing.

iv) Leave installation clean and in good working order.

GENERAL ITEMS

i) This specification is to be read in conjunction with any other relevant documents and drawings.

ii) Sizes are not to be scaled from any drawings or sketches but should be measured on site prior to manufacture.

Window Accessories

i) Window should be designed and reinforced such that it can with stand the wind load requirements by providing suitable strengthening accessories.

ii) The window shall meet the requirements of water tightness

Trims shall be used to cover the window to masonry joints

Window Hard ware

i) All slider door/windows are to be provided with multi point locking arrangement with/without key locking facility as per the requirement. The hardware shall be provided as per preferred list attached. The slider locking mechanism handles are of projected/flush type.

ii) Casement window friction stays are to be of G-U or Securistyle or equivalent make of appropriate size and weight bearing capacity, made of SS 304. The stack height of friction stay is to be 16+0.5 mm.

iii) The casement windows are to be provided with multi point locking mechanism of shall be provided as per preferred list attached.

Guarantee Bond:

The Contractor shall submit Guarantee Bond as per Proforma given in the tender document. In addition, 5% (five percent) of the cost of this item of work shall be retained as security deposit and the amount so withheld would be released after **Five years** from the date after the expiry of maintenance period prescribed in the contract, if the performance of the work done is found satisfactory. If any defect is noticed during the guarantee period, it shall be rectified by the contractor along with any incidental repairs to structure, flooring, finishing, fixtures and any other related damaged work within fifteen days of receipt of intimation of such defects in the work. If the defects pointed out are not attended to within the specified period, the same shall be got done from another agency at the risk and cost of the contractor and the cost of attending such repairs shall be deducted from any dues payable to the contractors.

Particular specifications and special conditions for structural design work.

DESIGN CONSIDERATIONS& REQUIREMENTS (CIVIL WORK)

The buildings shall be designed and constructed as per minimum "3-star GRIHA Rating".

1. Type of Structure –The structure shall be with conventional RCC framed cast-in-situ construction.
2. All concrete to be used /prepared at the site shall be Design Mix concrete/ RMC as per mix design approved by the Engineer-in-charge.
3. Design criteria of RCC structural units shall conform to the Design requirements of the Latest Version of IS: 456.
4. Minimum grade of concrete RCC shall be of M-30 Grade as per the Latest version of IS: 456.
5. ISI-marked TMT bars of various grades shall be procured from:

(a) The steel Manufacturers such as SAIL, TATA Steel Ltd., RINL and JSW steel Ltd or their authorized dealers having valid BIS license for IS: 1786-2008 (Amendmant-1 November 2012).

6. The permissible stresses for plain and reinforced concrete shall be in accordance with the requirements of the Latest Version of IS: 456.
7. Components of the RCC structure shall be designed for loads in accordance with IS 875 (Parts l to 5) and IS 1893 (latest version) - (Part 1). In addition, loads that might be expected during the construction shall also be considered in the design.
8. Resistance to horizontal loading shall be provided by having moment-resisting frames and/or shear walls.
9. The structure shall be designed for a Fire rating of **two** hours.
10. For shrinkage, thermal effects and lateral loads provisions of expansion Joints as per IS 3414(Latest Version) shall be provided.
11. Frame members i.e., Beams & columns to be designed for shear moments and deflections as per the values obtained from model analysis. All other components of the building shall be designed with approved design programs. Design calculations shall be provided for all the components of the structure.
12. Basic load calculations shall be provided for all values of loads applied on all members in the STAAD model. /ETAB MODEL
13. Water retaining structures shall be designed in accordance with the relevant provision of IS: 3370 (Part-I to part-IV, Latest Version). In addition, Earthquake forces as per IS -1893 latest version shall also be considered.

14. FOUNDATION

a. The Contractor/Agency has to conduct the subsurface soil investigation through an approved agency/institution, indicating vertical sections of the strata, testing of soil samples on the site and in a laboratory for determining shear strength parameters, bearing capacity of the soil, permeability, index properties, water table, compressibility characteristics, swelling properties type & classification of soil and other geophysical information in the field to decide economical & sound foundation type.

b. Number of Trial Pits and Borings

At least one Bore hole for each block should be tested. Cone penetration tests may be performed at every 50 m by dividing the area in a grid pattern and number of bore holes or trial pits decided by examining the variation in the penetration value curves

c. Depth of Exploration:

(i) The bore holes shall be made upto the required depths as per IS: 1892 (Latest Version)

(ii) In weak soils, the exploration should be continued to a depth at which the loads can be sustained without undesirable settlement and shear failure.

(iii) Water level in the bore shall be determined in accordance with, IS : 6935 (Latest Version)

d. The cement concrete foundation (plain or reinforced) shall be designed in accordance with IS 456 (Latest Version).

e. Masonry structures (foundation & superstructure) shall be designed in accordance with IS 1905 (Latest Version).

f. Design Considerations for Spread or Strip foundation shall be as per I.S. 1080 (Latest Version).

15. Seismic considerations

a. Dynamic analysis shall be performed on the latest version of the STAAD PRO model/ETAB/model considering the site of work falling **under Zone III**. Dynamic analysis, if required, shall be performed by the Response Spectrum method using the design spectrum specified under the relevant clause of IS code 1893 (Latest Version). RCC building frame system shall be designed and detailed to provide ductile behaviour and shall comply with the requirements given in IS 4326 and IS 13920. In the buildings with a Dual frame system, the RCC frame, as well as the shear walls, shall be designed and detailed to provide ductile behaviour and comply with the requirements given in IS 4326 and IS 13920.

b. Soft storey, if any, in the structure shall be treated as per the relevant clause of IS 1893 (Latest Version).

c. Time period of the structure shall be taken as per the relevant clause of IS 1893 (Latest Version)

d. Torsional forces in the structure arising out of mass or stiffness irregularity shall

be dealt as per relevant clause of IS 1893 (Latest Version)

e. For underground structures and foundations at depths of 30 m or below, the design horizontal acceleration spectrum value shall be taken as half the value as comes out as per relevant clause of IS 1893 part I (Latest Version). For structures and foundations placed between the ground level and 30m depth, the design horizontal acceleration spectrum value shall be linearly interpolated between Ah and 0.5 Ah, where Ah is as specified in relevant clause IS 1893 (part-1)(Latest Version). The design acceleration spectrum for vertical motions, when required, may be taken as two-thirds of the design horizontal acceleration spectrum specified.

f. To perform well in earthquake, the building shall be of simple & regular configuration and of adequate lateral strength, stiffness and ductility. The building shall be considered as irregular, if at least one of the conditions given in Tables 4 & 5, of IS 1893 (part1) (Latest Version) is applicable.

g. Vertical cantilever projections like RCC parapets, Tanks, etc. and others attached to the buildings projecting above the roof, shall be designed and checked for stability for five times the design horizontal seismic coefficient A as specified in relevant clause of IS 1893 (part1)(Latest Version). In the analysis of the building, the weight of these projecting elements will be lumped with the roof weight. The increased design forces specified are only for designing the projecting parts and their connections with the main structures. For the design of the main structure, such increase need not be considered.

16. Separation Between adjacent buildings:

Two adjacent buildings or two adjacent units of the same building with separation Gap in between shall be separated by a distance equal to the amount R times the sum of the calculated storey displacements calculated as per relevant clause of IS 1893 (part-1) (Latest Version) each of them, to avoid damaging contact when the two units deflect towards each other. When floor levels of two similar adjacent units or buildings are at the same elevation levels, factor R in this requirement may be replaced by R/2.In addition due allowance for Thermal Expansion shall also be made.

17. **Proof checking**: Architectural drawings are issued by the Engineer in Charge. The contractor shall design and submit the complete structural drawings, calculations, soft copies on CDs and two set hard copies for proof checking. **Proof check to be got done from any one of the Government Institute. (i) IIT Madras, Chennai (ii) NIT, Trichy (iii) NIT, Surathkal, (iv) IISC, Bengaluru, (v) NIT, Warangal(vi) Andhra University, Visakhapatnam, (vii) JNTU, Hyderabad (viii) JNTU Kakinada (ix) IIT, Tirupati or any other Engineering Colleges of repute as per approval of Engineer-in-charge.** After getting the proof checking done the contractor shall submit corrected and faired structural drawings in two set soft copies on CDs and eight set hard copies. The consultancy fees for proof checking shall be borne by the contractor.

18. The proof-checked structural drawings will be vetted by the competent authority of CPWD and if any corrections are required as pointed out by the competent authority of CPWD, the same shall be incorporated in the design and the design and drawings modified should be suitably modified without any extra cost. Also, the preliminary structural system shall be got approval from the Engineer-in-charge before proceeding further with detailed structural analysis and design.

19. All service drawings for Civil, Electrical, and Mechanical are to be submitted by the contractor for approval of the Engineer-in-Charge. The contractor should engage the specialist service consultant for the preparation of service drawings.

Note: Whether specifically mentioned or not, all the IS codes referred to above are to be used with the latest edition and amendments upto the last date of submission of the bid.

UNDERTAKING ON STRUCTURAL DESIGN

The following certificate is to be submitted along with the structural design before acceptance of competent authority.

Name of work: **Supply, Installation, Testing & Commissioning of 20 KLD Effluent Treatment Plant & Sewage Treatment Plant combo unit, cold room and other related items at National Centre for Disease Control, Mangalagiri, Andhra Pradesh.**

1. It is to certify that the structural design and drawings including safety from natural hazards like seismic, wind, fire etc., shall be prepared by duly qualified Structural Engineer as per norms prescribed in NBC/B.I.S/I.R.C./ APPLICABLE RECOGNISED CODES/STANDARDS.

2. Further to certify that the structural Consultant hired by us for carrying out the structural design shall have experience as mentioned below:
   a) Faculty at any reputed Government Engineering College like IIT/NIT etc.

   Or

   b) Under the panel list of CDO/CPWD (mention as the case may be)

   Or

   c) The structural consultant will have at least a degree of M.Tech (Structure) or equivalent and has got an experience of 10 years or more in the field of structural design of similar nature of works. Documents in support of the above will be submitted before proceeding with the design work for approval of the department.
   d) The work will be executed as per the particular specifications forming part of the tender/agreement.

   Signature of the contract or with date ----------

   Name in Blocks letters ----------

   Address ----------

LIST OF FIELD TESTS

i) Particle size and shape.
ii) Slump test.
iii) Flakiness & Elongation Index tests.
iv) Compressive strength (concrete or bricks) test.
v) Rebound Hammer test.
vi) Bulking of sand.
vii) Silt content of sand.
viii) Temperature measuring with thermometer with brass protected end 0-200° C.
ix) Proctor density of compacted earth.
x) Mix grading of DBM & BC.
xi) Thickness & density of compacted layer of DBM & BC.
xii) Pressure test of water supply lines.
xiii) Leakage test of water supply lines & sanitary stacks.
xiv) Any other tests as per CPWD specifications.

(TABLE-1)

Equipments for Testing of Materials & Concrete at Site Laboratory

All necessary equipment for conducting all necessary tests shall be provided at the site in the well-furnished site laboratory of minimum 25 sqm area by the contractor at his own cost The following minimum laboratory equipments shall be set up at site office laboratory: -

Sl. No.	Equipment	Numbers (Minimum)
1.	Cube testing machine - 100MT compression testing machine, electrical-cum-manually operated	1
2.	Slump cone	2
3.	Pumps and pressure gauges for hydraulic testing of pipes	2
4.	Graduated glass measuring cylinder	As per requirement
5.	Sets of sieves for coarse aggregate	2
6.	Sets of sieves for fine aggregate	2
7.	Cube moulds size 70mmx70mmx70mm	5
8.	Cube moulds size 150mmx150mmx150mm	18
9.	Electronic balance 100kg	1
10.	Physical balance weight up to 5kg	1
11.	Measuring jars 100ml, 200ml, 500ml	2 Nos. each
12.	Gauging trowels 100mm & 200 mm with wooden handle	2 Nos. each
13.	Spatula 100mm & 200mm with long blade wooden handle	1 No. each
14.	Vernier calipers 12″ & 6″ size	1 No. each
15.	Digital PH meter least count 0.01 mm	1
16.	Digital Micrometer least count 0.01mm	1
17.	GI tray 600x450x50mm, 450x300x40mm	4 Nos. each
18.	Screw gauge 0.1mm -10mm, least count 0.05	1Nos.
19.	Thickness gauge for measuring flakiness index	1 No.
20.	Elongation gauge	1 No.
21.	Measuring cylinder 3,5-,10- & 15-liter cylinder	2 Nos. each
22.	Motorized sieve shaker	1 No.

Sl. No.	Equipment	Numbers (Minimum)
23.	Pruning Rods 2kg weight length 40 cm and ramming face 25 Sqm.	2 Nos.
24.	Extra Bottom plates for 15 cm cube mould	6 nos.
25.	Concrete temperature measuring thermometer with Brass protection sheath 0- 100 degree centigrade	1 Nos.
26.	Mortar Cube vibrator	1 No.
27.	Iron Weight of 5 kg, 2 kg, 1 kg, 500 gm, 200 gm, 100 gm	1 No. each
28.	Brass Weight of 50 gm, 20 gm, 10 gm, 5 gm, 2 gm, 1 gm	1 No. each
29.	Hammer 1lb& 2lb	2 Nos. each
30.	Soil Testing Equipment.	As per requirement & as decided by Engineer-in-Charge.
31.	Bituminous Road-Testing Equipment.	As per requirement & as decided by Engineer-in-Charge.
32.	Any other equipment for site tests as outlined in BIS and as directed by the Engineer-in-charge.	As per requirement
33.	Tower Crane, Boom Crane of sufficient capacity	As per requirement

Note:

1. The contractor has to establish within 21 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** this own cost to have proper quality control. **Rs.5,000**/-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. A site laboratory with temporary structure of minimum 25 sqm area may be fabricated at site by the contractor for accommodating above instruments and for conducting of various tests for which no extra payment shall be made to the contractor.
3. One sample keeping room of minimum area of 20 sqm should also be fabricated at site for keeping various material brought by the contractor at site and approved by the Engineer-in-charge. No extra payment on account of this shall be made to the contractor.
4. All the above structures should be decent looking and shall be fabricated as per direction of Engineer-in-charge.
5. All the above structure shall be demolished after completion of work and the dismantled material shall be the property of the contractor.

Third party quality assurance by technical team of any reputed institution such as NCCBM/CBRI/IIT Chennai and like will be done and the report submitted by the quality assurance team shall be communicated to the contractor by the Engineer-in-charge. The contractor has to comply / rectify the defects/ shortcomings pointed out by the quality assurance team at his own cost within the time specified by Engineer-in-charge.

(TABLE – 2)

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

Sl.No.	Equipment	Numbers (Minimum)
1	Mini Concrete Batching Plant with digital print facility of capacity not less than 4.00 cum per batch	1
2	Excavator cum loader (JCB 3D model or equivalent)	1 No.
3	Compressor machine minimum 200 cfm with rock breaker	As per requirement and as decided by Engineer-In-charge.
4	DG set of capacity as per requirement	1
5	Needle Vibrators.	4
6	Plate Vibrators.	2
7	Reinforcement bending machine.	2
8	Reinforcement cutting machine.	2
9	Power driven earth rammer (Soil compactor).	2
10	Total station.	1
11	Auto level & staff.	1
12	Welding machine 400 Amere	2 Nos.
13	Tractor with trolley.	1
14	Water tanker.	2
15	Screener for coarse sand and fine sand	5
16	Centrifugal Mono block water pump minimum Capacity 2 HP	3
17	Centering & Shuttering	Minimum 2,000 Sqm
18	Double Scaffolding and staging materials	As per requirement and as decided by Engineer-In-
19	Floor grinding / polishing machines	2
20	Granite cutting machine	2
21	Ceramic / Vitrified tile cutting machine	2
22	Granite land polishing machine	2
23	Any other machinery required for completion of the work as per decision of Engineer-in-Charge.	As per requirement and as decided by Engineer-In-

Note:

(i) The above list is only indicative and not exhaustive.

The above plant and equipment are to be brought to the site within 60 days from the date of issue of the Commencement order, failing which, a penalty at Rs.5,000/- per day delay in the mobilization of equipment will be levied on the agency. Such penalty levied will be recovered from the immediate next RA bill of the contractor. However, if the work is completed within the stipulated date of completion, then the amount recovered will be refunded without any interest payment.

FORM –G

PROPOSAL FOR ELIGIBLE ASSOCIATING AGENCIES FOR SPECIALISED CIVIL COMPONENTS OF WORK

Name of work: **Supply, Installation, Testing & Commissioning of 20 KLD Effluent Treatment Plant & Sewage Treatment Plant combo unit, cold room and other related items at National Centre for Disease Control, Mangalagiri, Andhra Pradesh.**

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

Sl. No	Name of Associated Contractor	Category and Class of registration	Enlistment copy/completion Certificates attached	Monetary Limit of work	Validity of registration	Consent letter attached (Yes/No)
Waterproofing treatment work						

Note: Self Attested photocopies of enlistment order, work experience certificates of each agency for each component of specialized civil work shall be submitted.

Signature of contractor

FORM –H

CONSENT LETTER FROM ELIGIBLE ASSOCIATE AGENCY OF SPECIALISED CIVIL COMPONENT OF WORK

Name of work: **Supply, Installation, Testing & Commissioning of 20 KLD Effluent Treatment Plant & Sewage Treatment Plant combo unit, cold room and other related items at National Centre for Disease Control, Mangalagiri, Andhra Pradesh.**

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

1. 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 civil work till the completion of the work.

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

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

Date:

Signature with date of Major component contractor

Address

Signature with date of Associate/ specialized civil Component Contractor

Address

Witness with address
(From major component contractor side)

Witness with address
(From specialized civil Component contractor side)

FORM-"I"

AFFIDAVIT OF MEMORANDUM OF UNDERSTANDING (MOU)
(to be submitted for each and every Specialized Civil component)

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

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

For the execution of Specialized Civil Work

Name of work: **Supply, Installation, Testing & Commissioning of 20 KLD Effluent Treatment Plant & Sewage Treatment Plant combo unit, cold room and other related items at National Centre for Disease Control, Mangalagiri, Andhra Pradesh.**

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, CPWD, Vijayawada. His decision shall be final and binding on both of us.

We have agreed as under:

1. The Associated Contractor will execute all Specialized Civil 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.

3. All the machinery and equipment's, tools and tackles required for execution of the Specialized Civil works, as per agreement, shall be the responsibility of the Associated Contractor.

4. The site staff required for the Specialized Civil 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 Specialized Civil 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:
Place:

SIGNATURE OF ASSOCIATED CONTRACTOR
Date
Place:

1. Witness with address
(From major component contractor side)

2. Witness with address
(From Specialized Civil component contractor side)

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

(On non-judicial stamp paper of minimum Rs.100)
GUARANTEE BOND TO BE EXECUTED BY THE CONTRACTOR FOR REMOVAL OF DEFECTS AFTER COMPLETION IN RESPECT OF WATER-PROOFING WORKS (All Water - Proofing Items).

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

WHEREAS THIS agreement is supplementary to a contract (Hereinafter called the Contract) dated ..... and made between the GUARANTOR OF THE ONE PART AND the Government of the other part whereby the contractor inter alia undertook to render the building and structures in the said contract recited completely water and leak-proof.

AND WHEREAS THE GUARANTOR agreed to give a guarantee to the effect that the said structures will remain water/leak proof for **(10) Ten years** to be reckoned from the date after the expiry of maintenance period prescribed in the Contract.

NOW THE GUARANTOR hereby guarantees that work executed by him will render the structures completely leak proof and the minimum life of such water proofing treatment shall be **(10) Ten years** to be reckoned from the date after the expiry of maintenance period prescribed in the contract.

The decision of the Engineer-in-charge with regard to nature and cause of defect shall be final and binding on Guarantor.

During this period of guarantee, the guarantor shall make good all defects and in case of any defect being found render the building water proof to the satisfaction of the Engineer-In-Charge calling upon him to rectify the defects failing which the work shall be got done by the Department by some other contractor at the Guarantor's cost and risk. The decision of the Engineer-in-charge as to the cost payable by the Guarantor shall be final and binding.

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

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

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

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

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

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

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

GUARANTEE BOND TO BE EXECUTED BY THE CONTRACTOR FOR REMOVAL OF DEFECTS AFTER COMPLETION IN RESPECT OF uPVC DOORS, WINDOWS &VENTILATOR WORK/ ALUMINIUM WORK / STRUCTURAL GLAZING/STAINLESS STEEL WORK

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

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

AND WHEREAS THE GUARANTOR agreed to give a guarantee to the affect that the said work will remain structurally stable and guaranteed against faulty material and workmanship, defective anodizing/ powder coating for **Five years** to be reckoned from the date after the expiry of maintenance period prescribed in the Contract.

