



यते

भारतसरकार
संचारमंत्रालय
भारतीयडाकविभाग

सत्यमेवजय

Government of India
Ministry of Communications
Department of Posts



COMPOSITE PERCENTAGE RATE e-TENDER & CONTRACT

FOR THE WORK OF : Civil and Electrical repair and Maintenance of IQ
Basavanagudi HO, Bengaluru South Division – 560 004.

DRAFT NIT

N.I.T. No. : 04/PCD/BGL/2026-2027 DATED 12.05.2026

Estimated Cost: Rs.9,93,825/- (Civil: Rs.7,75,280/- + Elect: Rs. 2,18,545/-).

(i) Total Estimated cost: Rs.9,93,825/- (Civil: Rs.7,75,280/- + Elect: Rs. 2,18,545/-)

Earnest Money: Rs.19,877/-

Period of completion: 90 (Ninety) days

Last date and time of submission of bid: 19.05.2026 Upto 15.00
hrs

This NIT containing pages as per Index, amounting to Rs.9,93,825/- Only is hereby
approved.

Executive Engineer(C),
Postal Civil Division,
Bengaluru-560032.

NOTE: ---***--- any where in this document to be filled by the Executive Engineer

INFORMATION AND INSTRUCTIONS FOR EXECUTIVE ENGINEER FOR E-TENDERING

1. The Executive Engineer of all Postal Civil/Electrical Divisions should receive the original EMD for tender of other division.
2. The Executive Engineer at the time of issue of NIT shall also fill and upload the following prescribed format of receipt of deposition of original EMD along with NIT:

FORMAT FOR RECEIPT OF DEPOSITION OF ORIGINAL EMD

Receipt of deposition of original EMD

Receipt No.

Dated:

1. Name of work: **Civil and Electrical repair and Maintenance of IQ
Basavanagudi HO, Bengaluru South Division – 560 004**

1. NIT No.: **04/PCD/BGL/2026-2027** dated **12.05.2026**

2. Estimated Cost: **Rs.9,93,825/- (Civil: Rs.7,75,280/- + Elect: Rs. 2,18,545/-).**

3. Amount of Earnest Money Deposit: **Rs.19,877/-**

4. Last date of submission of bid 19.05.2026 : **15.00 hrs**

(*** To be filled by EE(C) at the time of issue of NIT and uploaded along with NIT)

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/AO/AE/AAO) along with Office Stamp

(# To be filled by EMD receiving EE)

3. The Executive Engineer receiving EMD in original form shall examine the EMD deposited by the bidder and shall issue a receipt of deposition of earnest money to the agency in a given format uploaded by tender inviting EE. The receipt may be issued by the AE/AAO.
4. The Executive Engineer receiving original EMD shall also intimate tender inviting Executive Engineer about deposition of EMD by the agency by e-mail/ Fax/ telephonically.
5. The original EMD receiving Executive Engineer shall release the EMD after verification from the e-tendering portal website <https://eprocure.gov.in/eprocure/appin> **Awarded Tenders** Section >> after Clicking the **Result** tab for the tender ID. Or a certificate to be obtained from the tender inviting Executive Engineer that the particular contractor is not L-1 tenderer and work has been awarded.
6. The tender inviting Executive Engineer will call for original EMD of the L1 tenderer from EMD receiving Executive Engineer immediately.
7. List of Executive Engineers along with address where EMD can be deposited is enclosed as Annexure-XL

NOTE: *----- any where in this document to be filled by the Executive Engineer**

List of Executive Engineers with addressAnnexure-XL

Executive Engineer (C) Postal Civil Division, GPO Building , 3 rd floor, Ambala-133001 0171-2645721	Executive Engineer (C) Postal Civil Division, R.N. Compound, Opp. Raj Bhawan, Shillong-793001, 0364 - 2222506	Executive Engineer (C) Postal Civil Division, 2 nd Floor, HPO Building, M.G. Road, Jubilee Chowk, Rajkot-360001 0821-2223795
Executive Engineer (C) Postal Civil Division, PO Building, 1 st Floor, Summer Hill, Shimla- 171005 0177-2832943	Executive Engineer (C) Postal Civil Division, 1st floor R.T.NAGAR, HPO Building, Bengaluru- 560 032, 080- 23332025, 23330720	Executive Engineer (C) Postal Civil Division, 1 st floor, Opp. PLI Section, CPMG Campus, Sardar Patel Marg, Jaipur-302007 0141-2365941
Executive Engineer (C) Postal Civil Division,1 st Floor, OldHPO building, Civil Lines, Prayagraj(U.P) - 211001, 0532- 2622151	Executive Engineer (C) Postal Civil Division, Old RO Bldg, Sapthapur, Dharwad-580001, 0836 - 2445252	Executive Engineer (C) Postal Civil Division,5 th Floor, C.T.T. Nagar,HPO Building, Bhopal-462003 0755- 2779149
Executive Engineer (C) Postal Civil Division, 2 nd floor, PO Bldg., Sector-C, Aliganj, Lucknow-226001, 0522 – 2335165	Executive Engineer (C) Postal Civil Division,No. 5, Ethiraj Salai, 2 nd floor, Chennai-600008, 044- 28203435, 28275525	Executive Engineer (C) Postal Civil Division-II,Yogayog Bhawan, 2nd Floor, P-36, CR-Avenue, Kolkata- 700012, 033 - 22121189
Executive Engineer (C) Postal Civil Division, Quarter no. 13&16, Postal Colony, Roop Nagar, Jammu-180013, 0191- 2592924	Executive Engineer (C) Postal Civil Division, Manacaud P.O., Trivandrum-695009, 0471 – 2466748	Executive Engineer (E) Postal Electrical Division-I, Meghdoot Bhawan,New Delhi-110001, 011-23514049
Executive Engineer (C) Postal Civil Division, 10 th Floor, MeghdootBhawan,New Delhi-110001, 011- 23628363	Executive Engineer (C) Postal Civil Division, 3 rd Floor, PO Building, Sion, Mumbai-400022, 022 – 24013900	Executive Engineer (E) Postal Electrical Division, Yogayog Bhawan, P-36, CR-Avenue, Kolkata- 700012, 033-22120646, 22120637
Executive Engineer (C) Postal Civil Division, Meghdoot Bhawan, 5 th Floor, GPO Compound, Patna-800001, 0612 – 2223936	Executive Engineer (C) Postal Civil Division, 2 nd Floor, Parvati PO Bldg, Parvati, Pune-411009 020-25817763	Executive Engineer (E) Postal Electrical Division, PO Building, Sector-C, Aliganj, Lucknow-226001 0522 – 2336053
Executive Engineer (C) Postal Civil Division, 3 rd floor, Postal Store Depot building, 3 rd Floor, satyanagar, Bhubaneswar - 751 007 0674 – 2570961/62	Executive Engineer (C) Postal Civil Division,Akashwani Chowk, DA (P) Compound, Civil Lines, Nagpur- 440001 0712-2540368	Executive Engineer (E) Postal Electrical Division Basavanagudi HPO Building, 1sr Floor, Bangalore-560 004 080-26676802
Executive Engineer (C) Postal Civil Division-I, Yogayog Bhawan, 3 rd Floor, P-36, CR- Avenue, Kolkata-700012, 033 – 29631441	Executive Engineer (C) Postal Civil Division, Quarter No. C-III/1&2, Postal Staff Qtrs, Meghdootnagar, Beerappagadda, Uppal, Hyderabad -500 039 040- 29563659 / 23463910	Executive Engineer (E) Postal Electrical Division 3 rd Floor, PO Building, Sion Mumbai-400022, 022 – 24044164
Executive Engineer (C) Postal Civil Division-II, Meghdoot Bhawan Complex, 1 st Floor, Amenity Block, Pan Bazar, Guwahati-781001 0361 - 2542679	Executive Engineer (C) Postal Civil Division,2 nd floor, Beharampur PO building, Ahmedabad- 380022 079- 25504055	Executive Engineer (E) Postal Electrical Division CSO, Gandhi Nagar,Jaipur-302015 0141-2708841

Name of Work: *Civil and Electrical repair and Maintenance of IQ Basavanagudi HO, Bengaluru South Division - 560004*

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It is certified that this document contains Four parts i.e. Part A, Part B, Part-C & Part-D containing pages No. **1 to 239**

Executive Engineer (Civil)
Postal Civil Division,
Bengaluru

ELIGIBILITY CONDITION

PART-A

Name of work:- Civil and Electrical repair and Maintenance of IQ Basavanagudi HO, Bengaluru South Division - 560004.

INDEX- Volume I of Part A

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Executive Engineer (Civil)
Postal Civil Division,
Bengaluru

SPECIAL INSTRUCTIONS TO THE CONTRACTORS/BIDDERS FOR THE E-SUBMISSION OF THE BIDS ONLINE THROUGH TENDER SITE <https://eprocure.gov.in/eprocure/app>

This tender document has been published on the portal <https://eprocure.gov.in/eprocure/app>. The bidders are required to submit soft copies of their bids electronically on the Portal, using valid Digital Signature Certificates. The instructions given below are meant to assist the bidders in registering on the Portal, prepare their bids in accordance with the requirements and submitting their bids online on the Portal. More information useful for submitting online bids on the Portal may be downloaded from “Download” section available on home page on <https://eprocure.gov.in/eprocure/app>.

REGISTRATION

- 1) Bidders are required to enroll on the e-tendering portal (URL:<https://eprocure.gov.in/eprocure/app>) by clicking on the link “Register” on the e-tendering portal.
- 2) As part of the enrolment process, the bidders will be required to choose a unique username and password for their accounts.
- 3) Bidders are advised to register their valid email address and mobile numbers as part of the registration process. These would be used for any communication from the DoP e-tendering portal.
- 4) Upon enrolment, the bidders will be required to register their valid Digital Signature Certificate (Class III Certificates with Signing+Encryption key usage) issued by any Certifying Authority recognized by CCA India (e.g. Sify / TCS / nCode / eMudhra etc.), with their profile.
- 5) Only one valid DSC should be registered by a bidder. Please note that the bidders are responsible to ensure that they do not lend their DSC's to others which may lead to misuse.
- 6) Bidder then logs in to the site through the secured log-in by entering their user ID / password and the password of the DSC / e-Token.

SEARCHING FOR TENDER DOCUMENTS

- 1) Bidder can search any tender by clicking on “Live Tender” under search option on Home Page. Once the bidders have selected the tenders they are interested in, they may download the required documents after clicking on “Tender Document”.
- 2) The bidder should make a note of the unique Tender ID assigned to each tender, in case they want to obtain any clarification / help from the Helpdesk.

PREPARATION OF BIDS

- 1) Bidder should take into account any corrigendum published on the tender document before submitting their bids. Please go through the tender advertisement and the tender document carefully to understand the documents required to be submitted as part of the bid. Please note the number of covers in which the bid documents have to be submitted, the number of documents - including the names and content of each of the document that need to be submitted.
- 2) Bidder, in advance, should get ready the bid documents to be submitted as indicated in the tender document / schedule and generally, they can be in PDF / XLS / JPEG formats.
- 3) To avoid the time and effort required in uploading the same set of standard documents which are required to be submitted as a part of every bid, a provision of uploading such documents (e.g. GST registration copy, annual reports, auditor certificates etc.) has been provided to the bidders. Bidders can use “My Document” available to them to upload such documents. These documents may be directly attached from the “My Document” library while submitting a bid, and need not be uploaded again and again. This will lead to a reduction in the time required for bid submission process.

SUBMISSION OF BIDS

- 1) Bidder should log into the site well in advance for bid submission so that he/she upload the bid in time i.e. on or before the bid submission time. Bidder will be responsible for any delay due to other issues.
- 2) The bidder has to digitally sign and upload the required bid documents one by one as indicated in the tender document.

- 3) Bidder has to select the payment option as “offline” to pay the Tender Fee and enter details of DD/any other accepted instrument. Bidder has to select the payment option as required from the drop down to pay the Processing Fee &EMD and enter details of DD/any other accepted instrument.
- 4) Bidder should prepare the EMD as per the instructions specified in the tender document. The original should be posted/couriered/given in person to the Tender Processing Section, latest by the last date of bid submission or as specified in the tender documents. The details of the DD/any other accepted instrument, physically sent, should tally with the details available in the scanned copy and the data entered during bid submission time otherwise the Tender will be summarily rejected.
- 5) The Tender Inviting Authority (TIA) will not be held responsible for any sort of delay or the difficulties faced during the submission of bids online by the bidders. The bidder should see that the bid documents submitted should be free from virus and if the documents could not be opened, due to virus, during tender opening, the bid is liable to be rejected.
- 6) Bidders are requested to note that they should necessarily submit their financial bids in the format provided and no other format is acceptable. The price bid has been given as a standard .xlsx format with the tender document, and then the same is to be downloaded and to be filled by all the bidders. Bidders are required to download the .xlsx file, open it and complete the unprotected cells with their respective financial quotes and other details (such as name of the bidder). No other cells should be changed. Once the details have been completed, the bidder should save it and submit it online, without changing the filename. If the .xlsx file is found to be modified by the bidder, the bid will be rejected.
- 7) The server time (which is displayed on the bidders’ dashboard) will be considered as the standard time for referencing the deadlines for submission of the bids by the bidders, opening of bids etc. The bidders should follow this time during bid submission. The bidders are requested to submit the bids through online e-tendering system to the TIA well before the bid submission end date & time (as per Server System Clock).
- 8) All the documents being submitted by the bidders would be encrypted using PKI encryption techniques to ensure the secrecy of the data. The data entered cannot be viewed by unauthorized persons until the time of bid opening.
- 9) The uploaded tender documents become readable only after the tender opening by the authorized bid openers.
- 10) Upon the successful and timely submission of bids, the portal will give a successful bid submission acknowledgement copy will be displayed with the bid no. and the date & time of submission of the bid with all other relevant details.
- 11) The acknowledgement copy has to be printed and kept as an acknowledgement of the submission of the bid.

ASSISTANCE TO BIDDERS

- 1) Any queries relating to the tender document and the terms and conditions contained therein should be addressed to the TIA i.e. Executive Engineer(C), of concerned Postal Civil Division Bengaluru inviting the tenders.

- 2) For any technical related queries please call at 24 x 7 Help Desk Number:

- 0120-4001 002,
- 0120-4001 005,
- 0120-4493 395

Email Support: For any Issues or Clarifications relating to the published tenders, bidders are requested to contact the respective Tender Inviting Authority

Technical - support-eproc(at)nic(dot)in

Policy Related - cppp-doe(at)nic(dot)in

INFORMATION AND INSTRUCTIONS FOR BIDDERS FOR E-TENDERING FORMING

PART OF BID DOCUMENT

- Executive Engineer(Civil), Postal Civil Division, on behalf of the President of India invites online percentage rate composite bids from approved and eligible contractors of Department of Posts for the following work

Sr. No.	NIT No.	Name of work & Location	Estimated Cost Put to Tender	Earnest Money	Period of Completion	Last date & time of Submission of bid, EMD, copy of receipt of deposition of original EMD and other documents as specified in the Bid document.	Time and Date of Opening of Eligibility Bid (Technical Bid envelope)	Time Period allowed for submission of originals of all the scanned and uploaded documents as specified in NIT by the lowest bidder
1	2	3	4	5	6	7	8	9
1	04/PCD/BGL/2026-2027	Civil and Electrical repair and Maintenance of IQ basavanagudi HO, Bengaluru South Division - 560004	Rs.9,93,825/- (Civil: Rs. 7,75,280/- + Elect: Rs.2,18,545/-).	Rs.19,877/-	90(Ninety) days	Upto 19.05.2026 on 15.00 hrs	At 20.05.2026 on 15.30.00 hrs	Within a week of opening of the financial bid in the office of tender inviting authority

The contractor submitting the tender should read the schedule of quantities, additional conditions, additional specifications, particular specifications, CPWD- 6 and other terms and conditions given in the NIT and drawings. The bidder should also read the General Conditions of Contract for **CPWD Maintenance Works 2023** with up to date correction slips, which is available as Government of India Publications; can also be seen on CPWD web site i.e. www.cpwd.gov.in . However, provisions included in the tender document shall prevail over the provisions contained in the standard form. The contractor should also visit the site of work and acquaint himself with the site conditions before tendering. He should only submit his tender if he considers himself eligible and he is in possession of all the required documents. The following conditions, which already form part of the tender conditions, are specially brought to his notice for compliance while submitting the tender online. They are requested to comply following instructions:-

- Bid with any condition including that of conditional rebates shall be rejected forthwith.*
 - The successful bidder shall be required to submit Performance Guarantee of **5% (Five Percent)** of the tendered amount within **10days** of issue of letter of intent. This period can be further extended by Engineer-in-Charge up to a maximum period of **7 days** on the written request of the contractor and with late fee as defined in Schedule-F.*
- The intending bidder must read the terms and conditions of CPWD-6 carefully. He should only submit his bid if he considers himself eligible and he is in possession of all the documents required.
 - Information and Instructions for bidders posted on website shall form part of bid document.

4. 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://eprocure.gov.in/eprocure/app> free of cost or in the office of the Executive Engineer (C), Postal Civil Division, Bengaluru between hours of 11:00 AM and 4:00 PM from Monday to Friday every day except on Saturday & Sunday and public holidays

5. Applicant has to deposit **Earnest Money of Rs. 19,877/-** in the form of Treasury Challan or Demand Draft or Pay order or Banker's Cheque or Deposit at Call Receipt or Fixed Deposit Receipt (drawn in favour of **Accounts Officer O/o Executive Engineer (C), Postal Civil Division, Bengaluru payable at**) or Bank Guarantee including e- Bank Guarantee (for balance amount as prescribed) from any of the Commercial Banks (drawn in favour of **Executive Engineer (C), Postal Civil Division, Bengaluru** shall be scanned and uploaded to the e-tendering website within the period of bid submission. **The original EMD should be deposited either in the office of Executive Engineer inviting bids or division office of any Executive Engineer (Civil/Electrical), Postal Civil/Electrical Division within the period of bid submission. The EMD receiving Executive Engineer (including NIT issuing EE) shall issue a receipt of deposition of earnest money deposit to the bidder in a prescribed format (enclosed) uploaded by tender inviting EE in the NIT. This receipt shall also be uploaded to the e-tendering website by the intending bidder up to the specified bid submission date and time.**

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 (Civil/Electrical) Department of Posts within the period of bid submission** and uploading the mandatory scanned documents such as demand draft or pay order or banker's cheque or deposit at call receipt or fixed deposit receipt and bank guarantee of any scheduled bank towards EMD in favour of Accounts Officer O/o Executive Engineer as mentioned in NIT, receipt for deposition of original EMD to division office of any Executive Engineer (Civil/Electrical) (including NIT issuing EE) Postal (Civil/Electrical) Division and other documents as specified. **OR**

Earnest Money can also be deposited through RTGS/NEFT in the account of Accounts Officer, Postal Civil Division, Bengaluru, having account no. 30435514351 with State Bank of India, R.T.NAGAR BR., Bengaluru Bank IFSC Code No.SBIN0007982). The unique transaction reference (UTR) of RTGS/NEFT shall have to be uploaded by the bidder in the e-tendering system by the prescribed date. The Executive Engineer concerned will get earnest money verified from the Bank based on the unique transaction reference number against each RTGS/NEFT payment before the tenders are opened.

Note:- The bidder will use one UTR for one work only. In case it is found that he has used one UTR number for different bids, all the bids submitted with the common UTR will be rejected and the bidder shall be debarred from further tendering in the department for one year.

A part of earnest money is acceptable in the form of bank guarantee also. In such case, minimum 50% of earnest money or Rs. 20 Lac, whichever is less, shall have to be deposited in shape prescribed above, and balance may be deposited in shape of Bank Guarantee of any scheduled bank having validity for **180 days or more** from the last date of receipt of bids which is to be scanned and uploaded by the intending bidders.

6. Those contractors not registered on the website mentioned above (CPP portal) are required to get registered before hand. If needed they can be imparted training on online tendering process as per details available on the website.
7. The intending bidder must have valid Class-II/class-III digital signature to submit the tender.
8. Contractor can upload documents in the form of JPG and/or PDF format only.
9. The eligibility bid (Cover 1 on the portal) shall be opened first on due date and time as specified herein above. The time and date of opening of financial bid (Cover 2 on the portal) of contractors qualifying the eligibility bid shall be communicated to them at a later date.
10. The department reserves the right to reject any prospective application without assigning any reason.
11. Contractor must ensure to quote rate in the prescribed column(s) meant for quoting rate in figures

appears in pink colour and the moment rate is entered, it turns sky blue. 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 bidder 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.

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

i	Scanned copy of Treasury Challan/ Demand Draft / Pay Order or Banker's Cheque / Fixed Deposit Receipts/ Deposit at Call Receipt / Bank Guarantee including e- Bank Guarantee (for balance amount as prescribed) of any scheduled bank against EMD as prescribed/Scanned copy of unique transaction reference (UTR) of RTGS/NEFT in case the earnest money has been deposited through RTGS/NEFT in the Account of tender inviting division.
ii	Copy of receipt for deposition of original EMD to division office of any Executive Engineer (Civil)/(Electrical) [including NIT issuing EE] Postal Civil Division. OR an Undertaking that 'this document is not required' if earnest money has been deposited through RTGS/NEFT in Account of tender inviting division.
iii	Copy of Enlistment Order .
vii	GST registration Certificate , if already obtained by the bidder. If the bidder has not obtained GST registration as applicable, then he shall scan and upload following under taking along with other bid documents. <i>"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 the Department, whichever is earlier, failing which I/We shall be responsible for any delay in payments which will be due towards me/us on a/c of the work executed and/or for any action taken by the department or GST department in this regard."</i>

b) COVER-2 (FINANCIAL BID) ENVELOPE shall contain

I	Tender Document in pdf format (XXXXX.pdf file) digitally signed.
II	Excel file (Performa for quoting percentage) in xlsx format (XXXXX.xlsx) file duly filled & digitally signed as per as per requirements of e-procurement module. E

E

Executive Engineer (Civil)
Postal Civil Division,
Bengaluru-560032.



भारतसरकार
संचारमंत्रालय
भारतीय डाक विभाग

Government of India
Ministry of Communications
Department of Posts



N.I.T.No. 04/PCD/BGL/2026 -27/

Date : 12.05.2026

DRAFT COMPOSITE PERCENTAGE RATE NIT FOR e-TENDERING

1. Executive Engineer (Civil), Postal Civil Division, on behalf of the President of India invites online percentage rate composite bids from approved and eligible contractors of Department of Posts for the work of **Civil and Electrical repair and Maintenance of IQ Basavanagudi HO, Bengaluru South Division – 560004.**
2. 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.
The work is estimated to cost **Rs.9,93,825/- (Civil: Rs.7,75,280/- + Elect: Rs. 2,18,545/-)**. This estimate, however, is given merely as a rough guide. Last Date & Time of submission of tender is **upto 15:00 hrs of 19.05.2026 and Technical Bid will be opened on 20.05.2026 at 15:30 hrs.**
- 1.1.1. The authority competent to approve NIT for the combined cost and belonging to the major discipline will consolidate NITs for calling the bids. He will also nominate Division which will deal with all matters relating to the invitation of bids. For composite bid, besides indicating the combined estimated cost put to bid, should clearly indicate the estimated cost of each component separately. The eligibility of bidders will correspond to the combined estimated cost of different components put to bid.
- 1.1. Intending bidders are eligible to submit the bid provided he has definite proof from the appropriate authority, which shall be to the satisfaction of the competent authority, of having satisfactorily completed similar works of magnitude specified below:-
Similar works means "Building works including internal Civil and Electrical (E&M) works under one agreement carried out with some Central/state government departments, Central/State Autonomous bodies/City Development Authority/ Municipal Corporation of city formed under any Act by Central/State Government published in any Central/State Gazette

Criteria of eligibility for submission of bid documents

1. The Bidder shall be enlisted in Department of Posts.
2. Agreement shall be drawn with the successful bidder on prescribed Form No. CPWD 7 (or other Standard Form as mentioned) which is available as a Govt. of India Publication and also available on website www.cpwd.gov.in with up to date correction slips. 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 from the date of start as defined in schedule 'F' or from the first date of handing over of the site, whichever is later, in accordance with the phasing, if any, indicated in the bid documents.
4. (i) The site for the work is available.
or
The site for the work shall be made available in parts as specified below:-
Civil and Electrical repair and Maintenance of IQ Basavanagudi HO, Bengaluru South Division - 560004
- (ii) The architectural and structural drawing for the work is available
or
The architectural and structural drawings shall be made available in phased manner, as per requirement of the same as per approved programme of completion submitted by the contractor after award of work.

5. The bid document consisting of plans, specifications, the schedule of quantities of various types of items to be executed and the set of terms and conditions of the contract to be complied with and other necessary documents except Standard General Conditions of Contract Form can be seen on website <https://eprocure.gov.in/eprocure/app> free of cost or in the office of the Executive Engineer (C), Postal Civil Division, between hours of 11:00 AM and 4:00 PM from 12.05.2026 to 19.02.2026 every day except on Saturday & Sunday and public holidays
6. After submission of the bid, the contractor can re-submit revised bid any number of times 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 rejected and the tenderer will be debarred for future tendering in DoP for two years (In case of DoP enlisted contractor) and by the concerned CE/SE (In case of non-enlisted contractor).
7. (a) Applicant has to deposit **Earnest Money Rs.19,877/-** of in the form of Treasury Challan or Demand Draft or Pay order or Banker's Cheque or Deposit at Call Receipt or Fixed Deposit Receipt (drawn in favour of **Accounts Officer O/o Executive Engineer (C), Postal Civil Division, Bengaluru** available at) or Bank Guarantee including e- Bank Guarantee (for balance amount as prescribed) from any of the Commercial Banks (drawn in favour of Executive Engineer (C), Postal Civil Division,) shall be scanned and uploaded to the e-tendering website within the period of bid submission. **The original EMD should be deposited either in the office of Executive Engineer inviting bids or division office of any Executive Engineer (Civil/Electrical) Postal Civil/Electrical Division within the period of bid submission. The EMD receiving Executive Engineer (including NIT issuing EE) shall issue a receipt of deposition of earnest money deposit to the bidder in a prescribed format (enclosed) uploaded by tender inviting EE in the NIT. This receipt shall also be uploaded to the e-tendering website by the intending bidder up to the specified bid submission date and time.**
 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 (Civil/Electrical) Department of Posts within the period of bid submission** and uploading the mandatory scanned documents such as demand draft or pay order or banker's cheque or deposit at call receipt or fixed deposit receipt and bank guarantee of any scheduled bank towards EMD in favour of Accounts Officer O/o Executive Engineer as mentioned in NIT, receipt for deposition of original EMD to division office of any Executive Engineer (Civil/Electrical) (including NIT issuing EE) Postal (Civil/Electrical) Division and other documents as specified. **OR**
Earnest Money can also be deposited through RTGS/NEFT in the account of Accounts Officer Postal Civil Division ,, having account no. 30435514351 with State Bank of India, k R.T.NAGAR Br., Bengaluru Bank (IFSC Code No.SBIN007982). The unique transaction reference (UTR) of RTGS/NEFT shall have to be uploaded by the bidder in the e-tendering system by the prescribed date. The Executive Engineer concerned will get earnest money verified from the Bank based on the unique transaction reference number against each RTGS/NEFT payment before the tenders are opened.
Note:-The bidder will use one UTR for one work only. In case it is found that he has used one UTR number for different tenders, all the tenders submitted by him will be rejected and he debarred from further tendering in the department for one year.
 A part of earnest money is acceptable in the form of bank guarantee also. In such case, **minimum 50% of earnest money or Rs. 20 Lac**, whichever is less, shall have to be deposited in shape prescribed above, and balance may be deposited in shape of Bank Guarantee of any scheduled bank having validity for **180 days or more** from the last date of submission of tender, 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.
 (b) Copy of Enlistment Order and other documents as specified in the notice inviting e- tender shall be scanned and uploaded on the e-Tendering website within the period of bid submission. However, certified copy of all the scanned and uploaded documents as specified in e- tender notice shall have to be submitted by the lowest bidder within a week physically in the office of tender opening authority. Online bid documents submitted by intending bidders shall be opened only of those bidders, who has

deposited EMD with any division of Postal and other documents scanned and uploaded are found in order.

(c) The bid submitted shall be opened on 20.05.2026 at 3.30 PM

8. The bid submitted shall become invalid 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.

9. The contractor whose bid is accepted will be required to furnish performance guarantee at specified percentage of the tendered amount as mentioned in schedule E and within the period specified in Schedule F. This guarantee shall be in the form of 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, if applicable, and also ensure the compliance of aforesaid provisions by the sub-contractors, if engaged by the contractor, within the period specified in Schedule F.

Time allowed for execution of work : 90(Ninety) days

10. The description of the work is as follows . **Civil and Electrical repair and Maintenance of IQ Basavanagudi HO, Bengaluru South Division – 560004.**

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

11. The competent authority on behalf of the President of India does not bind itself to accept the lowest or any other bid and reserves to itself the authority to reject any or all the bids received without the assignment of any reason. All bids in which any of the prescribed condition is not fulfilled or any condition including that of conditional rebate is put forth by the bidder shall be summarily rejected.

12. 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.

13. The competent authority on behalf of President of India reserves to himself the right of accepting the whole or any part of the bid and the bidder shall be bound to perform the same at the rate quoted.