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

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

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

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

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

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

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

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

GOVERNMENT OF ANDHRA PRADESH
ABSTRACT

Mines & Minerals - Amendment to the Rule 10 of the Andhra Pradesh Minor Mineral Concession Rules, 1966 Orders - issued.

INDUSTRIES AND COMMERCE (M.II) DEPARTMENT

G.O.MS.No. 11 **Dated: 11-02-2020**

Read the following:

1. G.O.Ms.No.198, Industries & Commerce (M.I) Dept., dt:13.08.2009.
2. GSR No.423 (E), dt: l0.02.2015 from the Ministry of Mines, Govt. of India, New Delhi.
3. G.O.Ms.No.100, Industries & Commerce (M.II) Dept., dt:31.10.2015.
4. G.O.Ms.No.105, Industries & Commerce (M.II) Dept., dt:13.11.2015.
5. G.O.Ms.No.38, Industries & Commerce (M.II) Dept., dt:17.03.2016.
6. G.O.Ms.No.156, Industries & Commerce (M.II) Dept., dt:03.11.2016.
7. G.O.Ms.No.131, Industries & Commerce (M.II) Dept., dt:04.10.2017.
8. G.O.Ms.No.18, Industries & Commerce (M.II) Dept., dt:29.01.2018.
9. G.O.Ms.No.28, Industries & Commerce (M.II) Dept., dt:17.04.2018.
10. G.O.Ms.No.49, Industries & Commerce (M.II) Dept., dt:21.02.2019.
11. Proposal from the Director of Mines & Geology, vide e-file No: INC04-17021(34)/1/2019-PLANNING SEC-DMG received by the Government on dt. 11.12.2019

***

O R D E R:

After careful examination of the proposal received from the Director of Mines & Geology, Andhra Pradesh, Ibrahimpatnam in the letter 11th read above, the Government hereby decided to amend the Rule 10 of Andhra Pradesh Minor Mineral Concession Rules, 1966 for enhancing the existing Seigniorage fee and Dead Rent in respect of Minor Minerals.

2. The following notification will be published in the Extra-ordinary issue of the Andhra Pradesh Gazette, dated: 11.02.2020.

NOTIFICATION

In exercise of the powers conferred by sub-section (1) of section 15 of the Mines & Minerals (Development and Regulation) Act, 1957 (Central Act 67 of 1957), the Governor of Andhra Pradesh hereby makes the following amendments to the Andhra Pradesh Minor Mineral Concession Rules, 1966 issued in G.O.Ms.No.1172, Industries and Commerce Department, dated. 04.09.1967 and subsequent amended from. time to time.

AMENDMENT

In the said rules, under Rule 10 for Schedules I and II, the following shall be substituted, namely

"SCHEDULE-I"

RATES OF SEIGNIORAGE FEE

Sl. No.	Name of the Minor Mineral	Units	Rate of Seignorage Fee (in Rupees)
1.	Agate	M.T.	Rs. 145 (Rupees One Hundred and Forty Five)
2.	Ball Clay	M.T.	Rs. 75 (Rupees Seventy Five)
3.	**Barytes**		
	i. Grey Colour – A Grade	M.T.	Rs. 480 (Rupees Four Hundred and Eighty)
	ii. Grey Colour – B Grade	M.T.	Rs. 355 (Rupees Three Hundred and Fifty Five)
	iii. Grey Colour – C + D + Waste Grade	M.T.	Rs.220 (Rupees Two Hundred and Twenty)
	iv. White Colour	M.T.	Rs. 1100 (Rupees One Thousand and One Hundred)
	v. Of colour other than Grey	M.T.	Rs. 500 (Rupees Five Hundred)
4.	Building Stone	M^3/M.T.	Rs. 90/60 (Rupees Ninety / Sixty)
5.	Calcareous Sand	M.T.	Rs. 90 (Rupees Ninety)
6.	Calcite	M.T.	Rs. 90 (Rupees Ninety)
7.	Chalcedony Pebbles	M^3/M.T.	Rs. 90/60 (Rupees Ninety / Sixty)
8.	Chalk	M.T.	Rs. 95(Rupees Ninety Five)
9.	China Clay	M.T.	Rs. 60 (Rupees Sixty)
10.	Clay (Others)	M.T.	Rs. 60 (Rupees Sixty)
11.	Corundum	M.T.	Rs. 120 (Rupees One Hundred and Twenty)
12.	Diaspore	M.T.	Rs. 415 (Rupees Four Hundred and Fifteen
13.	Dimensional Stone used for Kerbs & Cubes	M.T.	Rs. 135 (Rupees One Hundred and Thirty Five)
14.	Dolomite	M.T.	Rs. 100 (Rupees One Hundred
15.	Dunite or Pyroxinite	M.T.	Rs. 60 (Rupees Sixty)
16.	Feldspar	M.T.	Rs. 100 (Rupees One Hundred)
17.	Felsite	M.T.	Rs. 130 (Rupees One Hundred and Thirty)
18.	Fireclay	M.T.	Rs. 60 (Rupees Sixty)
19.	Fullers Earth / Bentonite	M.T.	Rs. 180 (Rupees One Hundred and Eighty)
20.	Fuschite Quartzite	M.T.	Rs. 90 (Rupees Ninety)

21.	**Granite useful for cutting and polishing purpose**					
S. No.	**Item**	**Unit**	**Super Gang Saw equal and above 300cm x 180cm size**	**Mini Gang Saw equal and above 270cm x 150cm size**	**270cm x 150cm & Below size**	**Below 75cm size**
i.	Black Galaxy Granite Variety	M^3/ MT	Rs.4600 / Rs.1415 (Rs. Four Thousand Six Hundred / Rs. One Thousand Four Hundred Fifteen	Rs.3680 / Rs.1130 (Rs. Three Thousand Six Hundred Eighty / Rs. One Thousand One Hundred Thirty)	Rs.3450 / Rs.1060 (Rs. Three Thousand Four Hundred Fifty / Rs. One Thousand Sixty)	Rs.1550 / Rs.480 (Rs. One Thousand Five Hundred Fifty / Rs. Four Hundred Eighty)
ii.	Black Granite other than Galaxy variety	M^3/ MT	Rs.3450 / Rs.1150 (Rs. Three Thousand Four Hundred Fifty / Rs. One Thousand One Hundred Fifty)	Rs.2875 / Rs.960 (Rs. Two Thousand Eight Hundred Seventy-Five / Rs. Nine Hundred Sixty)	Rs.2700 / Rs.900 (Rs. Two Thousand Seven Hundred / Rs. Nine Hundred)	Rs. 1150 / Rs.385 (Rs. One Thousand One Hundred Fifty / Rs. Three Hundred Eighty-Five)
iii.	Colour Granite Srikakulam Blue, Moon White River white of Visakhapatnam Dist., Leptinites of Coastal Dists., Black pearl of Prakasam and Guntur Dists.	M^3/ MT	Rs. 3450 / Rs.1255 (Rs. Three Thousand Four Fifty Rs. One Thousand Two	Rs.2875 / Rs.1045 (Rs. Two Thousand Eight Hundred Seventy-Five / Rs. One	Rs. 2700 / Rs. 980 (Rs. Two Thousand Seven Hundred / Rs.	Rs. 1150 / Rs.420 (Rs. One Thousand One Hundred Fifty / Rs. Four Hundred

			Hundred Fifty-Five)	Thousand Forty-Five)	Nine Hundred and Eighty)	Twenty)
iv.	Colour Granite of other varieties	M^3/ MT	Rs.2700 / Rs.985 (Rs. Two Thousand Seven Hundred / Rs. Nine Hundred Eighty-Five)	Rs.2470 / Rs.900 (Rs. Two Thousand Four Hundred Seventy / Rs. Nine Hundred)	Rs.2300 / Rs.835 (Rs. Two Thousand Three Hundred / Rs. Eight Hundred and Thirty-Five)	Rs.1150 / Rs.420 (Rs. One Thousand One Hundred Fifty / Rs. Four Hundred Twenty)
v.	Kuppam Grey Granite available in Santhipuram & Ramakuppam mandals of Chittoor District	M^3/ MT	Rs.1925 / Rs.700 (Rs. One Thousand Nine Hundred Twenty-Five / Rs. Seven Hundred)	Rs.1650 / Rs.600 (Rs. One Thousand Six Hundred Fifty / Rs. Six Hundred	Rs.1375 / Rs.500 (Rs. One Thousand and Three Hundred and Seventy-Five / Rs. Five Hundred)	Rs.1100 / Rs.400 (Rs. One Thousand One Hundred / Rs. Four Hundred)
vi.	Chittoor Colour Granite (Other than Silver-waves, Madanapalli white and Iscon white)	M^3/ MT	Rs.1925 / Rs.700 (Rs. One Thousand Nine Hundred Twenty-Five / Rs. Seven Hundred)	Rs.1650 / Rs.600 (Rs. One Thousand Six Hundred Fifty / Rs. Six Hundred	Rs.1375 / Rs.500 (Rs. One Thousand and Three Hundred and Seventy-Five / Rs. Five Hundred)	Rs.1100 / Rs.400 (Rs. One Thousand One Hundred / Rs. Four Hundred)

Sl. No.	Name of the Minor Mineral	Unit	Rate of Seignorage Fee (In Rupees)
22.	Gypsum	M.T.	Rs. 150 (Rupees One Hundred and Fifty)
23.	Jasper	M.T.	Rs. 145 (Rupees One Hundred and Forty-Five)
24.	Kaolin	M.T.	Rs. 60 (Rupees Sixty)
25.	**Laterite**		
	i. Dispatched for use in Alumina & Aluminium metal extraction	M.T.	Rs. 200 (Rupees Two Hundred)
	ii. For use other than Alumina and Aluminium metal extraction and export	M.T.	Rs. 100 (Rupees One Hundred)
26.	Lime Kankar / Lime stone	M.T.	Rs. 90 (Rupees Ninety)
27.	Lime Shell	M.T.	Rs. 120 (Rupees One Hundred and Twenty)
28.	**Limestone Slabs:**		
	i. Color	Sq.Mt / M.T.	Rs. 10 (Rupees Ten) per Sq. Mt
	ii. White	Sq.Mt / M.T.	Rs.120 (Rupees One Hundred and Twenty) per MT whichever is higher
	iii. Black	Sq.Mt / M.T.	Rs. 6 (Rupees Six) per Sq. Mt or Rs. 110 (Rupees One Hundred and Ten) per MT whichever is higher.
29.	Manufactured Sand	M^3/M.T.	Rs. 90/60 (Rupees Ninety / Sixty)
30.	Marble	M^3/M.T.	Rs. 300/120 (Rupees Three Hundred / One Hundred and Twenty)
31.	**Mica**		
	i. Crude	M.T.	Rs.2000 (Rupees Two Thousand)
	ii. Scrap	M.T.	Rs. 750 (Rupees Seven Hundred and Fifty)
32.	Morrum / Gravel & Ordinary Earth	M^3/M.T.	Rs.45 / 30 (Rupees Forty-Five / Thirty)
33.	Mosaic Chips	M.T.	Rs. 90 (Rupees Ninety)
34.	Ochre	M.T.	Rs. 60 (Rupees Sixty)
35.	Ordinary Clay, Silt and Brick Earth used in the Manufacture of Bricks including Mangalore Tiles		Rs. 8000 (Rupees Eight Thousand Per Kiln per Annum for Bricks and Tiles)
36.	Ordinary Sand	M^3/M.T.	Rs. 100 / Rs. 66 (Rupees One Hundred / Rs. Sixty-Six)
37.	Pyrophillite	M.T.	Rs. 200 (Rupees Two Hundred)
38.	Quartz	M.T.	Rs. 90 (Rupees Ninety)
39.	Quartzite	M.T.	Rs. 90 (Rupees Ninety)
40.	Rehmati	M^3/M.T.	Rs. 35 / 25 (Rupees Thirty-Five / Twenty-Five)
41.	Road Metal / Ballast	M^3/M.T.	Rs. 90 / 60 (Rupees Ninety / Sixty)
42.	Rough Stone / Boulders	M^3/M.T.	Rs. 90 / 60 (Rupees Ninety / Sixty)
43.	Sand (Others)	M.T.	Rs. 100 (Rupees One Hundred)

Sl. No.	Name of the Minor Mineral	Unit	Rate of Seignorage Fee (In Rupees)
44.	Shale	M.T.	Rs. 180 (Rupees One Hundred and Eighty)
45.	Shingle	M^3/M. T.	Rs. 90 / 60 (Rupees Ninety / Sixty)
46.	Silica Sand	M.T.	Rs. 100 (Rupees One Hundred)
Sl. No.	**Name of the Minor Mineral**	**Units**	**Rate of Seignorage Fee (in Rupees)**
47.	Slate	M.T.	Rs. 175 (Rupees One Hundred and Seventy-Five)
48.	**Steatite or Talc or Soapstone**		
	i. Filler Grade	M.T.	Rs. 100 (Rupees One Hundred)
	ii. Other Grade	M.T.	Rs. 550 (Rupees Five Hundred and Fifty)

SCHEDULE-II
RATES OF DEAD RENT

S. No.	Name of the Minor Mineral	Rate of Dead Rent per hectare per annum (In Rupees)
1	Black Galaxy Granite and Black Granite	Rs. 1,30,000/- (Rs. One Lakh Thirty thousand)
2	All Colour Granite varieties	Rs. 1,30,000/- (Rs. One Lakh Thirty Thousand)
3	Limestone other than classified as major minerals used for lime burning for Building construction purpose, marble, boulders, building stone including stone used for Road Metal, Ballast, Manufactured sand, concrete & other construction purpose, Shale, Slate & phyllites, Mosaic Chips, Fullers Earth/ Bentonite &Dimensional Stone Used for Cubes and kerbs	Rs. 65,000/- (Rs. Sixty-Five Thousand)
4	Gravel, Morrum, Ordinary Earth, shingle, Limestone Slabs used for flooring purpose Limekankar, Chalcedonypebbles used in the building purpose Limeshell for burning used for building purpose and Rehmati.	Rs. 52,000/- (Rs. Fifty Two Thousand)
5	Barytes and Laterite	Rs. 26,000/- (Rs. Twenty Six Thousand)
6	Agate, Corundum, Diaspore and fluorite	Rs. 20,000/- (Rs. Twenty Thousand)
7	Mica	Rs. 15,000/- (Rs. Fifteen Thousand)
8	All minor minerals which are not covered under Serial number 1 to 7 above.	Rs. 20,000/- (Rs. Twenty Thousand)

3. This order shall come in to force with immediate effect.

4. This order issues with the concurrence of Finance Department vide their U.O No. FMUOASD(IC)/. 2019-FMU-IIEIC, dt. 09.01.2020 (computer No 1063684)

[BY ORDER AND IN THE NAME OF THE GOVERNOR OF ANDHRA PRADESH]

K. RAMGOPAL
PRINCIPAL SECRETARY TO GOVERNMENT
(MINES)

To

1. The Commissioner of Printing , Stationary & Store purchase (Ptg. Wing), Vijayawada. (He is requested to publish the above notification in the Extra-ordinary issue of Andhra Pradesh, and arrange to send 1000 copies of the same to Govt. Ind. & Com. (M.II) Department).
2. The Director of Mines & Geology, Andhra Pradesh, Ibrahimpatnam.
3. The Chief Executive Officer, SERP, Vijayawada.
4. All the Joint Director/ Deputy Director / Asst. Director of Mines & Geology through the Director of Mines & Geology, Ibrahimpatnam.

Copy to:

1. The Secretary to Govt. Ministry of Mines, Govt. of India, Shastry Bhawan, New Delhi.
2. The Law Department / The Finance Department.
3. The P.S to Minister for Mines & Geology. / The PS to Prl. Secretary to Govt, (Mines).
4. SF/SC (e-file NO. INC04-17021(34)/1/2019-PLANING SEC-DMG, Comp. No. 1052464).

Note:

Rates of Seigniorage fee mentioned above in Schedule I & II is for guidance only and Royalty / Seigniorage fee, DMF, MERIT etc., shall be deducted from the running / final bills of Contractor as per the updated Seigniorage fee intimated by the Industries and commerce (M.I) department, Government of Andhra Pradesh, from time to time and nothing extra shall be payable in this regard and no claim in this regard shall be entertained.

GOVERNMENT OF ANDHRAPRADESH
DEPARTMENT OF MINES AND GEOLOGY

From
Sri B.Ashok Kumar, M.Sc.,
Asst.Director of Mines and Geology,
Chittoor
e-mail Id.No.admgctr@gmail.com
Cell No.9100688839

To
The Executive Engineer & SM(C),
Central Public Works Department,
Ministry of Housing & Urban Affairs,
Tirupati Project Division – I,
III Permanent Campus,
Venkatagiri Road,
Yerupudu Mandal,
Chittoor District.

Lr. No. 7105/OD/2013, Dt.09-02-2021

Sir,

Sub:- Mines and Minerals – O/o.Assistant Director of Mines and Geology, Chittoor – Furnish Seigniorage Fee deduction from work bills / ongoing work details - Requested - Regarding.

Ref:- 1. Government Memo. No. 12326/M I (1)/2015, Dt. 26.09.2015 from Industries & Commerce (M-II) Department.
2. Memo. No. 21684/MR.ODC/2015, Dt. 07.10.2015.
3. G.O.Ms.No.18 , Ind. & Com. (M-II) Dept., Dt: 13-01-2016.
4. G.O.Ms.No.36, Ind. & Com. (M-II) Dept., Dt: 14-03-2016.
5.G.O.Ms.No.11, Ind. & Com. (M-II) Dept., Dt: 11-02-2020.
6. Lr.No.23(8)/2021-1/21(H), Dt.28-01-2021 of the Executive Engineer & SM (C)

-oOo-

With reference to your letter reference 6th cited, it is to inform that it is not possible to furnish Bank account particulars as the same is zero based Account.

Further, it is to inform that, the Director of Mines and Geology while enclosing copy of the Government Memo vide ref. 2nd cited directed this office to obtain Seigniorage Fee deductions by other departments against the Minor minerals consumed in their civil works and also to make a comprehensive survey & document the process being followed for the collection and accounting of Seigniorage fee.

Further, you are requested to remit the deducted Seigniorage fee, DMF & MERIT etc., payments under the following head of accounts as detailed below as per G.O's mentioned at reference 3rd to 5th and send the original challans/Demand Drafts to this office for reconciliation and taking further necessary action.

Mineral	Revenue Head	Amount (Rs.Per Cubic Meter / Metric Tonns)	Head of Account	DDO Code	CFMS Service Code
Road Metal	S.Fee	90 / 60	0853-00-102-00-02	1102-1307-001	4008
	DMF (30% of S.Fee)	27 / 18	8448-00-101-01-13-001-001 (Consider for 98%)	1101-1307-001	1102
			8342-00-120-00-13-001-000 (Consider for 2%)	2703-1307-002	8093
	MERIT (2 % of S.Fee)	1.8 / 1.2	8443-00-111-01-27-003-003	2703-1307-002	8213
	IT (2% of S.Fee)	1.8 / 1.2	0021-200-6CH	TAN No.HYDO00636G	
Gravel	S.Fee	45 / 30	0853-102-02	1102-1307-001	4008
	DMF (30% of S.Fee)	13.5 / 9	8448-00-101-01-13-001-001 (Consider for 98%)	1101-1307-001	1102
			8342-00-120-00-13-001-000 (Consider for 2%)	2703-1307-002	8093
	MERIT (2 % of S.Fee)	0.9 / 0.6	8443-00-111-01-27-003-003	2703-1307-002	8213
	IT (2% of S.Fee)	0.9 / 0.6	0021-200-6CH	TAN No.HYDO00636G	

In view of the circumstances stated above, I request the Executive Engineer & SM (C), Central Public Works Department, Ministry of Housing & Urban Affairs, Tirupati Project Division – I, Yerpedu Mandal, Chittoor District to furnish the Seigniorage Fee payments particulars recovered from the contractor work bills to this office as per the above mentioned head of accounts immediately.

The earnest action in this regard may be highly appreciated.

Yours faithfully,

Asst. Director of Mines and Geology,
CHITTOOR.

Copy Submitted to the:

- The Director of Mines & Geology, Ibrahimpatnam for favour of kind information.
- The District Collector, Chittoor District for favour of kind information.
- The Deputy Director of Mines and Geology, Chittoor for favour of kind information.

GOVERNMENT OF ANDHRA PRADESH

ABSTRACT

Mines & Minerals–Levy of Consideration amount on all Minor Minerals in Addition to the Seigniorage Fee, DMF and MERIT–Orders–Issued.