14. The contractor shall not be permitted to bid for works in the Postal Civil Circle responsible for award and execution of contracts, in which his near relative is posted a Divisional Accountant or as an officer in any capacity between the grades of Superintending Engineer and Junior Engineer (both inclusive). He shall also intimate the names of persons who are working with him in any capacity or are subsequently employed by him and who are near relatives to any gazetted officer in the Department of Posts or in the Ministry of Communications. Any breach of this condition by the contractor would render him liable to be removed from the approved list of contractors of this Department.
15. 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.
16. The bids for the work shall remain open for acceptance for a period of **75 (seventy five) days** from the date of opening of bid.
Further
 - (i). If any tenderer withdraws his tender within 7 days after last date and time (24 hrs 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 after expiry of 7 days after last date and time (24 hrs 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 ie through letter/ e-mail etc. shall not be considered.
 - (iv) In case of forfeiture of earnest money as prescribed in para (i) and (ii) above, the bidders shall not be allowed to participate in the rebidding process of the same work.
17. This notice inviting Bid shall form a part of the contract document. The successful bidder/contractor, on acceptance of his bid by the Accepting Authority shall within 15 days from the stipulated date of start of the work, sign the contract consisting of:-
 - (a) The Notice Inviting Bid, all the documents including additional conditions, specifications and drawings, if any, forming part of the bid as uploaded at the time of invitation of bid and the rates quoted online at the time of submission of bid and acceptance thereof together with any correspondence leading thereto.
 - (b) Standard C.P.W.D. Form 7/8 or other Standard C.P.W.D. Form as applicable.
18. **For Composite Bids**
 - 18.1.1 The Executive Engineer in charge of the major component will call bids for the composite work. The Earnest Money will be fixed with respect to the combined estimated cost put to tender for the composite bid.
 - 18.1.2 The bid document will include following **four** components:
 - Part A:- CPWD-6, CPWD-7/8 including schedule A to F for the major component of the work, **Standard General Conditions of Contract for CPWD 2023** as amended/modified up to Date.
 - Part B:- General / specific conditions, specifications etc.
 - Part C:- Schedule A to F for minor component of the work (competent authority under clause 2 and clause 5 shall be same authority as mentioned in schedule A to F for major components), General/specific conditions, specifications etc.
 - Part D:- schedule of quantities applicable to major and minor component of the work.**
 - 18.1.3 The bidders must associate himself/herself, with agencies as per NIT conditions.
 - 18.1.4 The eligible bidders shall quote rates for all items of major component as well as for all items of minor components of work.

- 18.1.5 After acceptance of the bid by competent authority, the EE in charge of major component of the work shall issue letter of award on behalf of the President of India. After the work is awarded, the main contractor will have to enter into one agreement with EE incharge of major component and has also to sign two or more copies of agreement depending upon number of EE's incharge of minor components. One such signed set of agreement shall be handed over to EE incharge of minor component(s).
EE of major component will operate Part A, Part B and Part D of the agreement.
EE incharge of minor component(s) shall operate Part- C and Part D alongwith Part A of the agreement.
- 18.1.6 Entire work under the scope of composite bid including major and all minor components shall be executed under one agreement.
- 18.1.7 Security Deposit will be worked out separately for each component corresponding to the estimated cost of the respective component of works.
- 18.1.8 The main contractor has to associate agencies for specialized component(s)/minor component 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).
- 18.1.9 In case the main contractor intends to change any of the above agency/agencies during the operation of the contract, he shall obtain prior approval of Engineer-in-Charge of relevant specialized component(s).
The new agency/agencies shall also have to satisfy the laid down eligibility criteria. In case Engineer-in-Charge is not satisfied with the performance of any agency, he can direct the contractor to change the agency executing such items of work and this shall be binding on the contractor.
- 18.1.10 The main contractor has to enter into MoU with agency(s) associated by him. Copy of such MoU shall be submitted to EE 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.
- 18.1.11 Running payment for the major component shall be made by EE of major discipline to the main contractor. Running payment for minor components shall be made by the Engineer-in-Charge of the discipline of minor component directly to the main contractor. The CMB shall be maintained independently by Engineer-in-Charge of major and minor components.
- 18.1.12A The composite work shall be treated as complete when all the components of the work are complete. The completion certificate of the composite work shall be recorded by Engineer-in-Charge of major component after record of completion certificate of all other components.
- 18.1.12B Final bill of whole work shall be finalized and paid by the EE of major component. Engineer(s) in charge of minor component(s) will prepare and pass the final bill for their component of work and pass on the same to the EE of major component for including in the final bill for composite contract.
19. **Integrity Pact:** The contractor shall download the Integrity Pact, which is a part of tender documents, affix his signature in the presence of a witness, and upload the same while submitting online bids for all works of estimated cost put to tender equal or more than the threshold value given in Schedule-F. In the event of his failure to sign and upload the Integrity Pact along with other bid documents, his bid shall be rejected.
20. The e-Tenders invited under TWO COVER system on <https://eprocure.gov.in/eprocure/app> , the 1st (first) ELECTRONIC COVER will be named as ELIGIBILITY BID/QUALIFYING DOCUMENTS & will contain documents of bidder's satisfying the eligibility conditions and 2nd (SECOND) ELECTRONIC COVER will be named as Financial Bid Cover containing TENDER DOCUMENT and WORK SCHEDULE and Performa for quoting the percentage. The bidder shall submit both the covers simultaneously. The TECHNICAL BID/QUALIFYING DOCUMENTS (1stcover) will be evaluated first and thereafter FINANCIAL BID (2ndcover) of eligible bidders shall only be opened. The time and date of opening of financial bid of contractors qualifying the eligibility/technical bid shall be communicated to them later. These envelopes shall contain one set of the following documents:

COVER 1 (QUALIFYING DOCUMENTS) shall contain the documents as below:

i	Scanned copy of Treasury Challan/ Demand Draft / Pay Order or Banker's Cheque / Fixed Deposit Receipts/ Deposit at Call Receipt / Bank Guarantee including e- Bank Guarantee(for balance amount as prescribed) of any scheduled bank against EMD as prescribed/Scanned copy of unique transaction reference (UTR) of RTGS/NEFT in case the earnest money has been deposited through RTGS/NEFT in the Account of tender inviting division.
ii	Copy of receipt for deposition of original EMD to division office of any Executive Engineer (Civil)/(Electrical) [including NIT issuing EE] Postal Civil Division. OR an Undertaking that 'this document is not required' if earnest money has been deposited through RTGS/NEFT in Account of tender inviting division.
iii	Copy of Enlistment Order .
iv	GST registration Certificate , if already obtained by the bidder. If the bidder has not obtained GST registration as applicable, then he shall scan and upload following under taking along with other bid documents. <i>"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 the Department, whichever is earlier, failing which I/We shall be responsible for any delay in payments which will be due towards me/us on a/c of the work executed and/or for any action taken by the department or GST department in this regard."</i>

b) COVER-2 (FINANCIAL BID) ENVELOPE shall contain

I	Tender Document in pdf format (XXXXX.pdf file) digitally signed.
II	Excel file (Performa for quoting percentage) inxlsx format (XXXXX.xlsx) file duly filled & digitally signed as per as per requirements of e-procurement module.

21. Receipt of deposition of original EMD Receipt No. _____ dated _____	
Name of work	Civil and Electrical repair and Maintenance of IQ Basavanagudi HO, Bengaluru South Division - 560004
Estimate Cost	Rs. 9,93,825/- (Civil: Rs. 7,75,280/- + Elect: 2,18,545/-)
Amount of Earnest Money Deposit	Rs. 19,877/-
Last date of submission of bid	19.05.2026 at 15.00 hrs
Date and Time of opening of Bid	20.05.2026 at 15.30 hrs
Time	03 (Three months) 90 days.

Executive Engineer (Civil)
Postal Civil Division,
Bengaluru

SECTION –I: BRIEF PARTICULARS OF THE WORK

1. Salient features of the work for which bids invited are as under:

Sl. No.	Name of Work	Estimated Cost	Period of completion
1.	Civil and Electrical repair and Maintenance of IQ Basavanagudi HO, Bengaluru South Division - 560004	Rs. 9,93,825/- (Civil: Rs. 7,75,280/- + Elect: 2,18,545/-	90 (Ninety) days

2. The work is situated at **state** under the jurisdiction of Executive Engineer (Civil) Postal Civil Division, **Bengaluru**

3. **Drawings and Technical Specification:-** Following provisions have been made in this detailed estimate:- **Electrical works :-**

- (i) Wiring, Fan and Fittings
- (ii) Counter Signages.
- (iii) Panel, MCB DB, cables, Earthing and Lightning arrestor.
- (iv) Compound and gate light
- (v) LAN
- (vi) CCTV
- (vii) Manual Fire alarm System
- (viii) Fire Fighting System
- (ix) Pump Set
- (x) UPS Backup
- (xi) Fire Extinguisher
- (xii) Solar PV
- (xiii) Silent DG Set etc

SECTION – II: INFORMATION AND INSTRUCTIONS FOR BIDDERS (REGARDING FILLING AND SUBMISSION OF VARIOUS ELIGIBILITY BID DOCUMENTS SPECIFIED HEREINAFTER)

1.0 GENERAL:

1.1 Letter of transmittal and forms for deciding eligibility are given in **Section – III.**

1.2 All information called for in the enclosed forms should be furnished against the relevant columns in the forms. If for any reason, information is furnished on a separate sheet, this fact should be mentioned against the relevant column. Even if no information is to be provided in a column, a **“nil” or “no such case”** entry should be made in that column. If any particulars / query is not applicable in case of the bidder, it should be stated as **“not applicable”**. The bidders are cautioned that not giving complete information called for in the application forms or not giving it in clear terms or making any change in the prescribed forms or deliberately suppressing the information may result in the bidder being summarily disqualified. **Bids made by telegram or telex and those received late will not be entertained.**

1.3 The bid should be type-written. The tenderer should sign each page of the application.

1.4 Overwriting should be avoided. Correction, if any, should be made by neatly crossing out, initialing, dating and rewriting. Pages of the eligibility criteria document are numbered. Additional sheets, if any added by the contractor, should also be numbered by him. They should be submitted as a package.

1.5 References, information and certificates from the respective clients certifying suitability, technical knowledge or capability of the tenderer should be signed by an officer not below the rank of Executive Engineer or equivalent.

1.6 The bidder may furnish any additional information which he thinks is necessary to establish his capabilities to successfully complete the envisaged work. He is, however, advised not to furnish superfluous information. No information shall be entertained after submission of eligibility criteria document unless it is called for by the Employer.

2.0 DEFINITIONS

2.1 In this document the following words and expressions have the meaning hereby assigned to them:

2.2 **Employer:** Means the President of India, acting through the Executive Engineer (Civil), Postal Civil Division,

2.3 **Contractor/ Bidder/ Agency/ Firm/ Applicant:** Means the individual, proprietary firm, firm in partnership, limited company private or public or corporation.

2.4 **Year:** means "Financial Year" unless stated otherwise.

3.0 METHOD OF APPLICATION

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

3.2 If the bidder is a proprietary firm, the application shall be signed by the proprietor above his full typewritten name and the full name of his firm with its current address.

3.3 If the bidder is a firm in partnership, the application shall be signed by all the partners of the firm above their full typewritten names and current addresses, or, alternatively, by a partner holding power of attorney for the firm. In the later case a certified copy of the power of attorney should accompany the application. In both cases a certified copy of the partnership deed and current address of all the partners of the firm should accompany the application.

3.4 If the bidder is a limited company or a corporation, the application shall be signed by a duly authorized person holding power of attorney for signing the application accompanied by a copy of the power of attorney. The bidder should also furnish a copy of the Memorandum of Articles of Association duly attested by a Public Notary.

4.0 FINAL DECISION MAKING AUTHORITY

The Employer reserves the right to accept or reject any application and to annul the Eligibility Criteria process and reject all applications at any time, without assigning any

reason or incurring any liability to the bidders.

5.0 PARTICULAR PROVISIONAL

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

6.0 SITE VISIT

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

7.0 ONE BID PER BIDDER

Each bidder shall submit only one bid for the work. A bidder who submits or participates in more than one bid (other than as a sub contractor or in cases of alternatives that have been permitted or requested) will cause all the bids with the Bidder's participation to be disqualified.

8.0 COST INCURRED FOR PREPARATION OF BID

The bidder shall bear all costs associated with the preparation and submission of his bid, and this office shall in no case be responsible and liable for those costs.

9.0 AMENDMENT OF BIDDING DOCUMENTS

This office may modify the bidding documents by issuing addendum, before the dead line for submission of bids.

Any addendum thus issued shall be part of the bidding documents and shall be communicated by way of uploading on the website <https://eprocure.gov.in/eprocure/app>. To give prospective bidders reasonable time to take an addendum into account in preparing their bids, this office shall extend as found necessary the deadline for submission of bids.

10.0 LANGUAGE OF THE BID

All documents relating to the bid shall be in the English language.

11.0 LATE BIDS

Bid received by this office after the deadline prescribed, shall not be opened.

12.0 OPENING OF PRICE BID

After evaluation of applications, a list of sort listed agencies/ post qualified bidders will be prepared. Thereafter, the financial bids of only the qualified and technically accepted bidders shall be opened at notified time, date and place in presence of qualified bidders or their representatives who intend to be present.

The bid shall remain valid for a period of 75 days from the date of opening of Eligibility bid.

AWARD CRITERIA

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

- (a) Amend the scope and value of contract to the bidder.
- (b) Reject any or all the applications without assigning any reason.

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

Signature of Executive Engineer (C)
Postal Civil Division, Bengaluru
For and on behalf of the President of India

FORM 'C': DETAILS OF ELIGIBLE SIMILAR NATURE OF WORKS COMPLETED DURING THE LAST SEVEN YEARS ENDING LAST DAY OF THE MONTH PREVIOUS TO THE ONE IN WHICH TENDERS ARE INVITED.

Sl no.	Name of work/ project and location	Owner sponsoring or organization	Cost of work in crore of rupees	Date of commencement as per contract	Stipulated date of completion	Actual date of completion	Litigation/Arbitration Casespending/ in progresswith details*	Name and address/ telephone number of officer to whom referencemay be made	Remark
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.

* Indicate gross amount claimed and amount awarded by the Arbitrator.

Signature of Bidder (s)

FORM 'D': PERFORMANCE REPORT OF WORKS REFERRED TO IN FORM 'C'

- 1.** Name of work/project & location :
- 2.** Scope of Work :
- 3.** Agency/ Organization :
- 4.** Agreement no. :
- 5.** Estimated cost :
- 6.** Tendered cost :
- 7.** Actual Amount of work done :
- 8.** Date of start :
- 9.** Date of completion
- (i) Stipulated date of completion
- (ii) Actual date of completion
- 10.**
- (a) Whether case of levy of compensation for delay has been decided or not? : Yes / No
- (b) If decided, amount of compensation levied for delayed completion, if any. :
- 11.** Performance Report :
- (i) Quality of work : Outstanding/Very Good/Good/Poor
- (ii) Financial soundness : Outstanding/Very Good/Good/Poor
- (iii) Technical Proficiency : Outstanding/Very Good/Good/Poor
- (iv) Resourcefulness : Outstanding/Very Good/Good/Poor
- (v) General Behavior : Outstanding/Very good/Good/Poor

Dated:

Executive Engineer or Equivalent

Volume II Of PART-A

Sl. No.	Particulars	Page No.
1.	Percentage rate tender for work (Form CPWD-7)	31-32
2.	Schedule (A to F)	33-38
3.	Appointment of Independent External Monitor (IEM)	39-40
4.	Form of Integrity Pact	41-45

Certified that this tender Document Volume-II of Part 'A' contains pages from 31to 45pages.