INDUSTRIES&COMMERCE(M.III)DEPARTMENT

G.O.MS.No.42 Dated: 07-06-2021

Read the following;

1. G.O.Ms.No.29,Ind.&Com.(Mines-II)Dept.dated15.02.2017
2. G.O.Ms.No.21,Ind.&Com.(Mines-III)Dept.dated25.03.2021
3. FromtheDirectorofMines&Geology,singlefileNo:4072/P/2021

****

ORDER:

Government, vide G.O.1st read above, have included a pre-emption clause to direct the lessees to sell minerals to the processing industries duly paying the Consideration Amount in addition to Seigniorage Fee, Contribution to DMF and MERIT to the State Government.

2. In the G.O., 2nd read above, Government have ordered that the Silica Sand lease holders shall also pay Consideration Amount of Rs.212/- per ton to the State Government in addition to the Seigniorage Fee, DMF and MERIT and to use the collected fund for the purposes as specified therein.

3. The DM&G, AP., in the single file 3rd read above, while referring to the recommendations of the State Level Core Committee and keeping in view thesuggestionsmadeduringreviewmeetingsonMineralRevenuereceiptsandPolicyaspectsofDepartmentofMines&Geology,hasrequestedtheGovernmenttoissueofnecessaryordersforlevyofconsiderationamount,onthesimilarlinesofSilicaSandordersissuedvideGO2ndreadabove,onthelease holders in addition to the Seigniorage Fee, DMF and MERIT, duly fixing it as one time of Seigniorage fee for all minor minerals other than granite and 0.5 time of Seigniorage fee for granite, since it is high value mineral(Seigniorage fee ranges from Rs.3,452 to Rs.4,600 per cum) irrespective of the mode of grant of leases.

4. Government, after careful examination of the proposal of the DM&G, AP, in terms of orders issued vide GO 1st read above, and on the similar lines of the orders issued vide GO 2nd read above, hereby levy consideration amount, on the lease holders, in addition to the Seign.Fee, DMF and MERIT, @ onetime of Seigniorage fee for all minor minerals except granite and @0.5 time of Seigniorage fee for granite, irrespective of the mode of grant of leases. The funds collected shall be used for the following purposes:

i. To mitigate the impact of disaster and epidemic;
ii. To provide the rehabilitation/employment of informal workforce;
iii. to create all such infrastructures in the field of Cottage / village Industries, MSME generating employment and mitigating the hard

ships caused due to loss of jobs due to the pandemic;

iv. to augment the existing health infrastructures;

v. to establish the community shelters/dormitories/kitchens/food securities etc;

vi. to provide all such necessary help/logistic support for proper cultivation to the Agriculturist;

vii. toprovidenecessarylogisticsupportformarketabilityofAgriculture produces;

viii. to provide all necessary assistance/support to all such informal workforce, casual/migrant workforce, persons, who suffered loss of employment or suffered pecuniary losses during the epidemic;

ix. to augment other welfare schemes in the State or and for all such other purposes as the Government may specify, from time to time in the State.

5. The Director of Mines & Geology, A.P., shall take necessary action accordingly in the matter.

(BYORDERANDINTHENAMEOFTHEGOVERNOROFANDHRAPRADESH)

GOPAL KRISHNA
DWIVEDIPRINCIPALSECRETARY
TO GOVERNMENT(M)

To
The Director of Mines & Geology, AP, Ibrahimpatnam, Vijayawada.(w.e.file) All the District Collectors in the State.
The VC&MD, M/s APMDC Ltd, Kanur,
Vijayawada. Copy to:
The OSD to Hon'ble Minister (Mines &
Geology) The PS to Prl. Secy. To Hon'ble CM
The PS to Secretary to Govt (Mines)The Finance Department SF
/SC(CompNo:1420114)

//FORWARDEDBYORDER//

SECTIONOFFICER

Standard Operating Procedures (SOPs) and Guidelines for Construction Sites for COVID-19 Outbreak

The agency shall follow the below mentioned standard operating procedures and guidelines scrupulously at the construction site to contain the outbreak of COVID-19, failure to adhere to the SoPs issued by CPWD and other orders & Guidelines issued by Various Governments(Govt. of India and/or Govt. of AP and/or Dist. Administration or Local Govt.) from Time to Time will result in levy of nonrefundable penalty of Rs.5000/- per day on the agency by Engineer-in-charge which shall be final and binding on the contractor. The quoted rates shall inclusive of all such required measures and materials like Soaps, Detergents, Sanitizers, Disinfectants, Masks, Gloves and other personal protection equipment's to contain COVID-19 and nothing extra shall be paid. All such penalties shall be recovered from the respective Running account bills of the contractor.

In response to COVID-19 outbreak, the following Standard Operating Procedures (SOPs) and guidelines to ensure safety of construction site workers are issued for field units. In addition to trained Supervisor (s), a Site Safety Representative (SSR) will be deployed at every site, to ensure the safety guideline is followed. Necessary trainings will be given in advance to Supervisors and SSRs, so that they can train the workers further.

a. General guidelines – Applicable to All

1. The workers coming from outside will be required to self-declare their health profile as per Annexure 1 and shall be quarantined for a period of at least 15 days. Mandatory
2. Thermal Scanning of everyone entering and exiting a construction site will be done for fever with thermal scanners. if anyone leaves and re-enters the site during the shift, re-screening of the individual will be done prior to re-entry into the work site.
3. PPE and Other material requirement shall be documented as per Annexure 2.
4. Provision for hand wash & sanitizer (touch free recommended) will be made at all entry and exit points and common areas (including at distant locations like higher floors). Everyone will be required to wash & sanitize his/her hands before entering the site and using PPEs. Same procedure to be followed after removing PPEs and exiting the premise. Sufficient quantities of all the items should be available at the site.
5. All Protocol including Emergency Response will be laid out. Periodic tailgate sessions will be arranged to review site protocols in view of highly dynamic scenario ensuring social distancing norms. During these sessions, everyone including workers will be informed about the safety guidelines and important updates. Necessary arrangements for announcements shall be made at every site.
6. Mandatory use of PPEs (face mask, hand gloves and other as applicable) by everyone entering the premise. Re-usable PPEs should be thoroughly cleaned and should not be shared with others.
7. Entire construction site including site office, labour camp, canteens, pathways, toilets, and entry / exit gates will be disinfected on daily basis. Housekeeping team should be provided with necessary PPEs.
8. There will be total Ban on non-essential visitors at sites (including from Head office staff, consultants etc.).
9. There will be strict ban on Gutka, Tambaku, Paan etc. on site and spitting shall be strictly prohibited.
10. Food should be consumed at designated areas only ensuring social distancing.
11. Common sitting arrangements should be removed.
12. Post lunch, waste should be disposed by individual in designated bins and area should remain clean.
13. Areas with a probability of bigger gathering, for e.g., cleaning area, toilets etc. should be identified and all arrangements should be made to ensure social distancing.

14. A doctor will be present periodically (at least once a week) at site on allotted time for any medical assistance.
15. Appropriate signage at construction site spelling out safety practices in the language which is understood by all.
16. Hospital/clinics in the nearby area, which are authorized to treat COVID-'19 patients, should be identified and list should be available at Site all the time.
17. For any confusion, clarification and update, everyone should approach designated authority or rely on authentic source.
18. Rumors shall be discouraged and offenders be warned.
19. An isolation room shall be created at site.

b. Guidelines for workers:

1. On day 0, before resuming the work on site post lockdown period, mandatory medical check-up will be arranged for all workers. The workers coming from outside will be quarantined for a period of at least 15 days. Only medically fit workers will be deployed at site and medical assistance will be arranged for unfit workers. Medical checkup camp should be arranged every month.
2. The labours staying at site will not be allowed to go outside. All the essential items will be made available to labours at site only. If necessary, the workers can go out wearing PPEs, after informing supervisor. Similarly, no outside labour will be allowed at site without following proper procedure and instructions.
3. Start time on site will be staggered to avoid congestion at the entry gates. Number of workers working at a particular time / place will be reduced by making arrangements for different shifts / areas. Accordingly, additional staff such as security guards, supervisors etc. will be deployed.
4. As in most cases, workers reside at the Sites, hence there is no need for any travel. For Workers staying outside, (which are always nearby) special transportation facility will be arranged without any dependency on the public transport system.
5. During attendance, training and other sessions, social distancing guidelines will be followed along with provision of no {ouch attendance.
6. Workers should not shake hands when greeting others and while working on the site.
7. Workers shall avoid contact with sick people and avoid going to site if they are feeling sick, have fever, cough or shortness of breath. In such case, supervisor should be informed immediately.
8. Workers with such symptoms should not come to site and should be placed in isolation and medical assistance will be provided on immediate basis.
9. Mandatorily wear face masks while working on site. While not wearing masks, worker shall cover his mouth and nose with tissues.
10. Cough/sneeze should be done in the crook of one's arm and your elbow.
11. Avoid large gatherings or meetings of 10 people or more. Stay at least 6 feet away from others on job sites and in gatherings, meetings, and training sessions.
12. Not more than 214 persons (depending on size) will be allowed to travel in lifts or hoists. Use of staircase for climbing should be encouraged.
13. Workers should clean hands frequently by washing them with soap and water for at least 20 seconds. When hand washing isn't possible, alcohol based hand sanitizer with greater than 60% ethanol or 70% isopropanol should be used.
14. Workers should not share their belongings like food, water bottles, utensils, mobile phones etc. with others.
15. The utensils should be washed properly post use at designated place.
16. Post work, workers should change their clothes before leaving the site and clothing should not be shook out.
17. Avoid touching eyes, nose, or mouth with unwashed hands.

c. Guidelines for Material, Tools. Machinery, Vehicles etc.

1. Wipe down interiors and door handle of machines or construction vehicles, the handles of equipment and tools that are shared, with disinfectant prior to using.
2. Non-ouch waste bin with disposable garbage bag should be installed for waste collection at all common access areas.

3. Proper disposal of garbage should be ensured.
4. At all point of time, easy access to parking should be ensured since public transit is limited.
5. All construction material arriving at site should be left idle for 3 days before use to ensure safe usage.
6. All vehicles and machinery entering the premise should be disinfected by spray mandatorily.

d. Emergency protocol in case of detection of symptoms of COVID 19 to be observed by Project Manager of Contractor

1. immediate shift worker to isolation room. inform the Engineer-in charge CPWD or his Nodal officer.
2. Call for a doctor.
3. Keep worker under observation for a few days in isolation room. ln case of doubt act per advice of local doctor.
4. Covid testing shall be arranges as per instruction of doctor and if so, advised by doctor move worker to Hospital.
5. Prevent rumors and take strict action against those who spread it.

e. Responsibility of various stakeholder

Responsibility of various stakeholders shall be as below

Sl. No.	Designation	Responsibility
1	CPWD Nodal officer as Designated by Engineer in Charge	To coordinate efforts on behalf of Engineer in Charge and ensure compliance of these SOPs. He shall send a daily confirmation of compliance of SOPs.
2	Project Manager of Contractor	Overall responsibility of ensuring compliance of procedure and precautions in SOP. To submit daily compliance report to CPWD Nodal officer To designate a senior person as COVID Marshal and form a team under him
3	COVID Marshal (Nodal Officer)	To exclusively look after the implementation of all the precautions and procedure at work site and labour camps To intimate daily requirement of PPEs, sanitizers, disinfectants etc in their respective sections Regular attendance of workers to ensure no one leaves the site Permission from local authorities Ensuring Timely payment to workers/ staff

Annexure 1

COVID-l9 (Coronavirus) Exposure Questionnaire for New workmen

Name:	Native (State, District/City, Village)
Age:	
Gender:	

Please answer the following questions with as much detail as possible:

1. Location/Travel Declaration
   a. Please provide your locations/travel patterns over the past 14 days in Table below:

Country	City/Village	Date Arrived/Since when you have been in the location	Date departed

2. Any cases of COVID-'19 in your in the locations where you have been for last 14 days?

   YES NO

3. Are you, or have you been in close contact with anyone who has been quarantined or who has been diagnosed with novel coronavirus (SARS-CoV-2/COVID-19)? If yes, please provide details.

   YES NO

4. Have you ever been quarantined due to a possible exposure to novel coronavirus (SARS-CoV-2/COVID-19)? If yes, please provide dates and locations.

   YES NO

5. Have you experienced any of the following symptoms within the last 14 days?
   . Any fever
   . Cough
   . Shortness of breath
   . Malaise (flu-like tiredness)
   . Rhinorrhoea (mucus discharge from the nose)
   . Sore throat
   . Gastro-intestinal symptoms such as nausea, vomiting and/or diarrhoea

If yes, to any of these, please indicate which and provide full information.

6. Are you currently in good health?

   YES NO

Declaration

I confirm that the answers I have given are, to the best of my knowledge, true, and that I have not withheld any material information that may influence the assessment or acceptance of this application.

I agree that this form will constitute part of my application for insurance(s) and that failure to disclose any material fact known to me may invalidate my insurance(s).

Signature
Date
Time
Witness

Annexure 2

PPE and Other material requirement

Sl. No.	List of Items (Personal Sanitization)	At Stores	At office	At workmen camp
1	Hand Sanitizer (min 60% alcohol)	1 bottle (500m1) at all entrances and to be refilled on regular basis	1 bottle (500m1) at all entrances and to be refilled on regular basis	2 bottle (500m1) at all entrances and to be refilled on regular basis
2	Alcohol based Soap Solution	To be made available on demand	To be made available on demand	2 bottle (500m1) at the front side of each camps visible & easy to access along with water availability for washing. Need to be refilled on regular basis
	Soap (100 gm)		1 No in each toilets and wash basins	1 No. to be distributed to each Contractor workman once in a week.

Sl. No.	List of Personal Protective Equipment (PPEs)	Scope
1	Nose Mask & Paper Tissues	For all workmen (daily one for at least one month
2	Face mask/Face shield/Goggles	For workmen involved in disinfection/sanitization activity (new one to be issued for each day activity and COVID Marshal
3	Gloves (Nitrite)	For workmen involved in disinfection/sanitization activity (new one to be issued for each day activity)
4	Coverall/Gowns (Nitrite)	For COVID Marshals and workmen involved in disinfection/sanitization activity (new one to be issued for each day activity)

LIST SHOWING PREFERRED BRANDS/ MANUFACTURERS/MAKES

NOTE: - 1) A List of Preferred Brand Names of Various Materials / Products are shown below for usage in execution of Work. However, approved equivalent material of any other Specialized Companies / Firms may also be used, in case it is established that the Brands Specified below are not available in the market or in other unavoidable circumstances and subject to Approval of the alternate Brand by the Engineer-In-charge. 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.

2) It must be ensured, in general, that all materials to be used in the works shall bear BIS Certification mark. In cases where for a particular material/product, BIS Certification Mark is not available, then the material proposed to be procured can be used subject to the condition that it should conform to CPWD Specifications and relevant BIS codes. In such cases written approval of the Engineer-in -Charge shall be obtained before use of such material in their works.

3) The list given below does not absolve the Executing Agency from their responsibility for using these products. It is only after, they are satisfied about the quality and performance, the products shall be used. To achieve this, proper check on the quality of the product, actually to be used, should be exercised.

4) The Chief Engineer, CPWD, Vijayawada reserves the right to add or delete any materials and brands in the list of approved makes. 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.

Sl. No.	Material Description	Brand	Makes *
1	AAC Blocks	A B Dinesh	A B Dinesh
		Areocon	HIL
		Bilt	Bilt
		Ecorex	Ecorex
		Fastbuilt	Fastbuilt
		Kncrete	Koncrete
		NCL	NCL VEKA Ltd.
		Nucon	Green Way building materials India Pvt. Ltd.
		Renacon	Renaatus Procon Pvt. Ltd.
		Siporex	SIPOREX
		Xtralite	Ultra Tech Cement Ltd
		SMART BRIX	M/s Smart Brix Infra Technology Pvt. Ltd., Jaggaiahpet Mandal, Krishna District, A.P. - 521175
		Fusion Brand	M/s Fusion Building Materials (Vizag) Private Limited

Sl. No.	Material Description	Brand	Makes *
2	Acoustic Insulation	Anutone	Anutone Acoustics Ltd.
		Himalyan Accoustics	Himalyan Accoustics
		Kanuf	Knauf Gypsum India Pvt. Ltd.
		Lloyd Insulation	Lloyd Insulation (India) Ltd.
		Saint Gobain Gyproc	Saint Gobain Gyproc India
		Twingerinsul	U.P. Twiga fiber glass ltd.
3	Actativ polypropylene (APP) Modified water proof membrane	Ardex endure	Ardex endure
		Bitumat Co Ltd	Bitumat Co Ltd
		Ferrous crete	Ferrous Crete (India) Pvt Ltd
		Hydrotech ltd	Hydrotech ltd
		Pidilite	Pidilite industries
		STP	Shalimar tar products
4	Acrylic emulsion	Asian Tractor Premium emulsion	Asian paint
		Berger (BISM)	Berger Paints
		Dulux (Super Cover)	ICI Dulux
		Nerolac (Beauty Gold)	Nerolac
		SURFA	M/s Surfa Coats (India) Pvt., Ltd., Bangalore
5	Acrylic smooth exterior paint	Apex (ACE)	Asian Paints
		Berger	Berger
		Dulux	ICI duLux
		Nerolac	Nerolac
		Nippon	Nippon
		SURFA	M/s Surfa Coats (India) Pvt., Ltd., Bangalore
6	Acrylic textured plaster	Apex Duracast	Asian Paints
		Asian paints	Asian Paints
		Heritage	Heritage Rajkamal Group
		Nerolac	Nerolac
		Spectrum paints	Spectrum paints Ltd.
7	Acrylic exterior Texture	Akzonobel	Akzonobel
		Asian paints	Asian paints
		Berger	Berger paints India ltd
		Ebco	Ebco
		Nerolac	Nerolac paints Ltd.
8	Adhesive	Asian Paints	Asian Paints
		CICO	CICO Industries
		Dunlop	India Tyre & Rubber Co (India) Ltd.
		Finical	Pidilite Industries
		Proofex of Adhesive	FOSROC India
		Sika	Sika India Pvt. Ltd
		Vamorganic	Vamorqanic Ltd.

Sl. No.	Material Description	Brand	Makes *
		AC-Tile Bond-N	Apple Chemie(I) Pvt. Ltd
9	Adhesive for AAC Block/Tiles	Ardex Endura/Gold star	Ardex Endura
		Ferrous Crete	Ferrous Crete (India) Pvt Ltd
		Tile Adhesive Plus	Berger Paints
		Ultra tech	Ultra tech cement ltd
10	Air transfer grills	Cool grills	Cool grills, Pune
		Systemair India	Systemair India Pvt Ltd.
11	Air release valve	Kartar	Kartar valves private Ltd.
		Kirloskar	Kirloskar brothers Ltd.,
		RBM	AFS Ltd
12	Aluminium doors/windows sections	Bhoruka	Bhoruka Aluminium Ltd.,
		Hindalco	Hindalco Industries Ltd..
		Hydro	Hydro Extrusion
		INDAL	Indian Aluminium Ltd.,
		Jindal	Jindal Aluminium Ltd,
		Omalco Extrusion	Omalco Extrusion Pvt Ltd.
		Padmavati Exrusion	Padmavath Extrusion Private Ltd.
13	Aluminium system/ Anodised Aluninium fittings for doors/windows	Bhoruka	Bhoruka Aluminium Ltd.,
		Define	Define Overseas Pvt. Ltd.
		Everite	Everite Agencies
		Hardima	Hardima sales corporation
		Jyothi	Jyothi industries
		Kawneer	Kawnear India
		Schueco	Schueco India Pvt. Ltd.,
		Sigma	Sigma Corporation
		CROWN	M/s Crown Industries
		Global	M/s Aluminium Udyog, New Delhi (for non-ferrous metal hardware)
14	Aluminium composite panels	Alpolic	Alpolic
		Alstone	Alstone
		Alstrong	Alstrong
		Alex panel	M/s Alex Panels
		Alucobond	3A composites India Pvt Ltd.
		Aludecor	M/S Aludecor lamination Pvt ltd.
		Eurobond	M/S Euro panel products Pvt ltd.
		Eurobond	Eurobond pvt Ltd.
		Hynadecor	Hynadecor
		Reynobond	Reynobond

Sl. No.	Material Description	Brand	Makes *
		ALUTECH	M/s Alutech Industries, New Delhi
		VIRGO	M/s VIRGO Laminates Ltd., Chandigarh
15	Aluminium framework	MFE (MIVAN)	(MIVAN)
		MFS	MFS
		S-form	S-form
16	Anchor/ SS Stone Cladding Clamps/ Dash fasteners	Anchor	Anchor Ltd.
		BOSCH	BOSCH Ltd.
		Canon	Canon
		Fischer	Fischer India
		Helfen	Helfen Gmbh
		Hilti	Hilti India Pvt. Ltd.
		Nutech	Nutech Concrete Products Pvt. Ltd.
		Trixel	Axel India Pvt. Ltd.
		Wurth	Wuerth India Pvt. Ltd.
17	Anti corrosive bit mastic paint	Bergar	Berger paints India Ltd
		Bituminous black	Asian Paints
		Shalimar	Shalimar paints India Ltd.
18	Butt Hinges openable window shutters	Alu Alpha	Alu Alpha India
		Dorma	Dorma India Pvt. Ltd.
		Dorset	Dorset Industries Pvt. Ltd.
		Earit Bihari	Earit Bihari India Pvt. Ltd.
		Hafele	Hafele India Pvt. Ltd.
		Helix	Helix India
19	Bamboo Wood Flooring and wall paneling.	AMITEX	AMITEX Enterprises, Delhi.
		Eco green Flooring	Jupiter Traders Bangalore.
		Floor India	Flooring India Company, Panipat, Haryana.
		FLOSTO Tanks	Devi Polymer Pvt. Ltd., Chennai.
		VIVANTA	VIVANTA Enterprises, Mumbai.
		EPITOME	M/s Mutha Industries Pvt. Ltd., Mumbai
20	Cement OPC / PPC	Ambuja Cement	Ambuja Cements Ltd.
		ACC	ACC Cements Ltd
		Bharathi	Bharathi Cement Corporation Ltd.
		Birla	Birla Corporation Ltd
		Century Cement	Birla Gold Cement
		Chettinad	Chettinad Cements Corporation Ltd
		Coromandal	India Cements Ltd.

Sl. No.	Material Description	Brand	Makes *
		Dalmia	Dalmia Cement Bharat Ltd.
		Jaypee Cement	Jaypee Cement Ltd
		J.K. Cement	J.K. Cement Pvt. Ltd.
		Konark Cement	Konark Cement
		Maha Cement	Myhome Industries Pvt. Ltd.
		Penna Cement	Penna Cement Industries Ltd.
		Ramco Cement	M/s Ramco Cement ltd.
		Shree Cement	Shree Cement
		Ultra Tech	Ultra Tech Cement Ltd
		Zuari	Zuari Cement Limited
		Nagarjuna Cement	M/s NCL Industries ltd., Secunderabad
		NU VISTA / INFRACEM	M/s NU Vista Ltd. (Formerly M/s Emami Cements Limited)
		SAGAR CEMENTS	M/s SAGAR Cements Ltd., Hyderabad
		Anjani	M/s Anjani port land Cement Ltd., Hyderabad
		JSW	M/s JSW Cement Ltd., Mumbai
21	Cement Concrete Parking Tiles	Dazzle	Dazzle Designer tiles Pvt Ltd
		Eurocon	Eurocon tiles india
		Hindustan tiles	Hindustan tiles, Ranchi Pune
		NTC	NTC Parking tiles
		NITCO	NITCO Ltd
		Poddar	Poddar Udyog
		Ultra	Ultra tile private Ltd
		CEMTECH	M/s Cemtech Tiles, Uppal, Hyderabad
		DEC	M/s DEC Industries (P), Ltd.
22	Cement based wall putty	Altek	NCL Alltek & seccold Ltd.
		Ardex Endura	Ardex Endura India Pvt. Ltd.
		Asian paints	Asian paints Ltd
		Berger	Berger
		Birla Wall Care	Birla Cements Ltd.,
		Ferrous Crete	Ferrous Crete (India) Pvt. Ltd
		J.K wall putty	J.K. Cement Ltd
		DEC	M/s DEC Industries Pvt. Ltd., Hyderabad
23	Cement Board	Bison	Bison Group
		Everest	Everest Techno polis
24	Cement Primer	Asian paints	Asian Paints
		Berger	Berger paints India Ltd.
		JK Primaxx	JK Cement Ltd
		SURFA	M/s Surfa Coats (India) Pvt., Ltd., Bangalore

Sl. No.	Material Description	Brand	Makes *
25	Centrifugal Hubless Cast Iron Pipe & Fittings	Kapilansh	Kapilansh Dhattu Udyog (P) Ltd.
		NECO	Jayaswal NECO Ltd.
		Raj (RPMF)	Raj Pattern Makers and Founders Pvt.,Ltd.
		SKF	Singhaliorn Foundary Pvt.,Ltd.
		BIC	M/s Bengal Iron Corporation, Kolkata
26	Centrifugally (Spun) cast Iran	Electrosteel	Electrosteel castings Ltd.
		Jindal	Jindal saw Ltd.
		Kesoram	Kesoram Industries ltd.
		Lanco / Sripipes	Electrosteel castings Ltd.
27	Centrifugally Caste (Spun) Iron Soil Pipe	Bengal Iron Corporation	Bengal Iron Corporation
		HEPCO	HEPCO
		Kapilash	Kapilash Dhatu Udyog (P) Ltd.
		Neco	Jayaswal Neco Ltd
		RPMF	Raj Pattern Makers and Founders Pvt. Ltd
		SKF	SKF industries
28	Chemical water proofing system	BASF	BASF India Ltd.
		Dr. Fixit	Pidilite industries
		Ferrous Crete	Ferrous Crete (India) Pvt Ltd.
		Fosroc	Fosroc India
		Latex shield 2K/Tank shield PW	Berger Paints Ltd.
		MC- Bauchemie	MC- Bauchemie India Ltd.
		Perma construction Aid	Perma construction Aid Pvt Ltd
		Sika	Sika India
		Smart Care	Asian Paints Ltd.
		Sunanda speciality coating	Sunanda speciality coating Pvt Ltd.
29	Chloropyriphos	DURSBANTCT	DE-NOCIL Ltd.
		HILBAN	Hindustan Insecticides Ltd.
		NOBAN	Chemtts Wets & Flows Pvt. Ltd
		PIRAMID	AMVAC AGRI RASAYAN Pvt. Ltd.
		Premise Agenda	Bayer Ltd.
		Sarups Pest Control	Sarups Pest Control Ltd.
30	CI double flange sluice valve	BURN	BURN
		IVS	Indian Valves Private Ltd.
		Kartar	Kartar valves private Ltd.
		Kirloskar	Kirtoskar brothers Ltd.
		Leader	leader valves Ltd

Sl. No.	Material Description	Brand	Makes *
		RBM	AF-S LL
		Zoloto	Zoloto Industries
31	CI double flangad non raturn valve	Fluidtech	Fluidtech
		Kirloskar	Kirloskar Brothers Ltd.
		Zoloto	Zoloto Industries
32	CI Manhole cover	BIC	Bengal iron corporation
		HEPCO	HEPCO India
		Neco	Jayaswal Neco Ltd..
		RPMF	M/s Raj Pattern Makers & Founders Pvt. Ltd.
		SKF	SKF Industries
33	Clamp, Rebar, Chemical fastener	Fischer	Fischer India
		Hilti	Hilti India Pvt.Ltd.
		Wurth	Wuerth
34	C.P.Brass Fittings	CERA	M/s Cera Sanitaryware Ltd.
		ESS Bathsense & Royal	Asian Paints Ltd.
		Hindware	HSIL Ltd.
		Jaquar	Jaquar Group
		Johnson	Prism Johnson Ltd.
		KEROVIT	M/s Kajaria Ceramic Limited
		Kingston	Kingston Brass India Pvt., Ltd.
		MARC	MARC Sanitation Pvt.Ltd.
		Parryware	Parryware Sanitaryware
35	CPVC pipe and fittings	Ashirwad	Ashirwad PVC Pipes
		Astral	Astral Polytechnik Ltd..
		Birla HIL Pipes	HIL Ltd.
		Finolex	Finolex Industries Ltd.
		Flowgard	Flowgard
		Prince	Prince Pipes and finttings Ltd,
		Supreme	Supreme Industries Ltd.
		Truflo	HIS Ltd.
		SENTINI	M/s Sentini Flopipes India Pvt. Ltd, Hyderabad
		DEC	M/s DEC Industries Pvt. Ltd., Hyderabad
		SUDHAKAR	M/s Sudhakar Irrigation Systems Pvt., Ltd.
		AKG	M/s AKG Extrusions Pvt Ltd.,
36	Concealed tower bolt	Alu Alpha	Alu Alpha India
		Dorma	Dorma India Pvt. Ltd.
		Dorset	Dorset Industries Pvt. Ltd.
		Ingersolrand	Ingersolrand (India) Ltd.
37	Damp Proof material	ACCO Proof	ACC Cements Ltd
		Asian Paints smart care	Asian Paints Ltd.

Sl. No.	Material Description	Brand	Makes *
		damp proof	
		BASF	BASF India Ltd.
		CICO	CICO Industries
		Dr. Fixit	Pidilite Industries
		Duraseal	Apurva India Pvt. Ltd.
		Ferrous Crete	Ferrous Crete (India) Pvt. Ltd.
		Fosroc	Fosroc Chemicals India Pvt. Ltd.
		Impermo	Snowcem Paints
		MAPEI	MAPEI Construction Products India P Ltd
		MYK	MYK LATICRETE India Pvt. Ltd.
		PIDILITE	Pidilite Industries
		SIKA	Sika India Pvt. Ltd.
		Weather Coat Roof Guard	Berger Paints India Ltd.
38	DI Fittings	Electro steel	Electro steel
		Jindal	Jindal
		Kapilansh	Kapilansh
		Keshoram	Keshoram
		Tata Ductura	Tata Ductura
39	DI Pipes	Electrosteel	Electrosteel
		Jindal	Jindal
		Keshoram	Keshoram
		Tata Ductura	Tata Ductura
40	Engineered wood floor	Amstrong	Amstrong flooring
		Mikasa Real wood floors	Grean Lam Industries
		New wood	Naw Wood India ltd
		Pergo	Red floor India
		Werner	Dura floor wemer GmbH
41	EPDM Gaskets	Amee Rubber	Amee Rubber industries Pvt Ltd
		Anand	Anand NVI-I products (P) Ltd.,
		Bohra	Bohra rubber Pvt Ltd..
		Hanu	Hanu Industries
		Roop	Roop Polimers Ltd.,
42	EPDM water proofing Membrane	Ferrous Crete	Ferrous Crete (India) Pvt Ltd
		Fosroc	Fosroc India
		Pidilite	Pidilite Industries
		Smart care	Asian paints
		STP	Shalimar tar products
43	Epoxy	Ardex	Ardex Endura Ltd.
		Asian paints	Asian paints

Sl. No.	Material Description	Brand	Makes *
		CICO Poxy	CICO Technologies Ltd.
		Ferrous Crete	Ferrous Crete (India) Pvt Ltd.
		Fosroc	Fosroc India
		Shalibons	Shalimar tar products
44	Epoxy Paint	Ardex Endura	Ardex Endura India Pvt. Ltd.
		Asian epoxy	Asian Paints
		Berger	Berger paints India Ltd.
		Nerolac	Nerolac
		Shalimar	Shalimar paints India Ltd.
		STP Ltd.	Shalimar Tar Products
		SUNANDA	M/s Sunanda Specialty coatings Pvt. Ltd., Mumbai
45	Epoxy tile joint cements	Ardex Endura	Ardex Endura India Pvt. Ltd
		BASF	BASF India Ltd.
		Ferrous Crete	Ferrous Grete (India) Pvt. Ltd
		Fosroc	Fosroc indd
		Laticrete	MYK Laticrete India
46	Expansion Joint Bitumen board	Dura Board HD100	Supreme Industries
		DURAFILL	Supreme Industries
		STP	Shalimar Tar Products
47	False Ceiling	Aerolite	Andhra Polymers Pvt. Ltd./Aarolite lndustnas Pvt. Ltd.
		Armstrong	Armstrong Wond Indusvies
		Diamond (GRG Ceiling Tiles)	Diamond International Inex Pvt. Ltd.
		Griddsquare	Gridsquare Ceilings
		Gypframe steel	British Gypsum
		Knauf	Knauf Gypsum India Pvt. Ltd.
		Lloyd	Lloyd Insulation (India } Ltd
		Saint Gobain	Saint Gobain Gyproc
		DEC	M/s DEC Industries (P) Ltd., Hyderabad
48	False ceilings Members (Perimeter, Ceiling section, intermediates, angles etc.,)	Aerolite	Andhra Polymers Pvt. Ltd./Aarolite Industries Pvt. Ltd
		Anutone	Anutone Accoustics Ltd.
		Armstrong	Amstrong World lndustries
		Gridsquare	Gridsquare Ceilings
		Hunter Dougals	Hunter Dougals
		Knauf	Knauf Gypsum India Pvt. Ltd.
		Saint Gobain Gyproc	Saint Gobain Gyproc India
		USG Boral	USG Boral
		DEC	M/s DEC Industries (P) Ltd.,

Sl. No.	Material Description	Brand	Makes *
			Hyderabad
49	False Floor	Access floor sytem	Access Floor system
		Hewetson	Hewetson India
		Kebao	Inner Space (Distributors)
		PINNACLE	PINNACLE
		Unifloor	Unifloor India Ltd.
		Unitile	Unitile office systems Pvt. Ltd.
50	Fire Rated hardware	Backers FS	Backers FS
		Dorma	Dorma India Pvt. Ltd.
		Dorset	Dorset Industries Pvt. Ltd.
		Geze	Geze GMBH
		Ingersolrand	Ingersolrand (India) Ltd.
51	Fire rated glass	Contra Flam / Pyroswiss of Saint Gobain	Saint Gobain India Pvt. Ltd.
		Pilkinton	Pilkinton India
		Promat	Promat Fire & Insulation (P) Ltd.
		Pyran of Schott	Schott glass India Pvt. Ltd.
52	Fire retardant paint	Akzonobel	Dulex Akzonobel Paints
		Asian paints	Asian Paints
		Htlti	Hilti India Pvt. Ltd.
		Jotun	Jotun paints
		STPL Ltd.	STPL Ltd.
53	Fire Smoke Seal	Atroflame	Atroflame ltd.
		Hilti	Hilti India Pvt. Ltd.
		Promat	Promat Fire & Insulation (P) Ltd.
		Raven	Raven Global
54	Float Glass,	Saint Gobain	Saint Gobain India Pvt. Ltd.
		Asahi	Asahi India Glass ltd.
		Pilkinton	Pilkinton India
		Modiguard	Gujarat Guardian Ltd.
		Gold Plus	M/s Gold Plus Glass Industry Ltd., New Delhi
55	Float Valve (Ball valve)	Arco	Arco valve Pvt ltd
		IBP	IBP industries
		Leader	Leader valve Ltd
		Prayag	Prayag Polymers Pvt Ltd.
		Zoloto	Zoloto industries
56	Floor spring (For non DSR Items)	Dorma	Donna lndia Pvt Ltd.
		GEZE	GEZE GmbH
		Ingersolrand	lngersolrand India Pvt Ltd
		OZONE	Ozone Hardware.

Sl. No.	Material Description	Brand	Makes *
57	Flushing Cistern	Bath sense	Asian Paints
		CERA	CERA Sanitary ware Ltd.,
		Hindware	HSIL Ltd,
		Jaquar	Jaquar Group
		Kohler	Kohler
		Parryware	ROCA Bath Pvt. Ltd.,
		Somany	Somany
58	Fly ash cement bricks	Concerned CE/SE's will approve based on local availability.	
59	FRP Door Frames & shutters	Ambieance	Ambieance
		Cactus	Cactus
		Duroplast	Duroplast Extrusion pvt ltd.
		Jain doors Pvt. Ltd.	Jain doors Pvt. Ltd.
		Jayna	Jain wood industries
		Meena fibre glass	Meena fibre glass
		Polyline	Polyline
		DEC	M/s DEC Industries Pvt. Ltd., Hyderabad
		Ahlada Engineers	M/s Ahlada Engineers Limited
60	Friction stay hinges	Earl Bihari	Earl Bihari Pvt. Ltd.
		KINLONG	Kinlong lndustriss
61	FRP covers	Everlast Composites	Everlast Composites Pvt.,Ltd.
		Fibrocast	Fibrocast FRP cover manufacturer
		Thermodrain	Poly products (I) Pvt.,Ltd.
62	Galvolume sheet for roofing, cladding, sandwitch panel	Bhushan	Bhushan steel
		Essar	Essar Group
		JSW	JSW
		Llyod metal craft	Llyod Insulation
		Tata Blue Scope	Tata Blue Scope
		BIRLA AEROCON	M/s HIL Ltd.
63	Galvanising	Jenco	Jenco Group
		Karamtara	Karamtara Engineering Pvt.,Ltd.
		Steel liteS	Galvanized Steel Ltd.
64	G I Pipe fittings	HB	HB Industries
		ICS	Sgree samarth Englnears
		Surya	Surya Roshni Ltd.
		TATA	TATA Steel Ltd.,
		Unik	Unik malleable
		Zoloto	Zoloto Industfiea
65	G.I. Pipes	HISSAR	HISSAR
		Jindal	Jindal Pipes Ltd.,
		Surya	Surya Roshni Ltd.

Sl. No.	Material Description	Brand	Makes *
		TATA	TATA Steel Ltd.,
		Zenith	Zenith Birla (India) Ltd.
66	Glass door hardware	Classic	Classic Hardware
		Dorma	Dorma India Pvt. Ltd.
		Dorset	Dorset Industries Pvt. Ltd.
		Geze	Geze GMBH
		Godrej	Godrej
		Hafele	Hafele India Pvt. Ltd.
		Kich	Kich Architectural Products Ltd.
		Ozone	Ozone Hardware
		Squash	Squash glass doors
67	Glass mosaic tiles	Birla White	Birla Corportion Ltd.
		Bisazza	Bisazza Italy
		Coral	Coral tiles
		Italia	Tie italia mosaic Pvt Ltd
		JK White	JK Cement ltd.
		Mridul	Mridut tiles
		Paljadto	Palladto Mosaics
		PAVIT (Eco Tile)	PAVIT Ceramics Pvt Ltd.
68	Glazed Ceramic tiles (Also wall tiles)	Aparna	Vitero Tiles
		AGL	Asian Granite India Ltd.
		CERA	CERA Sanitaryware Ltd
		Jonson	Prism Jonson Ltd.
		Kajaria	Kajaria Ceramic Ltd.
		NITCO	NITCO Ltd.
		Oasis	M/s Oasis Vitrified Pvt.Ltd.
		Orient Bell	Orient Bell Ltd.
		RAK	RAK Ceramic India Pvt. Ltd.
		Somany	Somany Ceramic Ltd.
		Varmora Granito	Varmora Granite Granite Pvt. Ltd.
		Vitero	Vitero Tiles Floor and Wall Tile Manufactures India
		Ultra	Ultra Ltd.
		NAVEEN	M/s Murudeswar Ceramics Ltd., Bangalore
		Orient Bell Ltd	M/s Orient Bell ltd
69	GRC Jali & Tile	Ecovision	Ecovision Industries Pvt ltd.
		Mahesh GRC	Mahesh Prefab Pvt Ltd.
		Terrafirma	Terrafirma GRC Industries
		Unistone	Unistone Interiors Pvt.,Ltd.
		DEC	M/s DEC Industries (P) Ltd.
70	GRP/SMC Panel	AMITEX	AMITEX Enterprises, Delhi.