Executive Engineer (Civil)
Postal Civil Division,
Bengaluru

Ministry of Communications, Department of Posts(Civil Wing)

STATE: KARNATAKA
BRANCH: Civil

Circle : PCC, Bengaluru
DIVISION: PCD, Bengaluru

COMPOSITE PERCENTAGE RATE e-TENDER & CONTRACT FOR WORKS

Tender for the work of: Civil and Electrical repair and Maintenance of IQ Basavanagudi HO, Bengaluru South Division – 560004 To be submitted/uploaded online by **19.05.2026 on 15.00 hrs** through website <https://eprocure.gov.in/eprocure/app> to **Executive Engineer (C), Postal Civil Division, Bengaluru**

- i) Eligibility bid to be opened online in presence of tenderers who may be present at **15.30 hrs on 20.05.2026** in the office of **Executive Engineer (C), Postal Civil Division, Bengaluru**

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 Quantity and 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 / Special conditions, Designs, Drawings and instructions in writing as referred to in this tender document and with such materials as are provided for, by and in respects in accordance with, such conditions so far as applicable.

We agree to keep the tender open for **(75) Seventy five days** from the date of opening of eligibility bid and not to make any modifications in its terms and conditions.

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 DoP 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 therefrom 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 XX
Witness: XX

Signature of Contractor

Postal Address:

Address: XX

Occupation: - XX

Telephone No.:

Fax:

E-Mail:-

ACCEPTANCE

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

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

- i) XXX
- ii) XXX
- iii) XXX

Signature

Dated: -

Executive Engineer (Civil)
Postal Civil Division,
For & on behalf of the President of India.

XXX To be filled in by the Executive Engineer
XX To be filled in by the contractor

SCHEDULE 'A'

Schedule of quantities - As per Part D of this document

SCHEDULE 'D'

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

1. Special conditions - Page No. **48 to 63** of Part B
2. Particular Specifications. - Page No. **66 to 92** of Part B
3. Annexures - Page No. **93 to 99** of Part B
Form of performance security (Bank Guarantee Bond),
Form of earnest money deposit (Bank Guarantee Bond),
guarantee bond for water proofing/ sanitary installations/
water supply/ for removal of defects in Stone/ tile work
etc.
4. Integrity Pact Page No. **41 to 45** of Part A

SCHEDULE 'E'Reference to General Conditions of contract: General Conditions of Contract (Construction) **2023**
CPWD works amended up to last date of submission of bids as per applicability in DoP.

1.1 *Name of Work:* **Civil and Electrical repair and Maintenance of IQ Basavanagudi HO, Bengaluru South Division - 560004**

1.2 *Estimated Cost of work* Rs.9,93,825/-

- (i) For Civil component : **Rs.7,75,280/-**
(ii) For Electrical (E&M) component: : Rs. 2,18,545/-

- 1.3 Earnest Money : Rs.19,877/-
/-(composite)
(To be returned after receiving performance guarantee)

1.4 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 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

- 1.5 Security Deposit : 2.50% of tendered value
(However, performance guarantee @ 2.50% shall be retained as security deposit after completion of the work.)

SCHEDULE 'F':-**General Rules & Directions:-**

Officer Inviting Tender

Executive Engineer(C), Postal Civil Division,
Bengaluru – 560 032

Maximum percentage for quantity of items of
work to be executed beyond which rates are
to be determined in accordance with
Clauses 12.2 & 12.3/12.2(C)

See below under Clause-12

Definitions:-

2(i) Engineer-In-Charge	Executive Engineer (C), PCD, Bengaluru for Civil component and Executive Engineer (E), PED, Bengaluru for Electrical component.
2(ii) Accepting Authority	Superintending Engineer (C), PCC, Bengaluru.
2(iii) Percentage on cost of materials and labour to cover all overheads and profits	15%
2(iv) Standard Schedule of Rates	Delhi Schedule of Rates 2023 (Civil) and DSR 2022/2025 (Electrical) with upto date correction slips
2(v) Department	Department of Posts
2(vi) Standard CPWD Contract Form	GCC 2023 and CPWD Form 7 as amended/ modified up to the last date of submission of bids as applicable in DoP.

Clause-1:

- | | |
|--|----------------|
| (i) Time allowed for submission of Performance guarantee, programme chart (Time and Progress) and applicable labour licenses, registration with EPFO, ESIC and BOCW Welfare Board or proof of applying thereof from the date of issue of letter of acceptance. | 10 days |
| (ii) Maximum allowable extension with late fee @0.1% per day of the performance guarantee amount beyond the period provided in (i) above | 7 days |

Clause-2:

Authority for fixing compensation: Superintending Engineer (C), Postal Civil Circle, Bengaluru

Clause-5:

Number of days from the date of issue of letter of acceptance for reckoning date of start 10 days

Reference to Mile Stones Refer Para (A) Table of Milestones at **Page Nos. 44 of Part A**

Time allowed for execution of work .

Authority to decide

- | | |
|--|---|
| i. Authority to convey the decision of shifting of Milestone and Extension of time | Executive Engineer (Civil),
Postal Civil Division, Bengaluru |
| ii. Authority decide rescheduling of Milestone and Extension of time | Superintending Engineer (Civil)
Postal Civil Circle, Bengaluru |
| iii. Shifting of date of start in case of delay in handing over of site. | Superintending Engineer (Civil)
Postal Civil Circle, Bengaluru |

Schedule of handing over of site:

Part	Portion of site	Description	Time Period for handing over reckoned from
------	-----------------	-------------	--

			date of issue of letter of intent.
Part A	Portion without any hindrance	Whole site is available	7 Days
Part B	Portions with encumbrances		NIL
Part C	Portions dependent on work of other agencies		NIL

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.

Clause-7A:-

Regarding applicability of labour laws:
Related to Labour licensee, registration of
contractor with EPFO, ESIC and BOCW
welfare board i/c Provident Fund

Yes, Applicable

No running account bill shall be paid in the work till the applicable labour licenses, registration with EPFO, ESIC, BOCW welfare board i/c Provident Fund Code No. if applicable whatever applicable are submitted by the contractor to the Engineer-in-charge.

Clause 8 A

Authority to decide compensation on account if
Contractor fails to submit completion plan.

Superintending Engineer (Civil), Postal Civil Circle, Bengaluru.

Clause-10A:-

List of testing equipment to be
provided by the contractor at site lab.

Refer particular specifications (Civil)
At Page No. **100-102** of Part- B.

Clause-10-B (ii):-

Whether clause 10-B (ii) shall be applicable

Not Applicable

Clause-10C:-

Component of labour expressed as percent of value of work

25 %

Clause 10 CA: -

Deleted

Materials covered under this clause:	Nearest material (other than cement, reinforcement bars and structural steel) for which All India Whole sale Price Index to be followed	Base Price of the materials covered under 10 CA (<u>***</u> (Month), Year)**
1. *Cement	- -	PPC = <u>***</u> / Per MT* OPC = <u>***</u> / Per MT*
2. Reinforcement bars a) Primary producers	- —	<u>***</u> / Per MT**
3. Structural Steel (Primary producers only) RSJ / Channel sections MS Angles / Flats / steel plates:	- —	<u>***</u> / Per MT**

*Includes Cement component used in RMC brought at site from outside approved RMC plants, if any

** The rates taken are FOR at manufacturer's yard nearest to the work site exclusive of all taxes i.e. **GST** etc. and carriage.

*** To be filled by the Executive Engineer (C)

Clause-10-CC:-

Component of Materials of Civil work (except materials covered under clause 10CA)

Not Applicable.

Xm= 75% Less actual value of cement, reinforcement and structural steel

construction value of work
 Component of Labour expressed as %age
 of total value of Civil work
 Component of POL expressed as %age of total
 value of Civil work

actually consumed in construction (on
 which 10 CA is applicable)
 Y= 25%
 Nil %

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

C.P.W.D. Specifications **2019 Vol. I & II** with correction slips issued upto last date of submission of bids & relevant BIS Codes.

Clause 12:-

Authority to decide deviation upto **1.5 times** of tendered Amount

Chief Engineer-II, Dak Bhawan, New Delhi

12.2 & 12.3/12.2(C) :Deviation limit beyond which clause 12.2 & 12.3/12.2(c) shall apply for building work in super structure.

No limit

12.3

(i) Deviation limit beyond which clause 12.2 & 12.3/12.2(C) shall apply for foundation works (except items mentioned in earth work Sub-Head in DSR and related items)

No limit

(ii) Deviation limit for items in Earth work Sub-head of DSR and related items

No limit

Clause-16:-Competent Authority for deciding reduced rates

For Civil Component: Superintending Engineer (Civil) Postal Civil Circle, Bengaluru
 For Electrical Component: Superintending Engineer(Electrical), Postal Electrical Circle, Bengaluru

Clause 18:-List of mandatory machinery, tools & plants

Refer **PageNo. 101**

Clause 19C Authority to decide penalty for each default

SE(C), PCC, Bengaluru

Clause 19D Authority to decide penalty for each default

SE(C), PCC, Bengaluru

Clause 19G Authority to decide penalty for each default

SE(C), PCC, Bengaluru

Clause 19K Authority to decide penalty for each default

SE(C), PCC, Bengaluru

Clause-25:-

a. Conciliator: Superintending Engineer(C), PCC, Mumbai

b. Arbitrator Appointing Authority: Chief Engineer-II, Dak Bhawan, New Delhi

(iii) Place of arbitration: As per Arbitration & Conciliation Act.

Clause-32:- Requirement of Technical Representative(s) and Recovery Rates (a) For Civil works:

S. No	Requirement of Technical Staff		Minimum experience(Years)	Designation of Technical Staff	Rate of which recovery shall be made from the contractor in the event of not fulfilling provision of Clause 36(i)	
	Qualification	Number			Figures	Words

1	Graduate Engineer or	1	5 (and having experience of one simillar nature of work)	Project manager	Rs. 25,000/- Per month	Rupees Twenty Five thousand per month
	Diploma Engineer(Civil)	1+1	2 or 5 respectively	Project Planning/quality/billing engineer	Rs. 15,000/- Per month Per person	Rupees Fifteen thousand per month per person

Assistant Engineers retired from Government Services that are holding Diploma will be treated at par with Graduate Engineers.

Diploma holder with minimum 10 years relevant experience with a reputed construction company can be treated at par with Graduate Engineers for the purpose of such deployment subject to the condition that such diploma holders should not exceed 50% of requirement of degree engineers.

Clause-38-

- i) a) Schedule / Statement for determining theoretical quantity of cement & bitumen As per **Delhi Schedule of Rates 2023** with amendments 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 not more than Rs. 25 lakh. 3% plus/minus.
- For works with estimated cost put to tender more than Rs. 25 lakh. 2% plus/minus.
- b) Bitumen for all work. 2.5% Plus only and NIL on minus side.
- c) Steel Reinforcement and structural steel sections for each diameter, section and category. 2% plus/minus.
- d) All other materials. Nil.

Provision of Independent External Monitors

- (i) Threshold value (Estimated cost put to tender) at and above which Integrity Pact would be applicable **Rs. 3.00 crore**.
- (ii) Particulars of IEMs appointed: **

**The present names and addresses of IEMs are given below.

S.NO	Name of IEM	ADDRESS
1	Shri Raj Kumar Singh, IRS (Retd.)	Ex-Member, Customs Excise and Service Tax Appellate Tribunal, New Delhi, 26 Cassia Marg, DLF-2, Gurgaon – 122008, Tel. No. 0124 – 4241100, Email id - mrrajksingh@gmail.com
2	Shri Animesh Chauhan	Former MD & CEO of Oriental Bank of Commerce, Flat No. 948, G Block, 6 th Avenue, Gaur City 1, Sector- 4, Greater Noida (West), UP - 201009, Email id – animeshchauhan7185@gmail.com

TABLE OF MILESTONE (S)**Name of work:**

Time Period allowed for Completion of Work: - .

S.No.	Milestone Programme	Time Allotted (From date of start)	Amount to be withheld in case of non-achievement of milestone.
1.	1/8 th (of the Tendered Amount)	1/4 th (of the whole period)	In the event of not achieving the necessary progress as assessed from the running payments, 1.25% of the tendered value of the work will be withheld for the failure of each milestone.
2.	3/8 th (of the Tendered Amount)	1/2 th (of the whole period)	
3.	3/4 th (of the Tendered Amount)	3/4 th (of the whole period)	
4.	Full Amount	Days	

Following changes may be read in the General Conditions of Contract (GCC):

This NIT has been prepared on forms approved and published by DG (Works), CPWD, New Delhi. This work relates to Department of Posts. The word CPWD where it refers to Department may be read as Department of Posts.

Except in:- In the following places and clauses where no modifications are intended:-

- i) CPWD safety code.
- ii) Clause 11, 19B, 19C, 19G and 19K.
- iii) Model rules for protection of health and sanitary arrangement for works employed by CPWD or its contractors.
- iv) Central Public Works Department Contractor's Labour Regulations.
- v) CPWD – Delhi Schedule of Rates and Specifications.

All reference to:-

- i) Additional DG/Special DG of CPWD
- ii) CPWD/Public Works Department.
- iii) Administrative Head of CPWD
- iv) Chief Engineer, CPWD
- v) CPWD Circle &
- vi) Ministry of Urban Development.

In various clauses shall be taken to mean:-

- i) Chief Engineer (Civil), Department of Posts
- ii) Department of Posts- Civil Wing
- iii) Administrative Head of Department of Posts
- iv) Chief Engineer (C), Department of Posts
- v) Postal Civil Circle
- vi) Ministry of Communications, Department of Posts

GUIDELINES REGARDING APPOINTMENT OF INDEPENDENT EXTERNAL MONITOR IN DEPARTMENT OF POSTS (Vide No. 77/60/2023-GA-DOP (e.F.No. 3128854) dated 21.03.2024))

Clarification regarding appointment of Independent External Monitor in Department of Posts

Department of Posts has conveyed the approval to appoint following officers as Independent External Monitor (IEM) in the Department of Posts.