Sl. No.	Material Description	Brand	Makes *
	Tank (New product in the market performance is yet to be established)	FLOSTO Tanks	Devi Polymer Pvt., Ltd., Chennai.
		PIPECO Tanks	PIPECO Tanks
		VIVANTA	VIVANTA Enterprises, Mumbai.
71	Grout	Asian Paints - Smart casre	Asian Paints Pvt. Ltd.
		Ardex	Ardex Endura Adhesive India Pvt. Ltd.
		BASF	BASF India Ltd.
		CICO	CICO Industries
		Dr. Fixit	Pidilite Industries
		Ferrous Crete	Ferrous Crete (India) Pvt. Ltd.
		Fosroc GP2	FOSROC India
		Fugabella, Porcelana	Kerakoll India Pvt. Ltd.
		Home shield super grout	Berger Paints India Limited.
		LATA POXY	MYK LATICRETE India Pvt. LTd.
		MYK Schomburg	MYK Arments Range of products
		SIKA	Sika India Pvt.Ltd.
		Weber	Saint Gobain India Pvt. Ltd.
		DEC (Non Shrink grout) (Note: Subject to statutory approvals)	M/s DEC Industries Pvt. Ltd., Hyderabad
		AC-Grout-H1/RR	Apple Chemie (I) Pvt. Ltd
72	Gun metal Valves	Audco	L&T Valves
		Leader	leader valves Ltd ,
		Sant	Sant Valaves Pvt. Ltd.
		Zoloto	Zolota Industries
73	Gypsum Board	Armstrong	Armstrong world Industries
		Gyproc Saint Gobain	Saint Gobain Gyprock India Ltd.
		Lafarge	Lafarge Gypsum India Pvt. Ltd.
		USG Boral board	USG Board India (P) Ltd.
74	Gypsum plaster	Ferrous crete (Ferro-500, Gypsum) Plaster)	Ferrous crete manufacturers
		Gyproc Saint Gobain (Elite 90)	The Saint-Gobain group
		Ultra tech	Ultra Tech Cement Ltd.
75	Heat resistant tiles on terrace	ABC Ceramics	ABC Ceramics
		Endura	Johnson India
		Johnson	Johnson India
		Somany	Somany Ceramic Tiles

Sl. No.	Material Description	Brand	Makes *
		Swastik	Swastik Tiles
		Thermatek	Thermatek
76	High Desity (HDF) Prelaminated board	Armstrong	Armstrong world industries Ltd.
		Green ply	Green Ply Industries Ltd.
		Pergo	Red Floor India
77	High end exterior Texture	Allura/ Graniza range	Asian paints
		Berger	Berger paints India ltd
		SKK Brand	SKK Ltd
78	Hydraulic door closers/ Floor springs	Dorma	Dorma India Pvt. Ltd.
		Dorset	Dorset Industries Pvt. Ltd.
		Everite	Everite agencies
		Godrej	Godrej locking solutioin & systems
		Hardwyn	Hardwyn hardware
		MAGNUM KIT	Mukund Overseas
79	Interlocking Concrete Paver Blocks	Basant Betons	Basant Betons
		BHARAT (NILSON)	Bharat
		Dazzie	Dazzle Designer tiles Pvt Ltd
		Hindustan tiles	Hindustan tiles, Ranchi Pune
		NITCO (ROCKARD)	NITCO
		REGENCY	Regency
		Shree	Shree Bharat Paver blocks
		Ultra	Ultra tile private Ltd
		Vyara Tiles	VYARA Tiles Pvt. Ltd. / Surat
		CEMTECH	M/s Cemtech Tiles, Uppal, Hyderabad
		DEC	M/s DEC Industries (P) Ltd.
		Any alternative tiles as approved by CE/SE based on local availability.	
80	Laminate	Archid ply	Archid ply industries ltd.
		A1 Teak	A1 Teak Products Pvt.,Ltd.
		Century	Centuray laminates
		Decolam	Decolam India Pvt. Ltd.
		Formica	Formica Laminates (India) Pvt. Ltd.
		Green Lam	Green lam Industries Ltd.
		KANCHAN PLY	M/s Vidya Ply & Board Pvt. Ltd
		Kitmica	Kitply Industries Ltd.
		Merino	Merino laminates
		Royal touche	Royal touche laminates
		Sonear	Sonear Laminates
		Sunmica	Sunmica Industries
		DECO-MICA	M/s Deco-Mica Ltd

Sl. No.	Material Description	Brand	Makes *
81	Linoleum sorts flooring	Armstrong	Armstrong flooring India Pvt. Ltd.
		Forbo	Forbo Flooring India Pvt. Ltd.
		Gerflor	Gerflor flooring
82	Locks & Latches	Dorset	Dorset Industries Pvt. Ltd.
		Godrej	Godrej locking solution & systems
		Hafele	Hafele India Pvt. Ltd.
		Harrison	Harrison locks
		Hitech	Globe Locks India
		Helix	Helix India
		Link	Link Locks
		Plaza	Bharat lock House
		Yale	ASSA ABOLOY India (P) Ltd.
83	Masking Tapes	3M	3M
		Roop	Roop Polymer Ltd.
		Sun	Sun
		Wonder polymer	Wonder Tape Industries
84	Melamine Polish	Asian paints	Asian paints
		Melamine Gold Wudfin	Pidilite industries
		Polycure	Polycure Malaysia
85	Mechanical coupler for reinforcement	Dextra	Dextra India Pvt Ltd.
		Sanfield	Sanfield India Ltd.
		Alchemica	Alchemica Ltd.
		Ardex Endura	Ardex Endura Ltd.
		Asian paints	Smart care water proofing products
86	Membarane water proofing system	BASF	BASF India Ltd.
		Dr. Fixit	Pidilite industries
		Ferrous Crete	Ferrous Crete (India) Pvt Ltd.
		Hydro tech	Hydro tech Ltd.
		MYK Schomburg	MYK Arments range of products
		STP Ltd	Shalimar tar products
		Texsa	Texsa India Ltd.
		KRYTON	M/s Kryton Buildmat Co. Pvt. Ltd. Gurugram, Haryana
		SUNANDA	M/s Sunanda Specialty coatings Pvt. Ltd., Mumbai
87	Metalic / Steel Fire Door	Godrej	Godrej Security Solutions
		Kenwood	Kenwood Ply & Board
		MPP Schodders	MPP Technology Pvt. Ltd.
		NAVAIR	NAVAIR International Pvt. Ltd.
		Promot	Promot fire & Insulation (P) Ltd.

Sl. No.	Material Description	Brand	Makes *
		Shakthi Hormann	Shakthi Hormann Pvt. Ltd.
		Signumfire Protection	Signumfire Protection pvt. Ltd.
		Sukri	Sukri Fire Doors Pvt. Ltd.
		ASES (Agni suraksha)	M/s ASES Security Pvt. Ltd., Ghaziabad)
		DEC	M/s DEC Industries Pvt. Ltd.
88	Metal Deck Sheet	Essar	Essar Steel Ltd.
		JSW	JSW Structural Metal Decking Ltd
		SAIL	SAIL
		TATA	TATA steel
89	Mild Steel Butt Hinges/ Piano hinges	Amit	Lovely metal Industries Pvt. Ltd.
		Deepak	Deepak
		Garg	D.P. Garg & Company
		Jolly	Jolly Engineering works
		Jyoti	Jyoti Architectural Pvt. Ltd.
		Saswat	Saswat
		Supreme	Supreme Industries
		Swift	Swift screws
90	Mirror	AIS Mirror	Asahi India Glass Ltd.
		Atul	Autl Glass Industries Ltd.
		Modi Guard	Gujarat Guardian Ltd
		Saint Gobain	Saint Gobain Glass India Ltd.,
		Gold Plus	M/s Gold Plus Glass Industry Ltd., New Delhi
91	Modular kitchen/ wardrobes/Hardware and Accessories	Evoke	Evoke
		Godrej	Godrej & Boyce co
		Sleek	Asian Paints
		Spacewood	Spacewood
92	M.S. Pipe, Tubes	Apollo	Appolo Tubes Ltd.
		JINDAL	JSW
		Kalinga	Kalinga Tubes Ltd.
		SAIL	SAIL
		Surya	Surya Roshi Ltd.
		TISCO	TATA STEEL
93	Multy walled polycarbonate roofing sheets	Danapalon	Danapal Light architecture
		Lexan GE	GE lexan
94	Non Asbestos Sheets	Everest	Everest Industries
		HIL	HIL Ltd.
		RAMCO	RAMCO Industries Ltd.
		Everest (Non-Asbestos Fibre Cement Board -	M/s Everest Industries Ltd.

Sl. No.	Material Description	Brand	Makes *
		Different Grade & Type)	
95	Non Metalic Fire door	Godrej	Godrej Security Solutions
		Kenwood	Kenwood Ply & Board
		NAVAIR	NAVAIR International Pvt. Ltd.
		Promot	Promat Fire & Insulation (P) Ltd.
96	Non Metallic floor surface hardness	BASF	BASF India Ltd
		CICo	CICO Technologies ltd
		Fosroc	Fosroc India
		Hardonite	Hardonite
		Ironite	Ironite
		Pidilite	Pidilite Industries ltd
		Sika	Sika India
97	Oil Bound Distemper	Berger (BISOM)	Berger Paints
		Dulux (Maxilite)	Dulux
		MG Polyplast	Nerolac
		Tractor Aqalock	Asian Paint
		SURFA	M/s Surfa Coats (India) Pvt., Ltd., Bangalore
98	Overdeck insulation with extruded polystyrene board (XPS board)	Dowcorning	Dowcorning
		Owen scorning	Owen scorning
		Supreme Petrochemical Ltd.	Supreme Petrochemical Ltd.
99	Panel Doors/Wire mesh Door shutters /Fire proof doors	Jain doors	Jain Door Pvt. Ltd.
		NCL	Nagarjuna
		ASES (Agni suraksha)	M/s ASES Security Pvt. Ltd., Ghaziabad)
		DEC	M/s DEC Industries Pvt. Ltd., Hyderabad
100	PE-AL-PE Composite Pipes	Kitec	Kitec Industries (Índia) Pvt. Ltd.
101	Pink primer	Berger	Berger Paints
		Dulex	ICI dutax
		Nerolac	Nerolac Kansia Nerolac Pains Ltd.
		Nippon	Nippon
		Wood primer	Asian paint
		SURFA	M/s Surfa Coats (India) Pvt., Ltd., Bangalore
102	Plasticiser & Super Plasticiser	BASF	BASF India Ltd.
		Chryso-HP/ Delta / Optima	Chryso India Pvt. Ltd.
		CICO	CICO Industries
		Contrament, Power flow	MC Bauchemie (India) Pvt. Ltd.

Sl. No.	Material Description	Brand	Makes *
		Conplast SP 430	FOSROC India
		MYK Schomburg	MYK Arments Range of products
		Plastiment, Sikament	Sika India Pvt. Ltd.
		Smart Care Techno Plast/Smart care maximo plast.	Asian Paints Limited
		Sunanda Chemicals	Sunanda Chemicals Ltd.
		DEC (Admixure(PC, SNF) (Note: Subject to statutory approvals)	M/s DEC Industries Pvt. Ltd., Hyderabad
		VISCOFLUX 2203/2208	Apple Chemie (I) Pvt Ltd
103	Plastic Encapsulated Foot Rest	Accurate Buildcon	Accurate Buildcon company
		KGM	KGM Exports
		KK India	KK Manhole and gratings Co Pvt Ltd.
104	Play Equipments	Koochie Play	Koochie Play systems Pvt ltd.
		Play world systems	Play world systems India.
105	Post tensioning System	BBR	BBR (India) Pvt. Ltd.
		CRUX	Crux Processing systems Pvt. Ltd.
		Ultracon	Ultracon Structural Systems Pvt. Ltd.
		VSL	VSL India pvt. Ltd.
106	Poly carbonate Sheet	Alcox	Hindeggan Alcox Ltd.
		Danapalan	Danapal Light architecture
		GE Lexon	GE Silicones
		MG Polyplast	MG Polyplast
		DPI – Flux	M/s DPI Day lighting pvt. Ltd. Gurugram, Haryana
107	Polycarbonate Convex mirrors, Rubbarised road hump	Unique safety solutions	Unique safety solutions
108	Poly sulphide sealant	Dr. Fixit	Pidilite industries
		Ferrous Crete	Ferrous Crete (India) Pvt Ltd.
		Fosroc	Smart care sealant
		MYK Schomburg	MYK Arments range of products
		Pidilite	Pidilite Industries
		STP Ltd	Shalimar tar products
		Techseal	Choksey chemical Pvt ltd.
		Tuff seal	Bondit construction chemical
		AC-Poly seal	Apple Chemie (I) Pvt. Ltd
109	Polyethylene backer rod	Supreme	Supreme Industries

Sl. No.	Material Description	Brand	Makes *
110	Polyurea Ultra	BASF	BASF
		Ferrous	Ferrous Crete (India) Pvt Ltd
		Pidilite	Pidilite Industries
		SIKA	SIKA India
		Smart care	Asian paints
111	Powder coating	Akzonoble	Akzonoble Coating Ltd.
		Berger	Berger Paints India Ltd.
		Jotun	Jotun Group
112	Powder & PVDF Processer	Aura International	Aura International Pvt.,Ltd.
		MJ coaters	MJ Coaters Pvt.,Ltd.
		SP Coating	SP Architectural Coating Pvt.,Ltd.
113	Prelaminated particle board Exterior Grade	Archid ply	Archid Ply Industries Ltd.
		Associate	Associate Décor Limited
		Centuary	Centuary MDF
		Ecoboard	Ecoboard Industries Ltd.
		Green Lam	Green lam Industries Ltd.
		Kitlam	Kit Ply Industries Ltd.
		Merino	Marino laminates
		Novapan	GVK Novapan Industries Pvt. Ltd.
		TESA Action Co.	TESA Action Co.
		GREEN PANEL	M/s Green Panel Industries Ltd.
		Bison Panel	M/s NCL Industries ltd., (Board division), Secunderabad
114	Premium Acrylic smooth exterior Paint with silicon additives	Berger	Berger
		Dulux	ICI dulux
		Nerolac	Nerolac
		ULTIMA	Asian paint
		SURFA	M/s Surfa Coats (India) Pvt., Ltd., Bangalore
115	PTMT/PVC water supply sanitary fittings, bibcocks, pillar cock Angle valve,	PEARL	Precision Products
		Prayag	Prayag Polymers (P) Ltd
		Supreme	Supreme industries
116	PT Strands	DP Wires	DP Wires Ltd.
		TATA wiron	TATA STEEL LTD.
		Usha Martin	Usha Martin Ltd.
117	PVC Doors and Frames	Ambieance	Ambieance
		Accucel	Accura Polytech Pvt. Ltd.
		Duroplast	Duroplast extrusion Pvt. Ltd.
		Encraft	Encraft India Pvt. Ltd.
		Plastic Wood	Plastic Wood

Sl. No.	Material Description	Brand	Makes *
		Polyline	Polyline extrusion Pvt. Ltd.
		Rajshri	Rajshri Productions Pvt. Ltd.
		Sintex	Sintex Plastic technology Ltd.
		VEKA	M/s NCL Veka Ltd.
		DEC	M/s DEC Industries Pvt. Ltd., Hyderabad
		RAJSHRI	M/s Rajshri Plastiwood, Pithampur, M.P.
		GIZA	M/s Navratan Soeciality Chemicals LLT., Ahmedabad – 380051, Gujarat
		KAKA	M/s Kaka Industries Limited
118	PVC / HDPE water storage tanks	Sintex	Sintex Plastic technology Ltd.
		Supreme	Supreme Industries Ltd.
		Vectus	Vectus Industries Ltd.
		SUDHAKAR	M/s Sudhakar irrigation system (P) Ltd., Hyderabad
119	PVC Perforated Pipes	Akash Enterprises	Akash Enterprises
		Rex Polyextrusion	Rex Polyextrusion ltd.
		Supreme	Supreme industries.
		Zenplas Pipes	Zenplas Pipes Pvt ltd.
120	PVC flooring	Armstrong	Armstrong world Industries
		Ger flor	Ger flor flooring
		LG Hausys	LG Hausys
121	PVDC coating	Akzonoble	Akzonoble Coating Ltd.
		Valspar	Valspar India Coating Corporation Ltd.
122	PU Coating (UV resistant Liquid Applied coating)	BASF	BASF
		Fosroc	Fosroc India
		Pidilite	Pidilite industries
		PU Roof Koat	Berger Paints Ltd
		SIKA	SIKA India
		Smart care	Asian paints
123	PU Enamel Metalic Paints on MS Structure & Epoxy paints (Premium Quality)	Akzonobel	Akzonobel
		Asian paints	Asian paints
		Berger	Berger paints India Ltd.
		MRF	MRF paints
		SKK	SKK ltd
		SUNANDA	M/s Sunanda Specialty coatings Pvt. Ltd., Mumbai
124	Raised / Cavity flooring	Access Floor systems	Access Floor Systems
		Tate	Tate
		Uni floor	Uni floor India
		Unitile	Unitile India
		Zt floor	Zt floor Pvt.,Ltd

Sl. No.	Material Description	Brand	Makes *
125	RCC Pipes	Indian Hume Pipes	Indian Hume Pipe Ltd.,
		Jain & Co	Jain spun pipes Co.,
		Lakahmi Sood & Sood	Lakshmi Sood & Sood Pipa Co.
		Madurai spun pipe	Madura spun pipe company
		Vishnu	Vishnu Spun Pipes.
		DEC	M/s DEC Industries Pvt. Ltd., Hyderabad
126	Ready mix cement plaster	Ferrous Crete	Ferrous Crete (India) Pvt. Ltd.
		Gyproc plasters	Saint Gobain Gyproc India
		Ramco super plaster melamine	Ramco super plaster melamine
		Read Plast	Ultratech cements Ltd
		Ultra tech	Ultra tech Cement Ltd
127	Red Oxide Zinc Chromate primer	Berger	Berger Paints
		Dulex	ICI dulex
		High performance yellow metal primer	Asian Paint
		Nerolac	Nerolac
		Nippon	Nippon
		SURFA	M/s Surfa Coats (India) Pvt., Ltd., Bangalore
128	Reflective glass	Asahi	Asahi India Glass ltd.
		Glaverbel	Glaverbel India
		Modifloat	Gujarat Guardian Ltd.
		Pilkinton	Pilkinton India
		Saint Gobain	Saint Gobain India Pvt. Ltd.
		Gold Plus	M/s Gold Plus Glass Industry Ltd., New Delhi
		Guardian Sun Guard	M/s Gujarat Guardian Ltd., Gujarat
		GUARDIAN SUNGUARD	M/s Gujarat Guardian Ltd.
129	RMC plants (Ready Mix Concrete)	ACC	ACC Cements Ltd
		A B Dinesh	A B Dinesh Concrete India Pvt., Ltd.
		Aparna	Aparna Ready Mix concrete
		Lafarge	Lafarge India Pvt. Ltd.
		NUVOCO	Nuvoco Vistas Corporation Ltd.
		RB Ready Mix	RB Ready Mix
		RDC	RDC Concrete (India) Pvt.Ltd.
		RMC (India)	RMC (India) Pvt. Ltd.
		Ultra Tech	Ultra Tech Cement Ltd
		Sarvani Industries Pvt. Ltd.,	M/s Sarvani Industries Pvt. Ltd., Guntur

Sl. No.	Material Description	Brand	Makes *
			Plants at Autonagar, Gajuwaka & Atchutapuram @ Visakhapatnam. Plants at at – Ankireddy Palem, Kolanukonda @ Guntur
		JK Concrete	M/s JK Ready Mix concrete, Visakhapatnam
		SCS Infra Concrete	M/s SCS Infrastructures Pvt. Ltd.,
		SVK Ready Mix	M/s Sai Venkata Krishna Reddy mix Industry, Guntur
		VNS Ready Mix	VNS READY MIX
		Icon Ready Mix	Icon Infra Concrete Private Limited, Tadepalli, Guntur
130	Rockwool/Glass wool insulation	Liyod Insulation	Liyod Insulation ltd.
		Supreme	Supreme Industries ltd.
		Twiga fiber	Twiga fiber glass ltd
131	Sandwich PUF panelled roofing sheets	Advent	Advent concrete vision
		BASF	BASF
		Danapalan	Danapal Light architecture
		Essar	Essar Group.
		Fosroc	Fosroc
		GE Plastic	GE Silicones
		GE Plastic	GE Silicones
		JINDAL MECTEC/ JINDAL	Mectec Pvt Ltd
		LEXAN	LEXAN Ltd
		Liyod Insulation	Liyod Insulation (India) ltd
		Lloyd Insulation	Lloyd insulation (India) Ltd
		Pidilite	Pidilite Industries ltd
		Smart care	Asian paints
		Supreme	Supreme ltd
132	Sensor based Auto flush systems	AOS System	AOS System
		Grohe	Grohe
		Hindware	HSIL Ltd
		Jaquar	Jaquar Group
		Kochier	Kochier
		Parryware	Parryware Sanitary ware
		TOTO	TOTO ltd.
133	SFRC Cover and grating	Nu-TEC	Nu-Tech concrete products (P) Lld,.
		KK	KK Manhole and gratings Co Pvt Ltd.,
		Kutty	Kutty Industries
134	Shear Stud/	KOCO	KOSTER & CO

Sl. No.	Material Description	Brand	Makes *
	Connector		
135	Silicon coating	BASF	BASF India Ltd.
		Dow Corning	Dow corning Indd
		GE	GE Silicones
		Wacker	Wacker silicones
136	Silicon Gaskets	Sree Geurev	Sree Gaurav Rubber products
137	Solar studs/ Median markers	3M	3M Science
		Avery Dennison	Avery Donnison India Pvt Ltd.
		Nikkalite	Nippon carbide Industires (USA)
138	Spider patch fittings for structural glazing	Dorma	Dormakaba
		hafele	Hafele Ltd.
		Kich	Kich india
		Ozone	Ozone Ltd.
		Sevax	Saint Gobain Glass India ltd
139	Spray applied Readymade plaster/ Gysum plaster	Buildon	Buildon
		Ferrous Crete	Ferrous Crete (India) Pvt Ltd.
		Gyproc cute 100	Gyproc India.
		Ultratech	Ultratech cement ltd.
140	Spun cast iron fittings	Neco	JayaSwal Neco Ltd
		Kartar	Kartar valves private Ltd. ,
		Electrosteel	Electrosteel
		Kapilansh Centrifugal	Kapilansh Dhatu Udyoo (P)Ltd.
		SKF brand	SINGHALIRON FOUNOARY Pvt. Ltd.
141	Spun cast iron covers & gratings	Jagannath	Sri Jaqannath iron Foundry Pvt. Ltd
		Kapilansh Centrifugal	Kapilansh Dhatu Udyoo{P)Ltd.
		Neco	Jayaswal Neco Ltd
		SKF brand	SINGHALIRON FOUNOARY Pvt. Ltd,,
142	Stainless Steel	Ark Product Pvt. Ltd.	Ark Product Pvt. Ltd.
		Connect	Connect Ltd.
		Jindal	JSW
		KINGSTON	KINGSTON
		Salem	SAIL
		SAIL	SAIL
		DEC (Stainless steel pipes*) *with emboss /mark "RM by JINDAL"	M/s DEC Industries Pvt., Ltd, Hyderabad
143	Stainless Steel screws	Alloy	Alloy Ltd.
		Atul	Atul fasteners Ltd.
		GKW	GKW Limited

Sl. No.	Material Description	Brand	Makes *
		Helix	Helix India
		Kundan	Kundan Industries Ltd.
		Nettlefold	Nettlefold Screws
		Pooja	Pooja Steel Corporation
144	Stainless steel Butt hinges	Dorma	Dorma India Pvt. Ltd.
		Helix	Helix India
		Prayag	Prayag Polymers (P) Ltd.
		Ozone	Ozone Hardware
		DEC	M/s DEC Industries (P) Ltd., Hyderabad
		Global	M/s Aluminium Udyog
145	Stainless steel friction hinges	Earl Bihari	Earl Bihari India Pvt. Ltd.
		EBCO	EBCO
		Hetich	Hetich India
		Haffle	Haffle India Pvt. Ltd.
		ROTO	ROTO Frank Asia
		Securistyle	Securityle India Pvt. Ltd.
146	Stainless steel Bolts, washers, nuts	Atul	Atul fasterners Ltd.
		Hilti	Hilti India Pvt. Ltd.
		Kundan	Kundan Industries Ltd.
		Pooja	Pooja Steel Corporation
		DEC	M/s DEC Industries (P) Ltd., Hyderabad
		GIZA	M/s Navratan Specialty, Chemicals LLT., Ahmedabad – 380051, Gujarat
147	Stainless steel pressure plate screws	Atul	Atul fasterners Ltd.
		Dorset	Dorset Industries Pvt.Ltd.
		Kundan	Kundan Industries Ltd.
		Pooja	Pooja Steel Corporation
148	Stainless Steel Kitchen sink	CERA	M/s Cera Sanitaryware Ltd.
		Diamond	Pheonix Appliances Pvt. Ltd.
		Franke	Franke India Ltd.
		Futura	Futura Kichen Sinks India Pvt. Ltd.
		Hindware	HSIL Ltd
		Jhonson	Prision Jhonson Ltd.,
		Jindal	Centuary polytech
		Joyna	Joyna
		Navkar	Shri Navkar Metals Ltd
		Nilkanth	Nilkant
		Nirali	Jyoti (India) Matel Industries Pvt Ltd
		Silver Shine	Blue stone sanitary Industries

Sl. No.	Material Description	Brand	Makes *
			Pvt. Ltd.
		DEC	M/s DEC Industries Pvt. Ltd., Hyderabad
149	Steel Windows/ Pressed steel frames	Accucel	Accura polytech Pvt ltd.
		Madhu industries	Madhu industries, San Harvic, NCL
		NCL	NCL Industries
		San Harvic	San Harvic
		DEC(CRCA Door Frames)	M/s DEC Industries Pvt. Ltd., Hyderabad
150	Structural Steel	APL	Apollo Tubes Ltd
		JSPL	JSPL
		JSW	JSW
		SAIL	SAIL
		TISCO	TATA STEEL
		VIZAG	RINL
151	Structural sealant	Asian paints	Smart care sealant
		BASF	BASF India Ltd.
		Dow corning	Dow corning india
		Fosroc	Fosroc India
		GE	GE silicones
		STP Ltd.	Shalimar tar products
		Wacker	Wacker silicones
152	Synthetic enamel Paint	Berger	Berger Paints
		Dulex	ICI dulex Ltd
		Premium gloss enamel	Asian paint Ltd
		Nerolac	Nerolac Paints Ltd
		Nippon	Nippon Paint India Ltd.
		SURFA	M/s Surfa Coats (India) Pvt. Ltd., Bangalore
153	Synthetic Carpet tiles	Hollitex	Hoilitex carper tilas
		Standard Carpets	Standard Carpets
		TOLI	TOLI Corporation
155	Synthetic Sports Flooring	Armstrong	Armstrong flooring
		Gerflor	RMG Polyvinyl India Ltd.
		LG Wondorfloor	LG Hausys India
156	SWR PVC Pipes & fittings	Astral	Astral poiytechnik Ltd.
		Finolex	Finolex Industries Ltd .
		Flowgard	Ashirwad PVC Pipes
		Nandi	Nandi pipes Pvt., Ltd.
		Prince	Prince Pipes and fittings
		Sudhakar	Sudhakar PVC Pipes
		Supreme	Supreme Industries Ltd
		SENTINI	M/s Sentini Flopipes India Pvt.

Sl. No.	Material Description	Brand	Makes *
			Ltd., Hyderabad
		Brila HIL Pipes	M/s HIL Ltd.
		AKG	M/s AKG Extrusion Pvt. Ltd.,
157	Tempered reflective/ clear glass	Asahi	Asahi India Glass ltd.
		FUSO	FUSO Glass India Pvt. Ltd.
		Gurind	Gurind India
		Imapct Safety	Impact Safety glass works Pvt. Ltd.
		Modiguard	Gujarat Guardian Ltd.
		Pilkington	Pilkington India Pvt. Ltd.
		Saint Gobain	Saint Gobain India Pvt. Ltd.
		Gold Plus	M/s Gold Plus Glass Industry Ltd., New Delhi
158	Thermal Insulation treatment	Asian	Asian Paints Ltd.
		Elastospray	BASF
		Pidilite	Pidilite Industries
		Rock India Pvt. Ltd	Rock India Pvt. Ltd
		Weather Kool & Seal	Berger Paints India Ltd.
159	TMT Bars	JSW	JSW Steel Ltd.
		SAIL	Steel Authority of India Ltd.
		TISCO	TATA STEEL LTD.
		VIZAG	Rastriya Inspat Nigam Ltd.
		JSPL	Jindal Steel & Power Ltd.,
160	UPVC Pipes and fittings	AKG	M/s AKG Extrusions Pvt. Ltd.,
		Astral	Astral polytechnik Ltd.
		Ashirwad	Aahirwad PVC Pipes
		Finolex	Finales Industries Ltd.
		KSR	KSR
		Prepoly	Premier PVC Industry
		Prince	Pnnce pipes and fittings Ltd.
		Supreme	Supeme industries Ltd.
		SENTINI	M/s Sentini Flopipes India Pvt. Ltd, Hyderabad
		DEC (UGD pipes (IS 15328)	M/s DEC Industries Pvt. Ltd., Hyderabad
		Birla HIL Pipes	M/s HIL Ltd.
		SUDHAKAR	M/s Sudhakar Polymers Pvt. Ltd.
161	UPVC doors, door frames and windows	Aluplast	Alu Alpha India
		Duroplast	Duro Plast Extrusion Pvt. Ltd.
		Encraft	Encraft India Pvt. Ltd.
		Fenesta	Fenesta DCM Shriman
		Komarling	Profile India Window

Sl. No.	Material Description	Brand	Makes *
			Technology Pvt. Ltd.
		LG	LG India Pvt. Ltd.
		MARCOLINI	M/s Mathura Poly pack Pvt, Ltd.
		Prominance	M/s Prominance Window Systems
		Rehau	Rehau Unlimited Polymer Solutions
		Sintex	Sintex Plastic technology Ltd.
		Venster/ OKOTECH	Aparna Enterprises limited
		VEKA	M/s NCL Veka Ltd.
		Plast One	M/s Plast One UPVC Profiles Pvt., Ltd., Secunderabad
		DEC	M/s DEC Industries Pvt. Ltd., Hyderabad
		RAJSHRI	M/s Rajshri Plastiwood, Pithampur, M.P.
		SIMTA ASTRIX	M/s Simta Clear Coat Pvt. Ltd., Hyderabad
162	UPVC Hardware	COAR	COAR
		DNV	DNV Global Pvt.,ltd.
		HOPPE	HOPPE
		PULSE	LGF SYSMAC (India) Pvt.,Ltd.
163	Vitreous Commodes/ Washbasin	BATHSENSE	Asian paints(Bath division)
		CERA	CERA Sanitaryware Ltd.,
		Hindware	HSIL Ltd.
		Jaquar	Jaquar Group
		Kerovit	M/s Kajaria Ceramic limited
		Kohler	Kohler world Wide
		Parryware	ROCA Bath Pvt. Ltd.,
		Roca	ROCA Bath room products
		RAK Sanitaryware	RAK Sanitaryware
		Somany	Somany Ceramic Ltd.
164	Vitrified paving tiles	Durostone	Ever stone International
		Johnson	Johnson India
		Kajaria	Kajaria Ceramics
		PAVIT	PAVIT Ceramics Pvt. Ltd.
165	Vitrified Tiles	AGL	Asian Granite India Ltd.
		CERA	M/s CERA sanitary ware Ltd.
		Johnson	Prism Johnson Ltd.
		Kajaria	Kajaria Ceramic Ltd.
		Marbito	Marito tiles
		NITCO	NITCO Ltd.
		Oasis	M/s Oasis Vitrified Pvt.Ltd.
		RAK	RAK Ceramic India Pvt. Ltd.

Sl. No.	Material Description	Brand	Makes *
		Restile	Restile Ceramic Ltd.
		Somany	Somany Ceramic Ltd.
		Varmora Granito	Varmora Granite Pvt. Ltd.
		Vitero	Aparna Enterprises limited
		NAVEEN	M/s Murudeswar Ceramics Ltd., Bangalore
166	Water Proof Plywood, Commercial ply, Fire retardant ply and Block boards / Shuttering ply	Archidply	Archid Ply Industries Ltd.
		A1 Teak	A1 teak Industries Pvt. Ltd.
		Century ply	Century Flush Doors
		Duroply	Duro Ply Industries Ltd.
		Duroplast	Duroplast
		Dura sleek	Dura sleek
		Grassim ply	Shree Ram Industries
		Green panel	Green panel Industries Lid.
		Green Ply	Green Ply Industries Ltd.
		Jayna ply	Jain Wood Industries
		KANCHAN PLY	M/s Vidya Ply & Board Pvt. Ltd
		Kitply	Kitply Industries Ltd.
		Polyline	Polyline
		AAMODA	M/s Jai Dayal Plywood Pvt. Ltd., Hyderabad
		BLACK COBRA	M/s Punjab Plywood Industries, Yamunanagr, Haryana
167	Water Proof cement paint	Asian exterior wall primer	Asian paint
		Berger	Bergar Paints
		Cem Colour	Snowcem Paints
		ICI DULUX	ICI DULUX
		Surfa	Surfacoats (India) Pvt. Ltd.
168	Water supply Valves	ARCO	Arco valves Pvt. Ltd ,
		leader	leader valves Ltd ,
		Nanda	Nanda Miller company
		Zoloto	Zoloto Industries
169	Welding rods	Advani	Advani oerlikon Ltd.
		ESAB	ESAB India Pvt. Ltd.
		ESS, BATHSENSE & Premium Range : Royale	Asian Paints (Bath Division)
		HlNDWare	HSIL Ltd.
		Jaquar	Jaquar Group
170	Water supply fixtures like bibcock, Shower panels	Johnson	Prism Jhonson Ltd
		Kerovit	M/s Kajaria Ceramic limited
		Kingston	Kingston brass India

Sl. No.	Material Description	Brand	Makes *
		MARC	MARK Showers
		Metro	Metro sanitations Pvt. Ltd.,
		Parryware	ROCO bath roam products Pvt. Ltd,
		Prayag	Prayag polymers Pvt Ltd ,
		Seiko	Seiko Sanitations
		Watarman	Kewal brothers
171	Water proofing Compound	Accoproof	ACC cement Ltd.
		Alchemica	Alchemica Ltd.
		Ardex Endura	Ardex Endura (India) Ltd.
		Asian Paints	Asian Paints
		CICO	CICO Technologies Ltd.
		Cement Mix Plus/Advanced Latex Plus	Berger Paints India Ltd.
		Dr. Fixit	Pidilite industries
		Ferrous Crete	Ferrous Crete (India) Pvt Ltd.
		Fosroc	Fosroc India
		Impermo	Snoweem paints
		MYK Schomburg	MYK Schomburg range of products
		Penetron	Penetron India Pvt Ltd.
		Shaliplast LW+	STP Ltd
		Sika	Sika India
		KRYTON	M/s Kryton Buildmat Co. Pvt. Ltd. Gurugram, Haryana
		DEC (SBR Latex) (Note: Subject to statutory approvals)	M/s DEC Industries Pvt. Ltd., Hyderabad
		SUNANDA	M/s Sunanda Specialty coatings Pvt. Ltd., Mumbai
172	Water stops	Ardex Endura	Ardex Endura Ltd.
		BASF	BASF India Ltd.
		Dr. Fixit	Pidilite industries
		Ferrous Crete	Ferrous Crete (India) Pvt Ltd.
		Hydroswell	Sika India
		Hydrotite	Sika India
		KRYTON	M/s Kryton Buildmat Co. Pvt. Ltd. Gurugram, Haryana
171	Water proofing materials/ GP Grouts	Asian paints	Smart care SC GP grout grey
		BASF	BASF
		Care	Care
		Ferrous crete	Ferrous Crete (India) Pvt Ltd
		Home shield Super grout	Berger Paints Ltd.

Sl. No.	Material Description	Brand	Makes *
		Pidilite	Pidilite Industries
		SIKA	SIKA India
		KRYTON	M/s Kryton Buildmat Co. Pvt. Ltd. Gurugram, Haryana
		DEC (Non-Shrink grout) (Note: Subject to statutory approvals)	M/s DEC Industries Pvt. Ltd., Hyderabad
173	Weather silicon make and grade	Down corning	Down corning india
		Momentive (GE)	GE silicones
174	White Cement	Birla	Birla Corporation Ltd.
		J.K.	JK Cement Ltd.
		Travancore	Travancore Cements Ltd.
175	Wood Polymer composite material for door frames and shutters, plain/pre laminated boards for wall linings etc.	Alstone	Alstone Industries Pvt., Ltd., Jaipur, Rajastan.
		Century	M/s Century Ply Boards (I) Limited
		Ecoste	Ecoste wood polymer composite, Delhi.
		Echon	Kumar Arch Tech, Pvt.Ltd., Rajastan.
		Green ply	Greenply Industries Limited
		Qute	Qute Extractions Pvt.Ltd., Chennai.
		Rajasree	Rajeswari Products Pvt.,Ltd., Madya Pradesh.
176	Wooden Flush door shutters	Archiply	Archiply
		A1 Teak	A1 Teak Products Ltd.
		Century	Century Flush Doors
		Duro Flushdoors	Dura Ply industries Ltd.
		Greenlam	Greenlam Ply Industries Ltd.
		Indian Timber Products	Indian Timber Products
		Jain doors Pvt.Ltd.	Jain doors Pvt.Ltd.
		Jayna Flush Doors	Jain Wood Industries
		Kailash	Kailash Hi Tech Timber Industries India pvt. Ltd.
		KANCHAN PLY	M/s Vidya Ply & Board Pvt. Ltd
		Kenwood	Kenwood Ply & Board
		Kitply	Kitply Industries Ltd.
		Mayur	Mayur Ply industries
		MP Ply wood products	MP Wood products

Sl. No.	Material Description	Brand	Makes *
		National plywood	National plywood
		Raavella door	Raavella Industries (P) Ltd.
		Shakthi	Shree Shakthi Modern Flush doors
		Swatic ply	Swatic ply
		Vidya ply	Vidya ply
		AAMODA	M/s Jai Dayal Plywood Pvt. Ltd., Hyderabad
		BLACK COBRA	M/s Punjab Plywood Industries, Yamunanagar, Haryana
		DEC	M/s DEC Industries Pvt. Ltd., Hyderabad
		NAGARJUNA	M/s Nagarjuna Doors, W.G.
177	Precast Concrete Manhole covers and Frame	DEC	M/s DEC Industries Pvt. Ltd., Hyderabad
178	HD PE pipes for water supply	DEC	M/s DEC Industries Pvt. Ltd., Hyderabad
179	Pre Painted Galvanized iron / Steel Doors & Windows	DEC	M/s DEC Industries Pvt. Ltd., Hyderabad
		APL APOLLO CHAUKHAT	M/s APL Appllo Tubes Ltd.
180	WPC Doors	RAJSHRI	M/s Rajshri Plastiwood, Pithampur, M.P.
		DEC	M/s DEC Industries (P) Ltd., Hyderabad
		GIZA	M/s Navratan Specialty, Chemicals LLT., Ahmedabad – 380051, Gujarat
181	WPC Frames	DEC	M/s DEC Industries (P) Ltd., Hyderabad
		GIZA	M/s Navratan Specialty, Chemicals LLT., Ahmedabad – 380051, Gujarat
182	CP Bath Fittings & Accessories	Ess “ap Royale” and Bathsense	M/s Asian Limited (Bath Division)
		CORONET	M/s Mohan Metal Industries
183	IoT based building Management System	WIS Spaces	M/s Wenalytics IoT Solutions Pvt. Ltd.

Sl. No.	Material Description	Brand	Makes *
	(S.T. Open Protocols)		
184	CC Kerb Stones	CEMTECH	M/s Cemtech Tiles
		DEC	M/s DEC Industries (P) Ltd.
185	HPL Sheets / Laminates	ALUTECH	M/s Alutech Industries, New Delhi
		VIRGO	M/s Virgo Laminates Ltd., Chandigarh
186	Stainless Steel Door Handles	DEC	M/s DEC Industries (P) Ltd., Hyderabad
187	Stainless Steel Aldrop	DEC	M/s DEC Industries (P) Ltd., Hyderabad
188	Tower Bolts	Global	M/s Aluminium Udyog
189	Door Handles	Global	M/s Aluminium Udyog
	New Products		
190	Super Plasticizers (Retarders)	AC-MENT -BV 430 A3	Apple Chemie (I) Pvt Ltd.
191	APCP Based High performance Hyper Plasticizers for self-compacting concrete with Higher slump Retention	Visco Flux 5507/6073	Apple Chemie (I) Pvt Ltd.
192	Pentrative BI-Polar Corrosion Inhibiting Admixture	AC-Corroguard	Apple Chemie (I) Pvt Ltd.
193	Micro Silica Additives (Pozzolanic Material)	AC- Microsil-Si9+	Apple Chemie (I) Pvt Ltd.
194	Cystal Line water proofing admixture (PRAH Based)	AC- Crystacrete	Apple Chemie (I) Pvt Ltd.
195	Curing compounds	AC- Cure R- (M)	Apple Chemie (I) Pvt Ltd.
196	PU Sealant	AC- Proseal 400	Apple Chemie (I) Pvt Ltd.
197	Coal Tar Epoxy coating	AC- DUR-CT(S)	Apple Chemie (I) Pvt Ltd.
198	Ploy Urethane water proofing	AC-1K-PU	Apple Chemie (I) Pvt Ltd.
199	Wireless Building Management System	Protech	M/s Protech Technologies
200	Rapicon wall panel	Everest	M/s Everest Industries Ltd.