1. Shri Raj Kumar Singh, IRS (Retd.), Ex-Member, Customs Excise and Service Tax Appellate Tribunal, New Delhi, 26 Cassia Marg, DLF-2, Gurgaon – 122008, Tel. No. 0124 – 4241100, Email id - mrrajksingh@gmail.com
2. Shri Animesh Chauhan, Former MD & CEO of Oriental Bank of Commerce, Flat No. 948, G Block, 6th Avenue, Gaur City 1, Sector- 4, Greater Noida (West), UP- 201009, Email id – animeshchauhan7185@gmail.com

The Scope of Work for IEMs in the Department shall be as under:-

- i. Independent External Monitor (IEM) shall oversee the implementation of Integrity Pact in the RFPs / Tenders floated by Department of Posts including all administrative and field offices.
- ii. The particulars of all Independent External Monitors engaged in the Department of Posts shall be mentioned in the RFPs / Tenders with estimated value of more than Rs. 03 Crores where implementation of Integrity Pact with prospective bidders has been made mandatory by Department of Posts. In cases where tenders have already been issued. The details shall be intimated to the concerned bidders / vendors forthwith before signing of the pre-Contract Integrity Pact. In case, the Pact has already been signed, the concerned bidders / vendors shall be suitably apprised at the earliest by the concerned officer.
- iii. The IEMs shall review independently and objectively whether and to what extent the parties comply with the obligations under the Integrity Pact. They shall not be subject to instructions by the representatives of the parties and perform their functions neutrally and independently.
- iv. The IEMs shall have the right to access all the documents relating to the project / procurement, including minutes of the Meetings.
- v. The IEMs shall have the right to access without restrictions all Tender / Project documentation of the Buyer (Department of Posts) including that provided by the Bidders/Vendors. They shall also have unrestricted and unconditional access to Tender / Project documentation of bidders / sub-contractors on request and demonstration of valid interest. However, IEMs shall be under contractual obligation to treat the information and documents of the bidder sub-contractor(s) with confidentiality.
- vi. The IEMs shall be provided sufficient information about all meetings among the parties related to the Project provided such meetings could have an impact on the contractual relations between the parties. The parties shall offer the IEMs the option to participate in such meetings.
- vii. The IEMs shall inform the Authority designated by the Department if IEM notices, or has reason to believe a violation of the Integrity Pact.
- viii. The IEMs shall submit a detailed written report to Secretary (Posts) within 8 to 10 weeks from the date of reference or intimation / complaint given to them by the Department or Bidders / Vendors. The IEM, should the occasion arise, shall submit proposals for correcting problematic situations.

Procedure to be adopted by IEMs: The procedure for examination of the references received from the Department or Bidders/Vendors shall be as follows:

- i. The decision of the Competent Authority with regard to NITs/RFPs/ Projects will be posted on the website of the Central Public Procurement Portal, GeM and/or Department of Posts and will also be communicated to the Bidders/Vendor either electronically and/or physically whose proposal are not selected / approved to give them an opportunity to make representation if any, to the tender inviting authority within 15 days from the date of the posting on the website or issue of the letter.
- ii. A decision by the Competent Authority on such representation will be taken within 15 days of receipt of the representation. If the application is found with merit, it will be referred to the nominated IEM.
- iii. The IEM, with reference to the representations sent by the Competent Authority or received directly from Bidders / Vendors, will re-examine the records of the case and hear the concerned officers / applicants and submit the report to Competent Authority.
- iv. The Report of the IEM on the representation by the Bidders / Vendors will be placed before the Competent Authority for consideration and appropriate decision will be taken within a period of 30 days. The decision of Competent Authority shall be final on the representation.
- v. The opportunity to submit representation will be given against the decision of the Tender Evaluation Committee / Competent Authority regarding the non- selection of the Tender / Project of the Bidders / Vendors. This mechanism will not be available during the implementation phase of the Tender / Project.

INTEGRITY PACT

(Integrity Pact is applicable for all works of estimated cost put to tender equal to or more than the threshold value given in Schedule-F)

This Integrity Pact is made at on this day of 20.....

BETWEEN

President of India represented by the Executive Engineer (C), Postal Civil Division (Hereinafter referred to as the 'Principal/owner', which expression shall unless repugnant to the meaning or context hereof include its successors and permitted assignees)

AND

.....
(Name and address of the bidder)

(Hereinafter referred to as the Bidder/Contractor and which expression shall unless repugnant to the meaning or context hereof include its successors and permitted assignees)

Preamble

WHEREAS the Principal has floated the tender (NIT No.) (hereinafter referred to as the Tender) and intend to award, under laid down organizational procedure, (Name of work) hereinafter referred to as the Contract.

AND WHEREAS the Principal values full compliance with all relevant laws of the land, rules, regulations, economic use of resources and of fairness/transparency in its relation with its Bidder(s) and Contractor(s).

AND WHEREAS to meet the purpose aforesaid both the parties have agreed to enter into this Integrity Agreement (hereinafter referred to as Integrity Pact), the terms and conditions of which shall also be read as integral part and parcel of the Tender/Bid documents and Contract between the parties.

In order to achieve these goals, the Principal will appoint Independent External Monitors (IEMs) who will monitor the tender process and the execution of the contract for compliance with the principles mentioned hereunder.

NOW, THEREFORE, in consideration of mutual covenants contained in this Pact, the parties hereby agree as follows and this Integrity Pact witnesses as under:

Articles

Article1:CommitmentofthePrincipal

- (1) The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:
 - (a) No employee of the Principal, personally or through any of his/her family members, will in connection with the Tender, or the execution of the Contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.
 - (b) The Principal will, during the Tender process, treat all Bidder(s) with equity and reason. The Principal will, in particular, before and during the Tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential/ additional information through which the Bidder(s) could obtain an advantage in relation to the Tender process or the Contract execution.
 - (c) The Principal shall endeavour to exclude from the Tender process any person, whose conduct in the past has been of biased nature.
- (2) If the Principal obtains information on the conduct of any of its employees which is a criminal offence under the Indian Penal code (IPC)/Prevention of Corruption Act, 1988 (PC Act) or is in violation of the principles herein mentioned or if there be a substantive suspicion in this regard, the Principal will inform the Chief Vigilance Officer and in addition can also initiate disciplinary actions as per its internal laid down policies and procedures.

Article2:CommitmentoftheBidder(s)/Contractor(s)

1. It is required that each Bidder/Contractor (including their respective officers, employees and agents) adhere to the highest ethical standards, and report to the Government / Department all suspected acts of fraud or corruption or Coercion or Collusion of which it has knowledge or becomes aware, during the tendering process and throughout the negotiation or award of a contract.
2. The Bidder(s)/Contractor(s) commits himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the Tender process and during the Contract execution:
 - (a) The Bidder(s)/Contractor(s) will not, directly or through any other person or firm, offer, promise or give to any of the Principal's employees involved in the Tender process or execution of the Contract to any third person any material or other benefit which he/she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the Tender process or during the execution of the Contract.
 - (b) The Bidder(s)/Contractor(s) will not enter with other Bidder(s) into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to cartelize in the bidding process.
 - (c) The Bidder(s)/Contractor(s) will not commit any offence under the relevant IPC/PC Act. Further the Bidder(s)/Contractor(s) will not use improperly, (for the purpose of competition or personal gain), or pass on to others, any information or documents provided by the Principal/Owner as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.
 - (d) The Bidder(s)/Contractor(s) of foreign origin shall disclose the names and addresses of agents/ representatives in India, if any. Similarly Bidder(s)/Contractor(s) of Indian nationality shall disclose names and addresses of foreign agents/representatives, if any. Either the Indian agent on behalf of the foreign principal or the foreign principal directly could bid in a tender but not both. Further, in cases where an agent participates in a tender on behalf of one manufacturer, he shall not be allowed to quote on behalf of another

manufacturer along with the first manufacturer in a subsequent/parallel tender for the same item.

- (e) The Bidder(s)/Contractor(s) will, when presenting his bid, disclose any and all payments he has made, is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the Contract.
 - (f) Bidder(s) / Contractor(s) who have signed the Integrity Pact shall not approach the courts while representing the matter to IEMs and shall wait for their decision in the matter.
- 3. The Bidder(s)/Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.
 - 4. The Bidder(s)/Contractor(s) will not, directly or through any other person or firm indulge in fraudulent practice, willful misrepresentation or omission of facts or submission of fake/forged documents in order to induce public official to act in reliance thereof, with the purpose of obtaining unjust advantage by or causing damage to justified interest of others and/or to influence the procurement process to the detriment of the Government interests.
 - 5. The Bidder(s)/Contractor(s) will not, directly or through any other person or firm use coercive practices (which shall include the act of obtaining something, compelling an action or influencing a decision through intimidation, threat or the use of force directly or indirectly, where potential or actual injury may befall upon a person, his/her reputation or property) to influence their participation in the tendering process.

Article 3: Consequences of Breach

Without prejudice to any rights that may be available to the Principal under law or the contract or its established policies and laid down procedures, the Principal shall have the following rights in case of breach of this Integrity Pact by the Bidder(s)/Contractor(s) and the Bidder/Contractor accepts and undertakes to respect and uphold the Principal absolute right:

- 1. If the Bidder(s)/Contractor(s), either before award or during execution of Contract has committed a transgression through a violation of Article 2 above or in any other form, such as to put his reliability or credibility in question, the Principal after giving 14 days' notice to the contractor shall have powers to disqualify the Bidder(s)/Contractor(s) from the Tender process or terminate/determine the Contract, if already ready executed or exclude the Bidder/Contractor from future contract award processes. The imposition and duration of the exclusion will be determined by the severity of transgression and determined by the Principal. Such exclusion may be forever or for a limited period as decided by the Principal.
- 2. Forfeiture of Earnest Money Deposit/Performance Guarantee/Security Deposit: If the Principal has disqualified the Bidder(s) from the Tender process prior to the award of the Contract or terminated/determined the Contract or has accrued the right to terminate/determine the Contract according to Article 3(1), the Principal apart from exercising any legal rights that may have accrued to the Principal, may in its considered opinion forfeit the entire amount of Earnest Money Deposit/Performance Guarantee and Security Deposit of the Bidder/Contractor.
- 3. Criminal Liability: If the Principal obtains knowledge of conduct of a Bidder or Contractor, or of an employee or representative or an associate of a Bidder or Contractor which constitutes corruption within the meaning of PC Act, or if the Principal has substantive suspicion in this regard, the Principal will inform the same to law enforcing agencies for further investigation.

Article 4: Previous Transgression

- 1. The Bidder declares that no previous transgressions occurred in the last 3 years with any other Company in any country confirming to the anticorruption approach or with Central Government or State Government or any other Central/State Public Sector Enterprises in India that could justify his exclusion from the tender process.

2. If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or action can be taken for banning of business dealings/holiday listing of the Bidder/Contractor as deemed fit by the Principal.
3. If the Bidder/Contractor can prove that he has resorted/recouped the damage caused by him and has installed a suitable corruption prevention system, the Principal may, at its own discretion, revoke the exclusion prematurely.

Article 5: Equal Treatment of all Bidders/Contractors/Subcontractors

1. The Bidder(s)/Contractor(s) undertake(s) to demand from all subcontractors a commitment in conformity with this Integrity Pact. The Bidder/Contractor shall be responsible for any violation(s) of the principles laid down in this agreement by any of its Subcontractors/sub-vendors.
2. The Principal will enter into pact on identical terms as this one with all Bidders and Contractors
3. The Principal will disqualify Bidders who do not submit the duly signed Integrity Pact between the Principal and the Bidder along with the Tender or violate its provisions at any stage of the Tender process.

Article 6: Duration of the Pact

This Integrity Pact begins when both the parties have legally signed it. It expires for the Contractor 12 months after the completion of work under the contract or expiry of defect liability period or last payment made under the contract, whichever is later and for all other bidders, 6 months after the Contract has been awarded. If any claim is made/lodged during this time, the same shall be binding and continue to be valid despite the lapse of this Integrity Pact as specified above, unless it is discharged/determined by the **Competent Authority, DoP.**

Article 7: Other Provisions

1. This Integrity Pact is subject to Indian Law, place of performance and jurisdiction is the Headquarter of the Division of the Principal, who has floated the tender.
2. Changes and supplements as well as termination notice need to be made in writing.
3. If the Contractor is a partnership or a consortium, this Integrity Pact must be signed by all the partners or by one or more partner holding power of attorney signed by all partners and consortium members. In case of a Company, the Integrity Pact must be signed by a representative duly authorized by board resolution.
4. Should one or several provisions of this Integrity Pact turn out to be invalid; the remainder of this Pact remains valid. In this case, the parties will strive to come to an agreement to their original intentions.
5. Issues like Warranty/Guarantee etc. shall be outside the purview of IEMs.
6. It is agreed term and condition that any dispute or difference arising between the parties with regard to the terms of this Integrity Pact, any action taken by the Principal in accordance with this Integrity Pact or interpretation thereof shall not be subject to arbitration.
7. In view of the nature of integrity pact, the Integrity Pact is irrevocable and shall remain valid even if the main tender/contract is terminated till the currency of the integrity pact.
8. If any complaint regarding violation of IP is received directly by the Principal in respect of the contract, the same shall be referred to the IEM for comments/recommendations.

Article 8: Independent External Monitor (IEM)

1. The Principal appoints competent and credible Independent External Monitor for this Pact after approval by Central Vigilance Commission (Names and address of IEMs are as mentioned in Schedule-F). The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.
2. The Monitor is not subject to instructions by the representatives of the parties and performs his/her functions neutrally and independently. The Monitor would have access to all contract documents, whenever required. It will be obligatory for him/her to treat the information and documents of the Bidders / Contractors as confidential.
3. The Bidder(s)/Contractor(s) accepts that the IEM has the right to access without restriction to all

project documentation of the Principal including that provided by the Contractor, The Contractor will also grant the IEM, upon his/her request and demonstration of a valid interest, unrestricted and unconditional access to their project documentation. The same is applicable to sub-contractors.

4. The IEM is under contractual obligation to treat the information and documents of the Bidder(s)/Contractor(s)/ Sub-contractor(s) with confidentiality. The IEM has also signed 'Non-Disclosure of Confidential Information' and 'Absence of Conflict of Interest'. In case if any conflict of interest arising at a later date, the IEM shall inform the Engineer-in-Charge and recuse himself / herself from that case.
5. As soon as the IEM notices, or believes to notice, a violation of this agreement, he/she will so inform the Management of the Principal and request the Management to discontinue or take corrective action, or to take other relevant action. The IEM can in this regard submit non-binding recommendations. Beyond this, the IEM has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.
6. The IEM will submit a written report to the Competent Authority, DoP within 8 to 10 weeks from the _____ date _____ of reference or intimation to him by the Principal and, should the occasion arise, submit proposals for correcting problematic situations.
7. If the IEM has reported to the Competent Authority, DoP, a substantiated suspicion of an offence under relevant IPC/PC Act, and the Competent Authority, DoP has, within a reasonable time, not taken visible action to proceed against such offence or reported it to the Chief Vigilance Officer, the IEM may also transmit this information directly to the Central Vigilance Commissioner.
8. The Principal will provide to the IEM sufficient information about all meetings among the parties related to the project provided such meetings could have impact on contractual relations between _____ the _____ Principal _____ and the contractor. The parties will offer to the IEM the option to participate in such meetings.
9. The word IEM or monitor would include both singular and plural.