PART-D

Schedule of Quantities

SCHEDULE OF QUANTITIES

Name of Work: Supply, Installation, Testing & Commissioning of 20 KLD Effluent Treatment Plant & Sewage Treatment Plant combo unit, cold room and other related items at National Centre for Disease Control, Mangalagiri, Andhra Pradesh**.**

S.No	Description of Item	Qty	Unit	Rate	Amount
	C1: IEI & Fans				
1	Supply, Installation, Testing & Commissioning of Hand dryer with HEPA filter, touch free, energy efficient, first hand dry, Sensor based, 600-900 watt, High Speed, Wall Mounted type with stainless steel body, 10 - 12 seconds drying time suitable for operation on single phase/three phase AC supply, complete with connections etc as required.	14	Job	34674.00	485436.00
2	Supplying and fixing suitable size GI box with modular plate and cover in front on surface or in recess, including providing and fixing 6 pin 5/6 & 15/16 A modular socket outlet and 15/16 A modular switch, connections etc. as required.	20	Each	711.72	14234.00
3	Supplying and fixing of following sizes of medium class PVC conduit along with accessories in surface/recess including cutting the wall and making good the same in case of recessed conduit as required.				
3.1	a) 20 mm	50	Metre	163.08	8154.00
3.2	b) 25mm	50	Metre	181.44	9072.00
3.3	c) 32mm	50	Metre	225.72	11286.00
4	Supplying and fixing following size/modules GI box along with modular base & cover plate for modular switches in recess etc as required.				
4.1	a) 1 or 2 Module (75mmX75mm)	10	Each	382.32	3823.00
5	Supplying and fixing following modular switch/ socket on the existing modular plate & switch box including connections but excluding modular plate etc. as required.				
5.1	Telephone socket outlet	10	Each	181.44	1814.00

6	Supplying, installation testing commissioning of LED illuminated sign board, double sided, transparent with having power backup (battery) arrangement, LED modules, internal wiring with FRLS copper wire, wiring with medium class PVC conduit/PVC casing and capping, FRLS copper conductor, upto 5 meters from the sign board to nearest distribution board, suitable for operation on 230 volts, 50 Hz single phase AC supply including suspension arrangement with metal chains, connections etc. complete as required.	10	Sq. Ft	1508.00	15080.00
7	Supplying and drawing following sizes of FRLS PVC insulated copper conductor, single core cable in the existing surface/ recessed steel/ PVC conduit as required				
7.1	3 x 4 sq. mm	150	Meter	239.76	35964.00
8	Supplying and drawing following pair 0.5 mm dia FRLS/HFFR PVC insulated annealed copper conductor, unarmoured telephone cable in the existing surface/ recessed steel/ PVC conduit as required.				
8.1	2 Pair	100	Meter	42.12	4212.00
	C2: Access Control System				
9	Supply installation Testing & Commissioning of The facial recognition shall have NIST evaluation FTE evaluation & complied to ISO30107-1 . 3.5 ″inch or more Capacitive Display with touch screen, Device shall have HD NIR and RGB cameras along with 2 IR LEDs and one white LED. Reader shall support 10k users(1:N) in device memory. Device shall Have NPU & AI based algorithm and will support Desfire,Mifare and Seos credential technology along with Seos BLE credentials . Readers will be IP65 and will offer JSON based internal API level IoT architecture and will not be required any SDK package, Support RTSP stream for video analysis, FR device shall also be able to encode face template to Seos, Mifare and Desfire cards. Device shall support FACE,				

	Smart card technologies, Seos BLE credentials in Apple and Google wallet, Dynamic and Static QR code & PIN for authentications. certifications: Safety: EN 62368-1:2018, EN 62311:2019, Cyber Security compliant: RED DA(CE DoC), EMC: EN 55035:2017 +A11:2020, EN 301 489-1 V2.1.1, EN 301 489-17 V3.1.1,EN 50130-4:2011 +A1:2014, Spectrum: EN 55032:2015 +A11:2020, EN 300 330 V2.1.1, EN 300 328 V2.2.2, RoHS: EN IEC 63000:2018, Algorithm: iBeta Level -1 PAD, Others: FCC, UL294 certified component etc as required.	3	Each	113072.00	339216.00
10	Supply, Installation, Testing & Commissioning (SITC) of 2-Door 2-Reader Intelligent Access Controller with MQTT cloud-native architecture, ARM Cortex-A7 Linux processor, support for 2 doors and 4 OSDP readers / 2 Wiegand readers, TLS 1.3 encrypted communication, Ethernet 10/100 Mbps, 100,000 credential capacity, 100,000 event log capacity, 12 supervised inputs, 8 relay outputs, embedded web interface, Wi-Fi Access Point mode, DHCP zero-touch commissioning, Type-C USB service port, reverse polarity & surge protection, reader power short-circuit protection, LED diagnostics, FCC/CE/RoHS compliant, complete with enclosure, power supply, mounting accessories and all necessary hardware for complete installation and commissioning. This controller should be integrated with turnstile & boom barriers the cost and accessories should be included etc as required.	2	Each	56536.00	113072.00

11	Supply, Installation, Testing & Commissioning (SITC) of Single-board Enclosure with Power Supply & Charging Circuit, Mild Steel 16AWG (1.2 mm), Powder Coated Surface Finish, Inbuilt Tamper switch in Power Distribution Board,11x Triple Knockout (1/2", 3/4", 1" Conduit size), or M32 Cable Gland, Input Voltage-90-264 VAC / 127-370VDC, AC OK-TTL open collector output, ON: AC OK; OFF: AC Fall; Ice: max. 30mA@50VDC,Battery Fail-TTL open collector output, ON: Battery Low; OFF: Battery OK; Ice: max. 30mA@50VDC,Safety Standard (Power supply)-UL62368-1, TUV BS EN/EN62368-1, approved EAC TPTC 004, Working Temperature (Power supply)- -20 Degree to +70 Degree C, The power distribution board in the enclosure includes switches for both AC mains and battery power cut-off, making maintenance operations easier. The power circuitry is designed to be compatible with all AC mains voltage levels, making installation etc as required.	2	Each	10279.00	20558.00
12	Supply, Installation, Testing & Commissioning (SITC) of an Enterprise-level Access Control Software with the following minimum specifications: Enterprise-grade Access Control Software supporting centralized management of access control systems. Base software license shall include: Access Control Management Graphical User Interface (GUI) Global and Local Anti-Pass back Reports in Inbox Door Scheduling Time-based Access Control Event & Alarm Notifications Mobile Application for Time & Attendance Dynamic QR Code Generation Visitor Request Management The software shall support an integrated Visitor Management System (VMS) as an optional module for future expansion without requiring replacement of the existing platform.				
	The software shall be VAPT (Vulnerability Assessment & Penetration Testing) Certified for cybersecurity compliance. The software shall include an Artificial Intelligence (AI) and Machine Learning (ML)-based Insights Dashboard capable of: Analysing access control events and security data. Identifying anomalies and security risks. Performing root cause analysis. Providing predictive analytics and actionable recommendations to strengthen the organization's security framework.				

	The software shall support: Unlimited Users/Cardholders, Unlimited Readers (expandable without software limitation),Unlimited Login AccountsUnlimited Event & Transaction Storage (database-dependent) Reports in Inbox Door Scheduling Time-based Access Levels System Alerts & Notifications. The software shall include Hardware Configuration and System Monitoring Modules for centralized device management. The platform shall support integration with multiple brands of access controllers through open architecture and standard communication protocols.				
	The software shall support multiple credential technologies including: RFID Smart Cards Fingerprint Biometrics Iris Recognition Face Recognition QR Code Credentials Mobile Credentials (BLE/NFC).The software shall comply with recognized cybersecurity standards and testing methodologies including: Grey Box Web Penetration Testing ISSAF (Information Systems Security Assessment Framework) OWASP Top 10 (2013, 2017 & 2021) SANS Top 25 CERT-In Security Guidelines				
	The software shall comply with international security and privacy standards including: SOC 2 GDPR ISO/IEC 27018 (Protection of Personally Identifiable Information in Public Clouds).The software shall support four-state supervised input monitoring, including: Normal Alarm Cable Open Circuit Detection Cable Short Circuit Detection. The system shall provide real-time monitoring, event logging, alarm management, audit trails, and centralized administration for enterprise deployments etc as required.	1	Each	359775.00	359775.00
13	Supply installation testing & commissioning of Double Door Electromagnetic Lock, minimum 2 × 600 Lbs)r 1200 LBS holding force, 12/24 VDC, fail-safe type, complete with suitable mounting brackets, lock status monitoring, power supply, required accessories, cabling, installation, termination, testing, commissioning and integration with the Access Control System, including all necessary hardware and consumables, complete in all respects etc as required.	2	Each	12335.00	24670.00

14	Supply installation testing & commissioning of single Door Electromagnetic Lock, minimum 1 × 600 Lbs holding force, 12/24 VDC, fail-safe type, complete with suitable mounting brackets, lock status monitoring, power supply, required accessories, cabling, installation, termination, testing, commissioning and integration with the Access Control System, including all necessary hardware and consumables, complete in all respects etc as required.	1	Each	10279.00	10279.00
15	Supply, installation, testing and commissioning of Break Glass with Flip Cover etc as required.	3	Each	2056.00	6168.00
16	Supply, installation, testing and commissioning of Magnetic SS type Duress/Push button Button touch less etc as required.	3	Each	3084.00	9252.00
17	Supplying, drawing, Installation, Testing and commissioning ofCat6A UTP 4 pair, 23 AWG solid copper cable in existing conduit/ on surface, U/FTP, LSZH, Non-Plenum, Horizontal(solid) Cable suitable for high speed data networking application supporting upto 10Gbps over a 100 meter channel. The 4 Unshielded Twisted Pairs (UTP) cable with colour coded insulation for easy identification should have FLAME PROPERTIES i.e. Flammability Test - IEC 60332-1, Smoke Density - IEC 61034, LSZH standards compliance: ANSI/TIA-568 C.2, ISO/IEC 11801, IEEE 802.3an, RoHS. Delay Skew should be < 45NS. The outer Cable Diameter should be 7.5 +2 mm. Cable should have been tested and verified by UL/ ETL etc. complete as required.				
17.1	1 Run of cable	250	Meter	65.10	16275.00
18	Supply, installation, testing and commissioning of multicore 4C X 1 Sqmm, 22 SWG, 300 V, 2A, Copper/PET Foil, Screened, Grey flame retardant non-corrosive jacket, 30 swg of strands, Beldfoil shield tape with drain wire etc as required.	100	Meter	106.00	10600.00

19	Supply, installation, testing and commissioning of multicore 8C X 1 Sqmm, 22 SWG, 300 V, 2A, Copper/PET Foil, Screened, Grey flame retardant non-corrosive jacket, 30 swg of strands, Beldfoil shield tape with drain wire etc as required.	100	Meter	227.00	22700.00
20	Supply, installation, testing and commissioning of Server ,CPU (Cores) 8 Cores (Physical) Processor Intel Xeon, 3.3 GHz or above RAM 32 GB Storage (SSD) 512 GB SSD Operating System Ubuntu 24.04 LTS Server Database Server Microsoft SQL Server 2025 – Edition (Express / Standard / Enterprise) selected based on the number of Users (see Section 3) , keyboard, mouse, 24 inch monitor and related cables , HDMI, power with related - Gate way controller etc as required.	1	each	565360.00	565360.00
21	SITC of 4-Port PoE Network Switch with minimum 4 × 10/100/1000 Mbps PoE RJ-45 ports, IEEE 802.3af/at PoE support, minimum 60W PoE budget, Gigabit uplink ports, complete with power supply, accessories, installation, termination, testing, commissioning and all required consumables, suitable for Access Control/IP-based security systems etc as required.	1	Each	25698.00	25698.00
	C3: HVAC System				
22	Supplying & Fixing air curtain, MS powder coated body having nominal air velocity of 21 m/s, size not less than 1800 mm x 230 mm x 210 mm, noise level not more than 55 db, having 6 nos. blowers and 3 nos. heavy duty motors, CFM not less than 1450, maximum speed not less than 2700 RPM, fixing above door at a height of 2.4 meters above floor level, including making good the damages connections, testing and commissioning, suitable for operation on single phase AC supply etc., complete as required.	4	Nos	42131.00	168524.00

23	Supplying, Installation, Testing and Commissioning of COLD Room of Size 3650 x 3100 x 3150 mm with prefabricated PUF panels & Refrigeration Units consisting of Condensing unit & Evaporator Unit, with refrigeration of capacity not less than 10,000 BTU/H, suitable to maintain desired temperature of +/- 2 Degree C to + 8 Degree C, machine should consists of 2 nos. (1 No. working + 1 No. standby) of energy efficient compressor. PUF insulated panels for Wall, Ceiling, floor insulation, inner and outer face of wall should be made up of Stainless Steel-304 grade, insulated Doors, with clear opening of size not less than 195 cm x 85 cm, PUF insulation of 80 mm thick, 40kg/ cu.m density.				
	2 nos. Stainless Steel-304 grade racks of each size 2.4 Meter length x 0.60 mtr depth (nominal) or as per cold room design required and approved by Engineer In charge. The Stainless Steel-304 grade sheet of thickness not less than 1.6mm, using square pipe of suitable size with minimum thickness 1.6mm, having 3 Nos. Shelf's of same thickness, PUF insulation of 80 mm thick, 40kg/ cu.m density & flooring with aluminium checker plate, minimum 6 mm thickness, suitable for operation on 3 phase 415V, 50 Hz AC Supply, complete with copper piping, inter connecting cable, Refrigeration control Panel accessories, Control panel, first charge of eco-friendly refrigerant gas with stand/ wall bracket for placement of Outdoor units, Temperature controller including feature of alert message to at least 2 nos. registered mobile phones etc as per attached specifications as required with LED lights of suitable wattage and illumination inside the room.	1	Job	1014826.00	1014826.00
	C4: 20 KLD MBBR ETP cum STP:				

24	Designing, Supplying, Installation, Testing & Commissioning of 20 KLD ETP & STP combo unit for treating waste liquids of NCDC building including BSL-2 lab facility Waste water, decontaminated liquids of BSL-3 lab facility using appropriate technology suitable to Flushing /Landscaping irrigation systems as per Andhra Pradesh State/CPCB upto date revised norms & guidelines with all types of mechanical equipments like Air Blowers and Air grid for pretreatment and MBBR Tanks, Pumps, Piping, Valves, Pressure Gauge, Level Controller, Filters, Air Diffuser System, Air Dispersion System, GI/UPVC Piping, & Electrical Panel, including CC foundation for tanks and CC foundation at the bottom for placing stp equipment like bar screen,et. as per the enclosed specifications etc. as required. Effluent Treatment plant cum Sewerage Treatment Plant installation in general shall include the Following with Specification:				
	The ETP & STP combo unit shall comprise the following electro mechanical equipment including MCC panel and inter connecting Cabling from MCC panel to pump sets, blowers etc., but not limited to the following and shall also include all other components also as may be required for proper and efficient operation of the plant. (All the machinery such as pumps, blowers etc shall be in N + N configuration i.e. one standby for every working)				
	Effluent condition before treatment				
	Daily average flow - 20 m3/day				
	pH - 6.5 - 8.5 BOD - 500 - 600 mg/l COD - 1800 - 2000 mg/l S.Solid - 200 - 430 mg/l Oil and Grease-40 mg/l T-N -50 mg/l TDS: <2100 mg/l				
	Treated water condition after treatment				
	P.H:- 6.5 to 9.0 BOD (mg/l):- ≤ 10 COD (mg/l):- ≤ 50 TSS (mg/l):- ≤ 20 Oil and Grease (mg/1):- ≤ 10 Total Nitrogen (mg/l) ≤ 10 NH4-Nitrogen (mg/l) ≤ 5 Faecal coliform (mpn/100 ml) ≤ 100				

	Coarse Bar Screen (Raw water):				
	Supplying, installing, testing and commissioning of 1no Stainless Steel Screen/ Grill - 700 mm spacing made out of 25mmX5 mm thick stainless steel flat strip (Grade SS-304) suitable for filtering/separating 10- 12 mm and above size solids (Bar spacing not more than 12mm) along with sliding rack, nuts bolts for handling peak flow of Raw Domestic Sewage into the equalization tank etc complete as per design approved by engineer in-charge.				
	Fine Bar Screen (Aeration Tank):				
	Supplying, installing, testing and commissioning of 1no Stainless Steel Screen/ Grill - 500 mm spacing made out of 25mmX5 mm thick stainless steel flat strip (Grade SS-304) suitable for filtering/separating 10- 12 mm and above size solids (Bar spacing not more than 12mm) along with sliding rack, nuts bolts for handling peak flow of Raw Domestic Sewage into the equalization tank etc complete as per design approved by engineer in-charge.				
	Oil & Grease Chamber:				
	Belt Type with MS Powder Coated of MS Powder Coated of Size :100 mm Width x 1500 mm Depth suitable capacity motor to remove oil removal capacity 10 LPH minimum, belt type of Oleophylic polymer, Suitable motor capacity, Top & bottom roller of MS powder coated, including fixing arrangement.				
	Air Grid for Equalization Tank:				
	Airgrid for Equivalization tank with disc type coarse bubble diffusers.				
	Treatment Tank:				
	Treatment Tank shall be of stainless steel tank with carbon steel supports. Tank shall be provided with required nozzles for receiving, treating and draining of the wash water. Tank shall be connected to the vent provided in the collection tank. Tank shall be provided with level sensors to monitor the level of wash. Number of Tanks-1No.TankMOC-SS304 Treatment Tank volume-2000 Ltrs				
	Bio medical dis inspection Chemical dosing with motorized agitator for flash mixture/flucuator :				

	Supply, installation, testing and commissioning (SITC) of an automatic **Chemical Dosing-cum-Disinfection System** suitable capacity Effluent Treatment-cum-Sewage Treatment Plant (ETP/STP) handling bio-medical and domestic wastewater, to achieve uniform disinfection as per CPCB/SPCB discharge norms, complete with the following components:				
	a) Dosing Pumps: 02 Nos. (1 Working + 1 Standby), electronic diaphragm-type, positive displacement metering pumps, capacity 0–6 LPH (adjustable stroke length and frequency manually/automatically), maximum pressure 3–5 bar, with PP/PVDF liquid end assembly, Teflon-faced diaphragm, anti-siphon valve, and built-in priming valve, 230V AC, single-phase, IP-55 protected motor.				
	b) Dosing/Solution Tank: 01 No., minimum 100-litre capacity, heavy-duty HDPE tank with graduated level markings, and necessary provisions for mounting dosing pumps.				
	c) Motorized Agitator: 01 No., high-speed/low-speed mechanical mixer with an SS-316/FRP-coated shaft and impeller, powered by a 0.25 HP to 0.5 HP, IP-55, Class-F insulated geared motor for homogenous chemical preparation				
	d) **Interconnecting Piping & Accessories and wiring**: UV-stabilized rigid PVC/PVDF suction and discharge chemical-grade piping, foot valve with strainer, injection valve assembly, back-pressure valve, and pulsations dampener ,Interfacing electrical wiring and controls within the Electrical Control Panel				
	Biological System:				
	The MSEP Packaged treatment tank contains (MOC:MSEP) comprising of the following: 1. Anaerobic tank 2.MBBR Tank 3.Tube Settler Tank 4.Clear Water Tank 5.Sludge Holding Tank 6.Air Diffusers for MBBR Tank 8.Air Blowers (02 Nos) 9.MBBR Media 10.Tube Deck media 11.Sludge Transfer Pumps				

	Electro-mechanical Components of the ETP cum STP:				
	RAW SEWAGE TRANSFER PUMPS				
	Self priming pumps of 1 m3/hr @ 10 Mtr capacity,Solid handling 50mm for Sewage transfer from Sewage collection Tank to MSEP packaged unit -2Nos (1Nos. Working + 1 Nos Standby).Accessories like PP Lifting Rope, SS Mesh Assembly for lifting and cleaning.				
	Air Diffusers for MSEP Tank:				
	Air Diffusers for MBBR Tank disc type diffusers				
	Air blowers:				
	Air Blowers of capacity 80 Cum/hr, 4000 mm/vc for aeration chamber of MSEP packaged unit -2Nos (1Nos. Working + 1 Nos Standby)				
	MBBR Media:				
	MBBR media of 800m2/m3				
	Tube Deck Media:				
	Tube Deck media of 20 m2/m3				
	Sludge Sewage Transfer Pumps:				
	Self priming pumps of 1 m3/hr @ 10 Mtr capacity -2Nos (1Nos. Working + 1 Nos Standby).Accessories like PP Lifting Rope, SS Mesh Assembly for lifting and cleaning.				
	Filter Feed Transfer Pump:				
	The pump shall with Capacity : 3.0 m3/hour @ 10m Head , Solid Handling Capacity : 7mm particles head mounted on common base frame. Accessories like PP Lifting Rope, SS Mesh Assembly for lifting and cleaning.				
	Pressure sand Filter Accessories:				
	Pressure Sand Filter:				

	Supply, installation, Testing & commissioning of Pressure Filter 3.0 m3/hr of Size : 350 m Dia x 1300 mm with following specifications: **Type :** Vertical Downflow stream Design Pressure : 5.5 kg/cm2 , Working **Pressure :** 3.0 kg/cm2 **Vessel:** The filter vessel is made of high grade rolled steel with stamped top and bottom dished ends welded onto it. The vessels inside and the exterior is painted with rust inhibiting primer and an epoxy paint, for lasting corrosion protection. **Internal:** Top and bottom internal water collection /distribution **Piping:** Laterals constructed in CS and all frontal piping works constructed in CS/GI **Accessories :** Frontal Piping, Valves, two Pressure gauges etc				
	PSF Filter Media:				
	SITC of Supporting Blue Metal Media, Various Graded Pebbles, Silex, Graded filtering coarse and Fine Quartz Sand. With 6 layers and bottom supporting media etcas required.				
	Activated carbon Filter:				
	Supply, installation, Testing & commissioning Activated Carbon Filter 3.0 m3/hr of Size : 350 m Dia x 1300 mm with following specifications:**Design Pressure :** 5.5 kg/cm2 , Working **Pressure :** 3.0 kg/cm2**Panit:** Mild steel with Epoxy paint **Vessel:** The filter vessel is made of high grade rolled steel with stamped top and bottom dished ends welded onto it. The vessels inside and the exterior is painted with rust inhibiting primer and an epoxy paint, for lasting corrosion protection.**Internal:** Top and bottom internal water collection /distribution **Filter media :** Graded Pebbles, Silex, Graded filtering Sand and Activated Carbon				
	ACF Filter Media:				
	SITC of Supporting filling of Filter media Blue Metal Supporting media, Various Graded Pebbles, Silex, Graded filtering Sand. Activated Carbon ID value 600 With 7 layers and bottom supporting media .				
	Disinfection System:				