Article 9- Legal and Prior Rights

All rights and remedies of the parties hereto shall be in addition to all the other legal rights and remedies belonging to such parties under the Contract and/or law and the same shall be deemed to be cumulative and not alternative to such legal rights and remedies aforesaid. For the sake of brevity, both the Parties agree that this Integrity Pact will have precedence over the Tender/Contact documents with regard to any of the provisions covered under this Integrity Pact.

IN WITNESS WHEREOF the parties have signed and executed this Integrity Pact at the place and date first above mentioned in the presence of following witnesses:

.....

(For and on behalf of Principal)

.....

(For and on behalf of Bidder/Contractor)

WITNESSES:

1
(signature, name and address)

2
(signature, name and address)

Place:

Dated:

Note: To be signed by the Bidder and the Engineer-in-Charge.

PART-B: CIVIL COMPONENT

INDEX - PART B

Name of work: Civil and Electrical repair and Maintenance of IQ Basavanagudi HO, Bengaluru
South Division - 560004

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Certified that this part of document i.e. Part B contains pages from ~~48 to 106.~~

Executive Engineer (Civil)
Postal Civil Division,
Bengaluru

1.0 General

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

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

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

- (i) Description of Schedule of Quantities
- (ii) Particular Specifications and Special Conditions, if any.
- (iii) Drawings
- (iv) CPWD Specifications.
- (v) Indian Standard Specifications of B.I.S.
- (vi) Manufacturers' specifications & as decided by Engineer-in-charge.

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

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

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

- i. Preparation of detailed SHOP drawings and AS BUILT drawings wherever applicable.
- ii. Obtaining of Statutory permissions where-ever applicable and required.
- iii. Pre-commissioning tests as per relevant standard specifications, code of practice, Acts and Rules wherever required.
- iv. Warranty obligation for the equipment and/or fittings/fixtures supplied by the contractor.

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

1.2 Any reference made to any Indian Standard Specifications, shall imply to the latest version of that standard, including such revisions / amendments as issued by the Bureau of Indian Standards up-to last date of receipt of tenders. The Contractor shall keep at his own cost all such publications including relevant Indian Standard Codes applicable to the work at site.

1.3 All the hidden items such as water supply lines, drainage pipes, conduits, sewers etc. are to be properly tested before covering.

1.4 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.

1.5 Equipment like concrete pumps excavators/Transit mixers etc. shall be allowed to be moved away from the site when, in written opinion of Engineer-in-Charge, the same are no longer required at site of work.

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

1.7 Contractor(s) shall study the soil investigation report for the site, available in the office of the

- Engineer-in-Charge and satisfy himself about complete characteristics of soil, ground water table and other parameters at site. However, no claim on the alleged inadequacy or incorrectness of the soil data supplied by the department shall be entertained. In the case of excavation in foundation bailing out of the ground water, the contractor shall be liable to make an arrangement for bailing out of ground water met during the excavation of foundation and on this account no extra payment shall be paid.
- 1.8 The tenderer shall see the approaches to the site. In case any approach from main road is required at site or existing approach is to be improved and maintained for cartage of materials by the contractor, the same shall be provided, improved and maintained by the contractor at his own cost.
 - 1.9 Contractor shall take all precautionary measures to avoid any damage to adjoining property. All necessary arrangement shall be made at his own cost.
 - 1.10 The contractor shall take all precautions to avoid accidents by exhibiting necessary caution boards day and night, speed limit boards, red flags, red lights and providing barriers. He shall be responsible for all damages and accidents caused to work due to negligence on his part. No hindrances shall be caused to traffic, during the execution of the work.
 - 1.11 The contractor shall take instructions from the Engineer-in-Charge regarding collection and stacking of materials at any place. No excavated earth or building rubbish shall be stacked on areas where other buildings, roads, compound wall, services etc. are to be constructed.
 - 1.12 The contractor shall provide at his own cost suitable weighing, surveying and leveling and measuring arrangements as may be necessary at site for checking. All such equipment shall be got calibrated in advance from laboratory, approved by the Engineer-in-Charge. Nothing extra shall be payable on this account.
 - 1.13 Contractor shall provide permanent bench marks, flag tops and other reference points for the proper execution of work and these shall be preserved till the end of work. All such reference points shall be in relation to the levels and locations, given in the Architectural and plumbing drawings.
 - 1.14 Water tanks, taps, sanitary, water supply and drainage pipes, fittings and accessories should conform to approved manufacturers specifications where CPWD Specifications are not applicable. The contractor should get the materials (fixtures/fittings) tested from approved labs wherever required at his own cost.
 - 1.15 The work shall be carried out in accordance with the Architectural drawings and Structural drawings, to be issued from time to time, by the Engineer-in-Charge. Before commencement of any item of work, the contractor shall correlate all the relevant architectural and structural drawings issued for the work, nomenclature of items, specifications etc. and satisfy himself that the information available there from is complete and unambiguous. The figures & the written dimensions of the drawing shall supersede the measurement by scale. The discrepancy, if any, shall be brought to the notice of the Engineer-in-Charge for immediate decision before execution of the work. The contractor alone shall be responsible for any loss or damage occurring by the commencement of work on the basis of any erroneous and/ or incomplete information and no claim, whatsoever shall be entertained on this account.
 - 1.16 The contractor should submit the shop drawing of staging and shuttering for approval of Engineer-in-Charge before actually commencing the execution of work under the item. Nothing extra shall be payable on this account.
 - 1.17 Other agencies may also simultaneously execute and install the works and the contractor shall afford necessary facilities for the same. The contractor shall leave such recesses, holes, openings, trenches etc. as may be required for such related works (for which inserts, sleeves, brackets, conduits, base plates, clamps etc. shall be available as specified elsewhere in the contract) and the contractor shall fix the same at the time of casting of concrete, stone work and brick work, if required, and nothing extra shall be payable on this account.
 - 1.18 All material shall only be brought at site as per program finalized with the Engineer-in-Charge. Any pre-delivery of the material not required for immediate consumption shall not be accepted and thus not paid for.
 - 1.19 The contractor shall procure the required materials in advance so that there is sufficient time for testing of the materials and approval of the same before use in the work.
 - 1.20 Existing drains, pipes, cables, over-head wires, sewer lines, water lines and similar services encountered in the course of the execution of work shall be protected against the damage by the contractor at his own expense. The contractor shall not store materials or otherwise occupy any part of the site in a manner likely to hinder the operation of such services. In case temporary supporting of such services is required to facilitate the work, the same shall be done by the contractor at no extra cost.

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

- 1.21 The contractor shall be responsible for the watch and ward / guard of the buildings, safety of all fittings and fixtures including sanitary and water supply fittings and fixtures provided by him against pilferage and breakage during the period of installations and thereafter till the building is physically handed over to the client department. No extra payment shall be made on this account.
- 1.22 The contractor shall be fully responsible for the safe custody of materials brought by him/ issued to him even though the materials may be under double lock key system.
- 1.23 For construction works which are likely to generate malba / rubbish, contractor shall dispose of malba, rubbish & other unserviceable materials and wastes at his own cost to the notified specified dumping ground and under no circumstances these shall be stacked / dumped even temporarily, outside the construction premises.
- 1.24 The rates quoted by the Contractor are deemed to be inclusive of site clearance, setting out work, profile, establishment of reference bench mark(s), taking spot levels, construction of all safety and protection devices, barriers, preparatory works, working during monsoon, working at all depths, height, lead, lift and location etc. until / unless specified otherwise and any other incidental works required to complete this work. Nothing extra shall be payable on this account.
- 1.25 For works below ground level the contractor shall keep that area free from water. If dewatering or bailing out of water is required the contractor shall do it and nothing extra shall be paid except otherwise provided in the items of schedule of quantities.
- 1.26 Results of sub-surface investigations conducted at site are indicated in extracts of the report attached. This information about the soil and sub-soil water conditions is being made available to the Contractor, in good faith, for guidance only and the Contractor is advised to obtain details directly as may be considered necessary by him before quoting rates in the tender. No claim whatsoever on account of any discrepancy between the sub-surface strata conditions that may be actually encountered at the time of execution of the work and those given in these tender documents, in-accuracy or interpretation thereof shall be entertained from the Contractor under any circumstances. The ground water table is a variable condition and the information given in the report is only indicative and it may vary from time to time.
- 1.27 Any legal or financial implications resulting out of disposal of earth shall be sole responsibility of the contractor. Nothing extra over the schedule shall be paid on this account.
- 1.28 The Contractor shall keep himself fully informed of all acts and laws of the Central & State Governments, all orders, decrees of statutory bodies, tribunals having any jurisdiction or authority, which in any manner may affect those engaged or employed and anything related to carrying out the work. All the rules & regulations and bye-laws laid down by Collector / MC etc. and any other statutory bodies shall be adhered to, by the contractor, during the execution of work. The Contractor shall also adhere to all traffic restrictions notified by the local authorities. It is clarified that the extra sewerage charges (one time charges for commencement of work) required to be paid to the Municipal Corporation / other statutory bodies shall be paid by the department and need not be considered by the contractor. The water charges (for municipal water connection as well as tanker water) shall be borne by the contractor. Also, if the contractor obtains water connection for the drinking purposes from the municipal authorities or any other statutory body, the consequent sewerage charges shall be borne by the contractor. All statutory taxes, levies, charges (including water and sewerage charges, charges for temporary service connections and / or any other charges) payable to such authorities for carrying out the work, shall be borne by the Contractor. The Contractor shall arrange to give all notices as required by any statutory / regulatory authority and shall pay to such authority all the fees that is required to be paid for the execution of work. He shall protect and indemnify the Department and its officials & employees against any claim and /or liability arising out of violations of any such laws, ordinances, orders, decrees, by himself or by his employees or his authorized representatives. Nothing extra shall be payable on these accounts. The fee payable to statutory authorities for obtaining the various permanent service connections and Occupancy Certificate for the building shall be borne by the Department.

- 1.29 Royalty at the prevalent rates shall be paid by the Contractor as per the terms of supply between them on all materials such as boulders, metals, sand and bajri etc. collected by him for the execution of the work, directly to the revenue authority of the state government concerned. Nothing extra shall be payable on this account.
- 1.30 No foreign exchange shall be made available by the Department for importing (purchase) of equipment, plants, machinery, materials of any kind or any other items required to be carried out during execution of the work. No delay and no claim of any kind shall be entertained from the Contractor, on account of variation in the foreign exchange rate.
- 1.31 The Contractor shall conduct his work so as not to interfere with or hinder the progress of the work being performed by other Contractors or by the Engineer-in-Charge. As far as possible, he shall arrange his work and place, so as not to interfere with the operations of other Contractors or shall arrange his work with that of the others, in an acceptable and coordinated manner and shall perform it in proper sequence.
- 1.32 The Contractor shall assume all liability, financial or otherwise in connection with this contract and shall protect and indemnify the Department from any and all damages and claims that may arise on any account. The Contractor shall indemnify the Department against all claims in respect of patent rights, royalties, design, trademarks of name or other protected rights, damages to adjacent buildings, roads or members of public, in course of execution of work or any other reasons whatsoever, and shall himself defend all actions arising from such claims and shall indemnify the Department in all respect from such actions, costs and expenses. Nothing extra shall be payable on this account.
- 1.33 The Contractor shall make all necessary arrangements for protecting from rains, the work already executed and for carrying out the further work, during monsoon including providing and fixing temporary shelters, protections etc. Nothing extra shall be payable on this account. Also, no claims for hindrance shall be entertained on this account.
- 1.34 In case of flooding of site on account of rain or any other cause and any consequent damage, whatsoever, no claim financially or otherwise shall be entertained notwithstanding any other provisions elsewhere in the contract agreement. Also, the Contractor shall make good, at his own cost, the damages caused, if any.
- 1.35 The Contractor shall take all necessary precautions to prevent any nuisance or inconvenience to the owners, tenants or occupants of the adjacent properties and to the public in general. The Contractor shall take all care, as not to damage any other adjacent property or other services running adjacent to the plot. If any damage is done, the same shall be made good by the Contractor at his own cost and to the entire satisfaction of the Engineer-in-Charge. The Contractor shall use such methodology and equipment for execution of the work, so as to cause minimum environmental pollution of any kind during construction, to have minimum construction time and minimum inconvenience to road users and to the occupants of the buildings on the adjacent plot and public in general, etc. He shall make good at his own cost and to the entire satisfaction of the Engineer in Charge any damage to roads, paths, cross drainage works or public or private property whatsoever caused, due to the execution of the work or by traffic brought thereon, by the Contractor. Further, the Contractor shall take all precautions to prevent any pollution of streams and waterways. All waste or superfluous materials shall be carted away by the Contractor, entirely to the satisfaction of the Engineer-in-Charge. Utmost care shall be taken to keep the noise level to the barest minimum so that no disturbance as far as possible is caused to the occupants / users of adjoining buildings. No claim what so ever on account of site constraints mentioned above or any other site constraints not specifically stated here, shall be entertained from the Contractor. Therefore, the Contractors are advised to visit site and get first hand information of site constraints. Accordingly, they should quote their tenders. Nothing extra shall be payable on this account.
- 1.36 All ancillary and incidental facilities required for execution of work like labour camp, stores, fabrication yard, offices for Contractor, watch and ward, temporary ramp required to be made for working at the basement level, temporary structure for plants and machineries, water storage tanks, installation and consumption charges of temporary electricity, telephone, water etc. required for execution of the work, liaison and pursuing for obtaining various No Objection Certificates, completion certificates from local bodies etc., protection works, barricading, testing facilities / laboratory at site of work, facilities for all field tests and for taking samples etc. during execution or any other activity which is necessary (for execution of work and as directed by Engineer-in-Charge), shall be deemed to be included in rates quoted by the Contractor, for various items in the schedule of quantities. Nothing extra shall be payable on these accounts. Before start of the work, the Contractor

- shall submit to the Engineer-in-Charge, a site / construction yard layout, specifying areas for construction, site office, positioning of machinery, material yard, cement and other storage, steel fabrication yard, site laboratory, water tank, etc.
- 1.37 The Contractor shall display all permissions, licenses, registration certificates, bar charts, other statements etc under various labour laws and other regulations applicable to the works, at his site office.
- 1.38 No tools and plants including any special T&P etc. shall be supplied by the Department and the Contractor shall have to make his own arrangements at his own cost. No claim of hindrance (or any other claim) shall be entertained on this account.
The Contractor shall be allowed to use the facilities available at site & arranged by the Associate Contractors and other agencies working at site for smooth execution of the work. The Contractor shall be
- (a) Allow to use of scaffolding already erected, toilets, sheds etc.
 - (b) Properly co-ordinate their work with the work of other Contractors.
 - (c) Provide control lines and benchmarks to his associate-Contractors and the other Contractors.
 - (d) Provide electricity and water at mutually agreed rates.
 - (e) Provide hoist and crane facilities for lifting material at mutually agreed rates.
 - (f) Co-ordinate with other Contractors for leaving inserts, making chases, alignment of services etc. at site.
 - (g) Adjust work schedule and site activities in consultation with the Engineer-in-Charge and other Contractors to suit the overall schedule completion.
 - (h) Resolve the disputes with other Contractor amicably and the Engineer-in-Charge shall not be made intermediary or arbitrator. The contractor shall indemnify the Department against any claim(s) arising out of such disputes.
- 1.39 On completion of work, the contractor shall submit at his own cost four prints of "as built" drawings of the completed work to the Engineer-in-Charge. These drawings shall have the following information.
- a) Run off of all piping and their diameters including soil, waste pipes and vertical stacks.
 - b) Ground and invert level of all drainage pipes together with locations of all manholes and connections, up-to out fall.
 - c) Run off of all water supply lines with diameters, location of control valves, access panels etc.
- In case the contractor fails to supply "as built drawing" aforesaid within 30 days of the date of completion, then the recovery @ Rs. 10,000/- for each such set of drawings shall be made from the contractor's final bill.
- 1.40 The contractor shall have to arrange water of desirable quality for the construction purpose for which he may have to install RO plant at site or might have to bring/ purchase water from outside as per decision of Engineer-in-charge. Nothing extra shall be paid on this account. The contractor has to take the water connection from local bodies and pay the charges for the same to the local bodies, if it is mandatory as per statutory laws, even in the case the contractor arranges his own water from other sources.
- 2.0** Unless otherwise specified in the schedule of quantities or CPWD specifications, the rates for respective items shall be all inclusive and apply to the following: -
- (i) All lifts & all heights, floors including terrace, leads and depths.
 - (ii) All labour, material, tools and plants and other inputs involved in the execution of the item.
 - (iii) Any of the conditions and specifications mentioned in the tender documents.
 - (iv) Providing sunk flooring in bath-rooms, kitchen, etc.
 - (v) Any legal or financial implications resulting out of disposal of earth, if any.
 - (vi) Payment of Royalty at the prevailing rates, if any, on the boulders, metal, shingle, sand and bajri etc. or any other material collected by him for the work direct to revenue authorities.
 - (vii) Performance test of the entire installation(s) before the work is finally accepted.
 - (viii) Any cement slurry added over base surface (or) for continuation of concreting for better bond is deemed to have been built in the items.
 - (ix) All incidental charges for cartage, storage and safe custody of materials brought to site.

3.0 QUALITY ASSURANCE/ TESTING OF MATERIALS

3.1 General:-

- 3.1.1 All incidental expenditure on security, construction of cement godown, access roads, arrangement of water, electricity etc. to be incurred by the agency for arranging, installing and operation of Batch Mix Plant shall be deemed to have been included in his quoted rates and no claim whatsoever will be tenable on this account.
- 3.1.2 With each Running Bill, the details of test carried out shall be submitted by the contractor as per Performa at **Page No. 103-104 of Part- B.**
- 3.1.3 Samples of materials required for testing shall be provided free of charge by the contractor. The cost of tests to be carried out on Steel in approved labs shall be borne by the contractor. "All the expenditure to be incurred for testing of the sample eg. Packaging, sealing, transportation, loading, unloading etc. including testing charges shall be borne by the contractor".
- All other expenditure required to be incurred for taking samples; conveyance, packing etc. shall be borne by the contractor himself.
- a) All the test in field lab setup at construction site shall be carried out by the Engineering Staff deployed by the contractor which shall be 100% witnessed by JE & 50% of tests shall be witnessed by AE –in-charge. At least 10% of the tests are to be witnessed by the EE/ SE division office.
- b) All the entries in the registers will be made by the designated Engineering staff of the contractor and same should be regularly reviewed by JE/AE/EE/ division office.
- c) Contractor shall be responsible for safe custody of all the test registers.
- d) Submission of copy of all Test Registers, Material at Site Register and Hindrance Register along with each alternate Running Account Bill and Final Bill shall be mandatory. These registers should be duly checked by AE(P) in Division Office & receipts of registers should also be acknowledged by Accounts Officer by signing the copies and register to confirm receipt in division office
- e) 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. The outside private laboratories shall be short listed before- hand by EE and approval obtained from **Chief Engineer-II** Dak Bhawan, New Delhi. In case of laboratories in the private sector, the past record and reputation of the laboratory must invariably be given due consideration. The infrastructure in these laboratories can also be inspected before they are short listed.
- 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-II** Dak Bhawan, New Delhi or higher officers provided these labs have all necessary facility to carry out the required tests.
- 3.1.4 However, if any ultrasonic pulse velocity/load testing or special testing is to be done for concrete whose strength is doubtful, the cost of the same shall be borne by the contractor.
- 3.1.5 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.
- 3.1.6 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, sealing 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.

3.2 FIELD LABORATORY

The contractor has to establish field laboratory at site including all necessary equipment and skilled manpower for the **Field Tests as at Page No. 100 of Part- B** at his own cost to have proper quality control.

For performing the above tests, the **Field Testing Equipments and Instruments as at Page No.**

101-102 of Part- B are to be arranged and maintained by the contractor.

- 3.2.1 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.
- 3.2.2 The list of Laboratory/ Field equipment referred above are to be arranged and maintained by the contractor at the site of work. In case the equipment required for any test is not available at site, the department shall get the test conducted from the third party. However, in that event, besides providing free materials of sample, the cost of taking of sample, packing, transportation, testing charges etc. shall be borne by the contractor irrespective of the results.
- 3.2.3 The contractor shall establish field laboratory including additional room (of minimum area of 20 sqm. each) for preserving samples of material till the completion of whole work. Nothing extra shall be paid for establishing field laboratory.

3.3 SAMPLE OF MATERIALS:-

- 3.3.1 All materials and fittings brought by the contractor to the site for use shall confirm to the samples approved by the Engineer-in-Charge which shall be preserved till the completion of the work. If a particular brand of material is specified in the item of work in Schedule of Quantity, the same shall be used after getting the same approved from Engineer-in-Charge. Wherever brand / quality of material is not specified in the item of work, the contractor shall submit the samples as per **List of Preferred Makes as at Page No. 105 to 106 of Part B** for approval of Engineer-in-Charge. For all other items, ISI Marked materials and fittings shall be used with the approval of Engineer-in-Charge. Wherever ISI Marked material / fittings are not available, the contractor shall submit samples of materials / fittings manufactured by firms of repute conforming to relevant Specifications or IS codes for the approval of Engineer-in-Charge.
- 3.3.2 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.
- 3.3.3 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 in para 4.0) required on the work shall be got tested, for only important tests, which govern the quality of the product, as decided by the Engineer-in-Charge. The frequency of such tests (except the mandatory test) shall be 5% of the frequency as specified in BIS. For mandatory test, frequency shall be as specified in the CPWD Specifications.
- 3.3.4 For certain items, if frequency of tests is neither mentioned in the CPWD Specifications & BIS, then tests shall be carried out as per decision of Engineer-in-Charge.

4.0 CEMENT & STEEL REINFORCEMENT (TO BE SUPPLIED BY THE CONTRACTOR).

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

4.2 CEMENT:-

- 4.2.1 The contractor shall procure 43 grade ordinary Portland Cement conforming to IS: 8112 / Portland Pozzolana Cement (PPC) conforming to IS: 1489 (Part-1) as required in the work from reputed manufacturers of cement such as ACC, ULTRATECH, VIKRAM, SHREE CEMENT, AMBUJA, JAYPEE CEMENT, CENTURY CEMENT & J.K. CEMENT etc. 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 09.04.2009. However, if the contractor uses higher grade of cement or uses Ordinary Portland Cement (OPC) only nothing extra shall be paid.
- 4.2.2 Samples of cement arranged by the contractor shall be taken by the Engineer-in-Charge and got tested in accordance with provisions of relevant BIS Codes. The cement for such testing purpose shall be supplied by the contractor free of charge. In case test results

indicate that the cement arranged by the contractor does not conform to the relevant BIS Codes, the same shall stand rejected and shall be removed from the site by the contractor at his own cost within a week's time of written order from the Engineer-in-Charge to do so.

"All the expenditure to be incurred for testing of the sample eg. Packaging, sealing, transportation, loading, unloading etc. including testing charges shall be borne by the contractor".

- 4.2.3 Cement shall be brought at site in bulk supply of approximately 100 tonnes or as decided by the Engineer-in-Charge.

- 4.2.4 OPC & PPC bags shall be stored in separate go-downs. Separate go-downs 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 go-down is indicated in the sketches for guidance. The actual size of go-down shall be as per site requirements and nothing extra shall be paid for the same. Each go-down 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 go-down 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 who shall be duly signed by the authorized representative of the Engineer-in-Charge before issue to the work on day to day basis.

Four separate cement go-downs each having capacity of 50 MT or more 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.

- 4.2.5 The actual issue and consumption of cement on work shall be regulated and proper accounts maintained as provided in the contract. The theoretical consumption of cement shall be worked out as per procedure prescribed in Clause-42 of the contract and shall be governed by the conditions laid therein.

- 4.2.6 If the quantity of cement actually used in the work is found to be more than the theoretical quantity of cement including authorized variation, nothing extra shall be payable to the contractor on this account. In the event of it being discovered that after the completion of the work, the quantity of cement used is less than the quantity ascertained as herein before provided (allowing variation on the minus side as stipulated in Clause - 42), 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-II**, Dak Bhawan, New Delhi regarding theoretical quantity of the cement, which should have been actually used, shall be final and binding on the contractor.

- 4.2.7 Cement brought to site and cement remaining unused after completion of work shall not be removed from site without written permission of the Engineer-in-Charge.
- 4.2.8 In case the contractor brings surplus quantity of cement the same shall be removed from the site after completion of work by the contractor at his own cost after approval of the Engineer-in-Charge.
- 4.2.9 Cement, which is not used within 90 days from its date of manufacture, shall be retested at approved laboratory. Until the results of such tests are found satisfactory, it shall not be used on the work.

4.3 SPECIAL CONDITIONS FOR STEEL REINFORCEMENT BARS: -

(Man Circular No.DG/CPWD Works Manual/350 dated 29/06/2017 effective from 01/07/2017.

- 4.3.1 (a) The Contractor shall procure ISI marked TMT bars of various grades from the steel manufacturers or their authorized dealers {as per following selection criteria} having valid BIS license for IS:1786-2008(Amendment -1 November 2012)
The procured steel should have following qualities: -

- i. Excellent ductility, bend ability and elongation of 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 finished product.
- iv. Steel should carry the quality of corrosion and earthquake resistance.
- v. Quality steel with achievement of proper level of Sulphur and phosphorus as per IS: 1786-2008.

(b) Selection Criteria of steel manufacturers

The supply of reinforcement steel for all works should have following selection criteria of steel manufacturers:-

Steel producers of any capacity using iron ore/ processed iron ore as the basic raw material adopting advanced refining technologies as given hereunder,

(i) DRI-EAF = Direct Reduced iron - Electric arc furnace.

or

(ii) BF-BOF = Blast furnace - Basic oxygen furnace

or

(iii) COREX-BOF= COREX- Basic oxygen furnace

for production of liquid steel to finish product at single/multiple locations with NABL or any other similarly placed accrediting Government body which operates in accordance with ISO/IEC17011 and accredits labs as per ISO/IEC 17025 conforming to IS:1786-2008 (Amendment -1 November 2012). The check list for incorporation any quality steel producer is enclosed for technical assessment is given in Annexure-L **Chief Engineer-II** shall approve the steel manufactures for projects under their jurisdiction. NIT approving authority shall specify the manufacturers in the tender document.

IN the absence of any approval from NIT approving authority the steel of Fe500D shall be procured from steel producers such as SAIL, TATA Steel Ltd., RINL, Jindal Steel & Power Ltd., JSW Steel Ltd. In case of approval from NIT approving authority is required for use of any other ISI marked manufacturer/brand of TMT bars, the case should be submitted by the contractor through Engineer-in-Charge within one month of probable date of likely utilization of steel in the work.

- 4.3.2 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.
- 4.3.3 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 specification 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.
- 4.3.4 The steel reinforcement bars shall be brought to the site in bulk supply of 10 tonnes or more, or as decided by the Engineer-in-charge.
- 4.3.5 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.
- 4.3.6 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 100 tonnes	For consignment above 100 tonnes
Under 10 mm dia bars	One sample for each 25 tonnes or part thereof	One sample for each 40 tonnes or part thereof
10 mm to 16 mm dia bars	One sample for each 35 tonnes or part thereof	One sample for each 45 tonnes or part thereof

	Over 16 mm dia bars	One sample for each 45 tonnes or part there of	One sample for each 60 tonnes or part there of
4.3.7	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.		
4.3.8	The actual issue and consumption of steel on work shall be regulated and proper accounts maintained as provided in clause 10 of the contract The theoretical consumption of steel shall be worked out as per procedure prescribed in clause 42 of the contract and shall be governed by conditions laid therein. In case the consumption is less than theoretical consumption including permissible variations recovery at the rate so prescribed shall be made. In case of excess consumption no adjustment need to be made.		
4.3.9	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.		

Annexure- L

Special Conditions for Steel (Reference para 4.3)

Sl. No.	Item	Checkpoint	Remarks
1.	Steel Producer having manufacturing facilities at Plant	a. Factory address and Registration no.	
		b. Certificate of manufacturing process	
		c. Refining process of steel Producer	
		c.1 BF- BOF route	
		c.2 Corex— BOF route	
		c. 3 DRI - EAF route	
		With documentary evidence either for BOF or EAF	
		d. Steel plant having infrastructure for producing sponge iron, billete and TMT Rebars	
		e. Production and Quality Flow Chart	
		f. Plant Evaluation and Process Verification	
2.	Established	g. List of Plant & Machinery	
		Document verification for :	
		a. Govt. / PSU Approvals	
		b. Supply orders of TMT Re-bars in Govt. Projects (Minimum-5 years)	
		c. Verification of direct supply orders to any State/Central Govt. Department	
3.	Indigenous	d. User Certificate issued by any Govt. Department directly	
		Documentary evidence like;	
		a. Certificate of Incorporation	
		b. Memorandum of Articles of Association	
		c. Credit rating of the company from CARE/CRISIL/ICRA should not be C/D grade (minimum last 3 year)	
4.	Reliable	a. Test Results from Govt./NABL accredited laboratories	
		b. In-house testing facility for physical/Chemical tests (NABL accredited)	
		d. Calibration Certificates	
		e. List of Lab Equipment:	
		e.1 Spectrometer	
		e.2 Computerized UTM	

5.	Use of Iron-Ore/Processes Iron are as basic raw materials	Verification of Iron-Ore/ Process iron ore invoices	
6.	In-house rolling facility	Plant verification to identify in-house rolling facilities, production of liquid steel & crude steel	
7.	Licences & Certificates	a. ISO 9001:2008 Certification	
		b. ISO 14001:2004 Certification	
		c. OHSAS 18001:2007 Certification	
		d. IS 1786:2008 (TMT Re-bars)	
		e. IS 2830:1992 (Billets)	
8.	Product Range	TMT Re-bars FE 415/415D/500/500D/550/550D	
		CRS (Corrosion Resistant) & EQR (Earthquake Resistant)	
		TMT Re-bars Size 8 to 36 mm dia	

Note:

DRI — EAF-> Direct Reduce Iron — Electric ARC Furnace

BF — BOF-> Blast Furnace — Basic Oxygen Furnace

COREX-BOF ->COREX Furnace — Basic Oxygen Furnace

5.0 **SECURITY**

- 5.1 The contractor shall take all steps necessary that all persons employed on any work in connection with the contract have notice that the Indian Official Secrets Act 1923 applies to them & will continue so to apply even after the execution of such works under the contract.
- 5.2 The contract is confidential and must be strictly confined to the contractor's own use (except so far as confidential disclosure to sub-contractors or suppliers as necessary) and to the purpose of the contract.
- 5.3 All documents, copies thereof & extracts there from furnished to the contractor shall be returned to the Engineer-in-Charge on the completion of the work / works or the earlier determination of the contract.