	Supplying, installing, testing and commissioning of chemical dozing system comprising of minimum 200 liters capacity HDPE tank, electronic diaphragm type dosing pump of 0 - 6 liters/hr. capacity with anti-syphon valve at discharge along with digital display injection fitting, solution delivery tube suitable for single/three phase, AC supply etc. including making electrical connection for auto operation, all complete etc. as required.				
	Electromagnetic Flow meter:				
	SITC of micro-processor based Electromagnetic Flow meter for 250 KLD plant capacity Suitable for 2-10 m3/hr with flow rate for sewage water with pulsed DC excitation having automatic Zero Correction with Bi Directional flow measurement, compact instrument version with measuring sensor (primary) and Amplifier integrated in1 Mechanical unit, IP 65 Protection measuring pipe material SS:304, electrode material SS:316 with 16 Character into 2 Lines LCD alphanumeric display for flow rate, totalize, diagnostic message, flow alarms with high and low flow program, Indicator; enclosure - cast aluminium, weather proof; mounting- field(direct on sensor);supply power-230volt ac etc. complete as required.				
	O-Generator:				
	Supply, installing, testing & commissioning of Ozone generator 30 -40 grams/hr DeBru Ozone generator water cooled 5lpm oxygen generator (2nos) SS Pump 5m3 @4bar pressure (2nos) SS Venturi(1nos) Zirconium diffuser(1nos) etc as required.				
	Auto level float switch:				
	Supply, installing, testing and commissioning of Auto level float switch controller for filter feed pumps and chlorine contact tank comprising of dry run protection in chlorine contact tank low and high level start and stop complete in all respect (for chlorine contact tank and treated water tank) etc as required.				
	Commissioning Chemicals:				

	Commissioning chemicals such as required for ETP cum STP plant caustic soda, Calcium hypochlorite (Ca(OCl)2, hydrochloric acid of for 1 month of 12.5cum/hr capacity for chemical washing for trial run period for STP with Softener and UF System.				
	Piping Works:				
	Supply of Piping works including required valves Suction and Delivery of Transfer Pumps and Dosing pumps, interconnection of pumps with necessary supports, excavation, backfilling, alignment, with following specifications.				
	Pipes & Fittings:				
	Material : PVC/UPVC SH 40, Pressure rating : PVC - 10 kg/cm2 MS/GI - 15 kg/cm2 Standards : IS 4984, IS 4985				
	Valves : Diaphragm Valves, Gate Valves, Ball Valves, Non Return Valves, Butterfly Valves, Needle Valves, Working pressure : 10 kg/cm2,Standard : BS 5351				
	Electrical Panel with cabling:				
	Floor/wall mounted non compartmentalized MS epoxy coated LT panel with the required no of outgoings with each outgoing for the pumps / equipment consisting of required rating TP MCCB, Star Delta / DOL Starter, push button stations, Indicating lamps, protection fuses / MCBS, Incomer FP MCCB of required rating with Multi function meter				
	Supply of Power cables and Control Cables are Copper flexible with required size of 3 core 4sqmm for Motors, . 2Core 1sq mm flexible cable for Dosing units , PLC System, Auto Valves Flow Meter etc.				
	Cable tray and fixing arrangement:				
	Supply of Cable trays of GI Perpetrated with required size and required size pipe bracket supports in walls and floors and Required MS Angle supports etc.				
	Testing Run Period:				
	Erection, Commissioning &30 Days Trial Run of the Sewage Treatment Plant				
	Flow Meter:				
	Magnetic Flow meter, turbine type / rotameter type flow meter as per approved specification.	1	Job	2250908.00	2250908.00

25	Supplying of XLPE, armoured, ISI marked PVC sheathed with galvanised round steel wire (or) steel strip and with aluminium conductor 1.1 KV grade and conforming to IS:7098 (Part-I)/1988 with amdt. Upto date of following size.				
25.1	3.5 x 50 sq. mm	160	Meter	649.00	103840.00
26	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size in the existing RCC/ HUME/ METAL pipe as required.				
26.1	Above 35Sqmm and upto 95 Sq.mm	130	Meter	77.76	10109.00
27	Supplying and making end termination with brass compression gland and aluminium lugs for following size of PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 KV grade as required.				
27.1	3½ X 50 sq. mm (32mm)	2	Each	458.85	918.00
28	Providing and installing maintenance-free copper bonded chemical earthing electrode system for STP Earthing complete in all respects, comprising the following: **(a) Earth Electrode:** UL Listed copper bonded steel earth rod of minimum 3.0 metre length and minimum 17.2 mm diameter, with uniform molecularly bonded copper coating of minimum 250 microns thickness, conforming to IEC 62561-2 and UL 467. The electrode shall be factory tested for dimensional accuracy, tensile strength, adhesion of copper coating, coating thickness, salt spray test, and electrical resistivity before and after corrosion test.				
	(b) Earth Enhancing Compound: Supply and filling of environmentally safe, non-corrosive, non-leaching mineral based earth enhancing compound conforming to IEC 62561-7, tested for leaching and TCLP NABL accredited laboratory, supplied in 25 kg bags, quantity as required to achieve earth resistance as specified.				

	(c) Earth Rod Clamp: 22 Heavy duty, corrosion resistant copper alloy / tinned brass clamp suitable for 17-20 mm dia earth rod and compatible for connection of 25 mm × 3 mm GI/ copper strip or 25 sq.mm to 70 sq.mm copper conductor, complete with stainless steel hardware.				
	(d) Earth Inspection Chamber: Providing and fixing heavy duty UV stabilized polymer / FRP earth inspection chamber of approximate size 300mm x 300mm x 300 mm, with removable cover, suitable for minimum 50 kN load, complete with funnel for watering arrangement and identification marking- The item includes excavation, boring/installation of electrode, backfilling with compound, interconnection with earth conductor up to 1.5 length, watering arrangement, testing of earth resistance, and making the system complete as required.	2	Job	22431.00	44862
	Total Rs.				**5706685.00**

Contractor Executive Engineer (E)

Civil component

Sl. No.	Description	Qty.	Unit	Rate	Amount
1.1	Earth work in excavation by mechanical means (Hydraulic excavator)/manual means over areas (exceeding 30 cm in depth, 1.5 m in width as well as 10 sqm on plan) including getting out and disposal of excavated earth lead upto 50 m and for all lift, as directed by Engineer-in-charge.				
1.1.1	All kinds of soil.	16.00	cum	192.12	3074.00
1.2	Earth work in excavation by mechanical means (Hydraulic excavator) / manual means in foundation trenches or drains (not exceeding 1.5 m in width or 10 sqm on plan), including dressing of sides and ramming of bottoms, lift upto 1.5 m, including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 m.				
1.2.1	All kinds of soil.	10.00	cum	281.74	2817.00
1.3	Excavating, supplying, stacking and filling of local earth (including royalty) by mechanical transport upto a lead of 5km also including ramming and watering of the earth in layers not exceeding 20 cm in foundation trenches, plinth, sides of foundation etc. complete for all lift.	10.00	cum	758.20	7582.00
1.4	Supplying and filling in plinth with sand under floors, including watering, ramming, consolidating and dressing complete.	10.00	cum	2298.67	22987.00
2.1	Providing and laying in position cement concrete of specified grade excluding the cost of centering and shuttering - All work up to plinth level :				
2.1.1	1:5:10 (1 cement : 5 coarse sand (zone-III) derived from natural sources : 10 graded stone aggregate 40 mm nominal size derived from natural sources)	10.00	cum	7055.51	70555.00

2.2	Providing and laying cement concrete in retaining walls, return walls, walls (any thickness) including attached pilasters, columns, piers, abutments, pillars, posts, struts, buttresses, string or lacing courses, parapets, coping, bed blocks, anchor blocks, plain window sills, fillets, sunken floor etc., up to floor five level, excluding the cost of centering, shuttering and finishing:				
2.2.1	1:1½:3 (1 cement : 1½ coarse sand (zone-III) derived from natural sources : 3 graded stone aggregate 20 mm nominal size derived from natural sources).	1.00	cum	11210.65	11211.00
2.3	Centering and shuttering including strutting, propping etc. and removal of form work for :				
2.3.1	Foundations, footings, bases for columns	5.00	sqm	424.45	2122.00
2.4	Making plinth protection 50mm thick of cement concrete 1:3:6 (1 cement : 3 coarse sand (zone-III) derived from natural sources : 6 graded stone aggregate 20 mm nominal size derived from natural sources) over 75mm thick bed of dry brick ballast 40 mm nominal size, well rammed and consolidated and grouted with fine sand, including necessary excavation, levelling & dressing & finishing the top smooth.	30.00	sqm	811.02	24330.00
3.1	Reinforced cement concrete work in beams, suspended floors, roofs having slope up to 15° landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral stair cases above plinth level up to floor five level, excluding the cost of centering, shuttering, finishing and reinforcement with 1:1.5:3 (1 cement : 1.5 coarse sand(zone-III) derived from natural sources : 3 graded stone aggregate 20 mm nominal size derived from natural sources).	1.00	cum	12453.15	12453.00
3.2	Centering and shuttering including strutting, propping etc. and removal of form for				
3.2.1	Foundations, footings, bases of columns, etc. for mass concrete	15.00	sqm	424.45	6367.00
3.2.2	Walls (any thickness) including attached pilasters, butteresses, plinth and string courses etc.	7.00	Sqm	911.89	6383.00

3.2.3	Lintels, beams, plinth beams, girders, bressumers and cantilevers	29.00	sqm	797.05	23115.00
3.2.4	Columns, Pillars, Piers, Abutments, Posts and Struts	18.00	sqm	1040.48	18729.00
3.2.5	Weather shade, Chajjas, corbels etc., including edges	4.00	sqm	1029.44	4118.00
3.3	Steel reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete upto plinth level.				
3.3.1	Thermo-Mechanically Treated bars of grade Fe-500D or more.	1580.00	kg	116.73	184438.00
3.4	Steel reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete above plinth level.				
3.4.1	Thermo-Mechanically Treated bars of grade Fe-500D or more.	840.00	kg	116.73	98056.00
3.5	Providing and laying in position ready mixed or site batched design mix cement concrete for reinforced cement concrete work; using coarse aggregate and fine aggregate derived from natural sources, Portland Pozzolana / Ordinary Portland /Portland Slag cement, admixtures in recommended proportions as per IS: 9103 to accelerate / retard setting of concrete, to improve durability and workability without impairing strength; including pumping of concrete to site of laying, curing, carriage for all leads; but excluding the cost of centering, shuttering, finishing and reinforcement as per direction of the engineer-in-charge; for the following grades of concrete. Note: Extra cement up to 10% of the minimum specified cement content in design mix shall be payable separately. In case the cement content in design mix is more than 110% of the specified minimum cement content, the contractor shall have discretion to either re-design the mix or bear the cost of extra cement.				
3.5.1	All works upto plinth level				
3.5.1.1	Concrete of M30 grade with minimum cement content of 350 kg /cum	14.00	cum	10450.99	146314.00

3.5.2	All works above plinth level upto floor V level				
3.5.2.1	Concrete of M30 grade with minimum cement content of 350 kg /cum	7.00	cum	10835.94	75852.00
3.6	Providing and fixing in position factory made precast RCC M-40 door and window frame fixing with hold fast embedded in 1:3:6 concrete block , having excellent smooth finish as per IS: 6523 with reinforcement of 3 Nos, 6 mm dia main bars tied with 3 mm M.S stirrups placed @ 200 mm C/C and 6 numbers high strength polymer blocks of required size for fixing hinges including providing 6 no specially designed M.S. galvanised sleeves for accommodating 6 mm dia fully threaded bolts for fixing hold fast on vertical members, providing suitable arrangement for receiving sliding door bolts and tower bolt etc. all complete, as per the direction of Engineer-in-charge. The frame shall be measured in running metre correct to two places of decimal.				
3.6.1	Door frame 100 mmx 60 mm	6.00	metre	819.46	4917.00
4.1	Brick work with non modular fly ash bricks conforming to IS:12894, class designation 7.5 average compressive strength in super structure above plinth level up to floor V level in :				
4.1.1	Cement mortar 1:6 (1 cement : 6 Coarse sand)	13.00	cum	9473.46	123155.00
4.2	Brick edging 7cm wide 11.4 cm deep to plinth protection with common burnt clay F.P.S. (non modular) bricks of class designation 5 including grouting with cement mortar 1:4 (1 cement : 4 fine sand).	17.00	metre	64.35	1094.00
5.1	Providing and fixing ISI marked flush door shutters conforming to IS : 2202 (Part I) non-decorative type, core of block board construction with frame of 1st class hard wood and well matched commercial 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters:				
5.1.1	35 mm thick including ISI marked Stainless Steel butt hinges with necessary screws	3.00	sqm	2589.72	7769.00

5.2	Providing and fixing M.S. grills of required pattern in frames of windows etc. with M.S. flats, square or round bars etc. including priming coat with approved steel primer all complete.				
5.2.1	Fixed to openings /wooden frames with rawl plugs screws etc.	87.00	kg	257.98	22444.00
5.3	Providing and fixing aluminium sliding door bolts, ISI marked anodised (anodic coating not less than grade AC 10 as per IS : 1868), transparent or dyed to required colour or shade, with nuts and screws etc. complete :				
5.3.1	300x16 mm	2.00	each	328.23	656.00
5.4	Providing and fixing aluminium tower bolts, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete :				
5.4.1	300x10 mm	1.00	each	140.82	141.00
5.5	Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete :				
5.5.1	125 mm	2.00	each	71.71	143.00
5.6	Providing and fixing aluminium hanging floor door stopper, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour and shade, with necessary screws etc. complete.				
5.6.1	Twin rubber stopper	1.00	each	78.31	78.00
5.7	Providing and fixing zinc alloyed (white powder coated) touch lock for uPVC/Aluminium sliding window with necessary screws etc. complete.	6.00	each	220.80	1325.00
6.1	Steel work in built up tubular (round, square or rectangular hollow tubes etc.) trusses etc., including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer, including welding and bolted with special shaped washers etc. complete.				

6.1.1	Hot finished welded type tubes.	1600.00	kg	210.41	336659.00
6.2	Providing and fixing bolts including nuts and washers complete.	40.00	kg	172.47	6899.00
7.1	62 mm thick cement concrete flooring with concrete hardener topping, under layer 50 mm thick cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20mm nominal size) and top layer 12mm thick cement hardener consisting of mix 1:2 (1 cement hardener mix : 2 graded stone aggregate, 6mm nominal size) by volume, hardening compound mixed @ 2 litre per 50 kg of cement or as per manufacture's specifications. This includes cost of cement slurry, but excluding the cost of nosing of steps etc. complete.	35.00	sqm	1143.14	40010.00
8.1	Providing and fixing precoated galvanised iron profile sheets (size, shape and pitch of corrugation as approved by Engineer-in-Charge) of total coated thickness 0.50mm (base metal of minimum 0.45mm thickness with total coating thickness of 0.05mm) with zinc coating 120 grams per sqm as per IS: 277, in 240 mpa steel grade, 5-7 microns epoxy primer on both side of the sheet and polyester top coat 15-18 microns. Sheet should have protective guard film of 25 microns minimum to avoid scratches during transportation and should be supplied in single length upto 12 metre or as desired by Engineer-in-charge. The sheet shall be fixed using self drilling /self tapping screws of size (5.5x 55 mm) with EPDM seal, complete upto any pitch in horizontal/ vertical or curved surfaces, excluding the cost of purlins, rafters and trusses and including cutting to size and shape wherever required.	80.00	sqm	799.49	63959.00

9.1	Providing and fixing precoated galvanised steel sheet roofing accessories of total coated thickness 0.50mm (base metal of minimum 0.45mm thickness with total coating thickness of 0.05mm) with Zinc coating 120 grams per sqm as per IS: 277, in 240 mpa steel grade, 5-7 microns epoxy primer on both side of the sheet and polyester top coat 15-18 microns using self-drilling/ self-tapping screws complete :				
9.1.1	Ridges plain (500 - 600mm)	10.00	metre	576.20	5762.00
10.1	12 mm cement plaster of mix :				
10.1.1	1:4 (1 cement: 4 fine sand)	62.00	sqm	375.63	23289.00
10.2	15 mm cement plaster on the rough side of single or half brick wall of mix :				
10.2.1	1:4 (1 cement: 4 fine sand)	62.00	sqm	432.35	26806.00
10.3	6 mm cement plaster of mix :				
10.3.1	1:3 (1 cement : 3 fine sand)	20.00	sqm	325.20	6504.00
10.4	Finishing walls with Premium Acrylic Smooth exterior paint with Silicone additives of required shade:				
10.4.1	New work (Two or more coats applied @ 1.43 ltr/10 sqm over and including priming coat of exterior primer applied @ 0.90 litre/10 sqm)	62.00	sqm	185.19	11482.00
10.5	Painting with synthetic enamel paint of approved brand and manufacture to give an even shade :				
10.5.1	Two or more coats on new work	34.00	sqm	168.74	5737.00
10.6	Wall painting with premium acrylic emulsion paint of interior grade, having VOC (Volatile Organic Compound) content less than 50 grams/ litre of approved brand and manufacture, including applying additional coats wherever required to achieve even shade and colour.				
10.6.1	Two coats	62.00	sqm	154.56	9583.00
10.7	Applying priming coats with primer of approved brand and manufacture, having low VOC (Volatile Organic Compound) content.				

10.7.1	With water thinnable cement primer on wall surface having VOC content less than 50 grams/litre	62.00	sqm	80.04	4963.00
11.1	Providing and fixing aluminium work for doors, windows, ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS: 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminium snap beading for glazing / paneling, C.P. brass / stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge. (Glazing, paneling and dash fasteners to be paid for separately) :				
11.1.1	For fixed portion				
11.1.1.1	Powder coated aluminium (minimum thickness of powder coating 50 micron)	33.00	kg	574.63	18963.00
11.1.2	For shutters of doors, windows & ventilators including providing and fixing hinges/ pivots and making provision for fixing of fittings wherever required including the cost of EPDM rubber / neoprene gasket required (Fittings shall be paid for separately)				
11.1.2.1	Powder coated aluminium (minimum thickness of powder coating 50 micron)	27.00	kg	686.71	18541.00
11.2	Providing and fixing glazing in aluminium door, window, ventilator shutters and partitions etc. with EPDM rubber / neoprene gasket etc. complete as per the architectural drawings and the directions of engineer-in-charge . (Cost of aluminium snap beading shall be paid in basic item):				
11.2.1	With float glass panes of 5.0 mm thickness (weight not less than 12.50kg/sqm)	6.00	sqm	1629.23	9775.00
				Total in Rs.	**14,71,157**

Contractor Executive Engineer (C)

Contr. EE(E)/VJA

Central Public Works Department

NIT. No.34 /EE(E)/(VJA)/2026-27

Name of Work: Supply, Installation, Testing & Commissioning of 20 KLD Effluent Treatment Plant & Sewage Treatment Plant combo unit, cold room and other related items at National Centre for Disease Control, Mangalagiri, Andhra Pradesh.

ABSTRACT OF COST

Name of the Contractor					
Sl. No.	**Name of Component**	**Estimated Cost**	**Percentage above or below the estimated cost**	**% in Figures**	**Total Cost**
1	Supply, Installation, Testing & Commissioning of 20 KLD Effluent Treatment Plant & Sewage Treatment Plant combo unit, cold room and other related items at National Centre for Disease Control, Mangalagiri, Andhra Pradesh.				
	Electrical component	**57,06,685/-**			
	Civil component	**14,71,157/-**			
	GRAND TOTAL	**71,77,842/-**			

Important Note:

1. The estimated cost of tender has been worked out by taking into consideration the cost index of **Guntur District** for DSR 2023 (Civil) & DSR 2025 (E&M) items and market rates for NSR items; therefore, are adjusted accordingly.
2. The tenderer is to quote a single consolidated percentage only separately for Civil and Electrical Component at par/above/below estimated cost to cover all the rates of all the items under the schedule of composite tender.
3. If the percentage quoted is not clear, or if the rate is not quoted in percentage, the tender shall be treated as invalid and will not be considered as lowest tenderer.

Contractor Executive Engineer(E)