6.0 **LABOUR AND SECURITY**

- 6.1 Contractor should provide his plan for labour huts as per his requirement and get it approved from the Engineer-in-Charge. The contractor will be provided space for labour huts etc. inside the campus but the space requirement and location, as assessed by Engineer-in-Charge shall be final and binding.
- 6.2 Contractor has to follow the security requirement of the campus and obtain necessary entry passes for the labour and vehicles and follow security checks at entry / exit gates, restriction on movement of vehicle, restricted timings of working etc. The Department however shall assist the contractor in obtaining such passes for movement of vehicles and labour. No claim whatsoever shall be entertained on account of delay in entry of vehicles and labour including restrictions in working hours, if there is any.
- 6.3 The contractor shall employ only Indian Nationals after verifying their antecedents and loyalty. The contractor shall, on demand submit list of his agents, employees and work people concerned & shall satisfy as to the bonafides of such people.
- 6.4 The contractor & his work people shall observe all relevant rules regarding security promulgated in which work is to be carried out by the Controlling Administrative Authority of the campus/area (hereinafter referred to as "Administrator").
- 6.5 The contractor, his representative, workman shall be allowed to enter through specified gates & timing as laid down by the controlling authority. They shall be issued an identity card or an individual pass in accordance with the standing rules & regulations & they should possess the same while working. The contractor shall be responsible for the conduct & actions of his workmen, agents / representatives.
- 6.6 Normally contractor shall be allowed to carry-out work between 7 AM to 6 PM. However, he may also be allowed to carry-out the work beyond 6 PM & up-to 7 AM if the site conditions / circumstances so demand with prior written permission from the "Administrator". However, if the work is carried out in more than one shift or at night, no claim on this account shall be entertained.

- 6.7 Normally contractor's material / vehicles etc. shall be allowed to move in / go-out between 7 AM to 7 PM only & no movement of material / vehicles out of site of work shall be allowed during night hours unless specific permission is obtained from the "Administrator".
- 6.8 In case if a separate entry has been allowed, the contractor has to make all arrangement for making a separate entry gate and barricading of the working area to segregate/separate the same from other areas. All these have to be done by the contractor at his own cost including safeguarding any untoward incident in the restricted area due to separate entry gate and barricading arranged by the contractor. No extra amount on this account shall be payable by the department.

7.0 TRANSPORTATION AND OFFICE INFRASTRUCTURE:

- 7.1 In order to complete the work within the scheduled time if the contractor shall be required to do the work in more than one shift and accepted by the department the contractor will provide vehicular facilities to the DoP site staff to reach the site and their residence at his own cost for their services required beyond the normal office hours. In case the contractor fails to provide the facilities Engineer-in-Charge shall be at liberty to make the arrangement themselves and deduct the respective cost from the contractor's bills.
- 7.2 For Quality Control Measures, Preparation of Bills and Monitoring the Quality, the contractor shall provide (min. two number) Computer having Intel core i 5 3rd generation processor, Latest MS Windows, A-3 Coloured Inkjet & A-4 Laser-jet Printers, Scanners, UPS etc. with required number of data entry operators(two or more) in the site office of Engineer-in-Charge.
- 7.3 The contractor shall make arrangement for Helmets and leather shoes (meant of construction work at sites) for all field staff of the department during the entire period of construction for safety reasons. One helmet and two pairs of shoes per staff member (maximum ten members) of the departments per year shall be arranged by the contractor.
- 7.4 The contractor shall establish free of cost fully furnished site office having two rooms of 10 sqm. area each for field staff (1 No. AE and 1 No. JE) with toilet facility. The electricity and water charges shall be paid by the agency.
It is clarified that nothing extra shall be payable for transportation and office infrastructure. The site office & conference hall shall be removed after the work is completed by the contractor at his own cost. The conference table & other office furniture for field staff shall be arranged by DOP.

8.0 DOCUMENTATION

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

9.0 PROGRAMME CHART: -

- 9.1 The Contractor shall submit a Programme Chart (Time and Progress) for each mile stone along-with performance guarantee and get it approved from the department. The chart shall be prepared in direct relation to the time stated in the contract documents for completion of the items of the work. It shall indicate the forecast of the dates of commencement and completion of various trades of sections of the work and may be amended as necessary by agreement between the Engineer-in-charge and the contractor within the limitations of time imposed in the contract documents, and further to ensure good progress during the execution of the work. The contractor shall in all cases in which time allowed for any work exceeds one month (save for special jobs for which a separate program has been agreed upon) complete the work as per milestones given in Schedule 'F'.
- 9.2 The work has to be completed in stages as indicated in the **Table of Milestones under Schedule 'F' Page No. 37 of Part -A** and the program should be prepared in such a manner to achieve these Milestones as indicated therein or earlier.
- 9.3 The program chart should include the following: -
 - a) Descriptive note explaining sequence of various activities.
 - b) Network (PERT/CPM/BAR CHART) prepared on MS project which will indicate resources in financial terms, manpower and specialized equipments for every important stage.
 - c) Program for procurement of materials by the contractor.

- d) Program of procurement of machinery/equipments having adequate capacity, commensurate with the quantum of work to be done within the stipulated period, by the contractor.
- 9.4 If at any time, it appears to the Engineer-in-Charge that the actual progress of work does not confirm to the approved program referred above, the contractor shall produce a revised program showing the modifications to the approved program by additional inputs to ensure completion of the work within the stipulated time.
- 9.5 The submission of revised program or approval by the Engineer-in-Charge of such program or the furnishing of such particulars shall not relieve the contractor of any of his duties or responsibilities under the contract. This is without prejudice to the right of Engineer-in-Charge to take action against the contractor as per terms and conditions of the agreement. Notwithstanding the fact that the contractor will have to pay to the labourers and other staff engaged directly or indirectly on the work according to the provisions of the labour regulations and the agreement entered upon and/or extra amounts for any other reason
- 10.0 PROGRESS AND MONITORING OF WORK:**
- 10.1 Apart from the above integrated program chart, the contractor shall be required to submit monthly progress report of the work in a computerized form. The progress report shall contain the following, apart from whatever else may be required as specified:
- (i) Construction schedule of the various components of the work through a bar chart for the next three quarters (or as may be specified), showing the milestones, targeted tasks and up to date progress.
 - (ii) Progress chart of the various components of the work that are planned and achieved, for the month as well as cumulative up to the month, with reason for deviations, if any in a tabular format.
 - (iii) Plant and machinery statement, indicating those deployed in the work.
 - (iv) Man-power statement, indicating individually the names of all the staff deployed on the work, along with their designations.
 - (v) Financial statement, indicating the broad details of all the running account payment received up to date, such as gross value of work done, advances taken, recoveries effected, amount withheld, net payments details of cheque payment received etc.
- 10.2 For completing the work in time, the Contractor might be required to work in two or more shifts (including night shifts). No claim whatsoever shall be entertained on this account, notwithstanding the fact that the Contractor may have to pay extra amounts for any reason, to the labourers and other staff engaged directly or indirectly on the work according to the provisions of the labour and other statutory bodies regulations and the agreement entered upon by the Contractor with them.
- 10.3 The work should be planned in a systematic manner so that chase cuttings in the walls, ceilings and floors is minimized. Wherever absolutely essential, the chase shall be cut using chase cutting machines. Chases will not be allowed to be cut using hammer/chisel. The electrical boxes should be fixed in walls simultaneously while raising the brick work. The contractor shall ensure proper coordination of various disciplines viz. building works, sanitary & water supply & electrical installations etc.
- 10.4 The contractor shall conduct his work, so as not to interfere with or hinder the progress or completion of the work being performed by other contractor(s) or by the Engineer-in-Charge and shall as far as possible arrange his work and shall place and dispose off the materials being used or removed so as not to interfere with the operations of other contractor or he shall arrange his work with that of the others in an acceptable and coordinated manner and shall perform it in proper sequence to the complete satisfaction of Engineer-in-charge.
- 10.5 The Contractor shall do proper sequencing of the various activities by suitably staggering the activities within various pockets in the plot so as to achieve early completion. The agency may deploy adequate equipment, machinery and labour as required for the completion of the entire work within the stipulated period specified. Also ancillary facilities shall be provided commensurate with requirement to complete the entire work within the stipulated period. Nothing extra shall be payable on this account. Adequate number/sets of equipment in working condition, along with adequate stand-by arrangements, shall be deployed during entire construction period. It shall be ensured by the Contractor that all the equipment, Tools & Plants, machineries etc. provided by him are maintained in proper working conditions at all times during the progress of the work and till the completion of the work. Further, all the

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

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

11.0 ENGAGING SPECIALISED AGENCIES FOR WORKS: -

- 11.1 The Contractor shall engage specialized agencies having adequate technical capability and experience of having executed at least one work of similar items of 80% or more magnitude or two works of similar items of value minimum 60% individually for executing the following items of the work and/or any other items of work where specialized firm is required to be engaged as per contract conditions. For determining the required magnitude, the value of the work executed may be suitably enhanced with the prevailing approved cost index.
i) Water proofing treatment work of all types. ii) Steel work in space frame
iii) Laying of granite stone flooring. iv) Acoustic treatment and other decorative item such as glass ceiling v) Aluminium Workvi) Underground tank vii) Ready-mix concrete
viii) Stainless steel railing ix) Structural glazing work x) Woodenflooring xi) Plumbing works.
- 11.2 The Specialized agency for the work shall be got approved from the Engineer-in-Charge well before actual commencement of the item of work. The contractor shall submit the list of specialized agencies proposed to be engaged by him along with necessary performance certificates, within 30 days from the date of issue of acceptance letter to substantiate technical capability and experience of the agency for prior approval of the Engineer-in-Charge.
- 11.5 Same milestones shall be applicable for all components of work.
- 11.6 For the specialized item of door & window fittings, water supply and sanitary installations; the contractor shall engage such vendors/installers as approved by the manufacturers. Provisions mentioned under Sr. No. 11.1 above shall not be applicable for the items mentioned herein above.

12.0SAMPLE ACCOMMODATION:-DELETED

13.0 Defect liability:

- 13.1 The contractor's liability during the defect liability period from the final date of completion as per clause 17 shall be limited to rectification of defects including replacement as follows which in the opinion of Engineer-in-Charge are not man made.

Sl. No.	Description	Defect Liability
(i)	Concrete/ RCC	(a) Rectification of structural / superficial / non-structural cracks. (b) Rectification of dampness / seepage in roof slab / junctions & sunken portion. (c) Rectification of cracks in beam, shade, column.
(ii)	Brick work/ Concrete Block Masonry	(a) Rectification of cracks in panel wall / portion. (b) Cracks / settlement of dwarf walls. (c) Rectification of efflorescence/ leaching.
(iii)	Joinery	(a) Replacement of warped joinery. (b) Cracks in panels, rails / styles etc.
(iv)	Builders Hardware	(a) Repairs / Replacement of loosened / pre-mature failure of fittings. (b) Tightening / Replacement of sag in mosquito proofing.
(v)	Steel & Iron work	(a) Rectification / Replacement of defective part of rolling shutter. (b) Redoing of defective portion in fabrication / welding including painting. (c) Steel windows, grills, gates etc. – defects to be rectified.
(vi)	Roof treatment	(a) Rectification of leakage / seepage of roof slab including covering at junction till guarantee period.
(vii)	Plastering	(a) Rectification of structural / superficial cracks if any. (b) Rectification of protruding / peeling off plaster if any. (c) Rectification of efflorescence
(viii)	Flooring	(a) Rectification of sinking portion of plinth protection including saucer drain. (b) Settlement of foundation & floors, hollow sounding, cracks in tiles/stones.

Sl. No.	Description	Defect Liability
(ix)	Plumbing / Sanitary fittings	(a) Making good of leakage through soil / waste pipe joints. (b) Replacement of looking mirror if found wavy. (c) Rectification of leakage of overhead tanks. (d) Leakage / seepage of sunken floor, blockage of taps / pipes, nonfunctioning of cistern.
(x)	Finishes	(a) Making good of defective / dissimilar patches of painting to match with remaining surfaces, peeling of paint.
(xi)	Internal Water Supply	(a) Repairs / Replacement of defective taps / fittings. (b) Repair to leakage of GI/ SS water pipe lines including joints. (c) Removal of blockage of GI/ SS pipe lines.
(xii)	Roads	(a) Repair of sunken portion of road & potholes, if any
(xiii)	Sewage	(a) Rectification of slope / system if found defective during use. (b) Rectification of major blockage in Sewer lines. (c) Cracks & settlement of sewage lines.
(xiv)	Drains	(a) Repair to Drains. (b) Settlement of Drains
(xv)	External Water Supply	(a) Repairs to installations & fittings.
(xvi)	General	(a) All manufacturing defects of structures / fixtures / fittings / equipments other than listed above including any defects of shrinkage or other faults that appear in the work within twelve months after a certificate of its completion is given by the Engineer-in-Charge shall be rectified by the contractor.

14.0 SAFETY MEASURES

14.1 Contractor shall take all precautionary measures to avoid any damage to adjoining property. All necessary arrangement shall be made at his own cost.

14.2 Warning / Caution Boards

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

14.3 Sign Boards

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

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

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

15.0 Special condition for Hardware and Sanitary Wares:

15.1 Engineer-in-Charge will take a decision regarding model numbers of equivalent Door/window

hardware, sanitary ware & Water Supply accessories at the time of execution, in case the material, from the manufacturer whose model number is mentioned, is not available. However, in case, the equivalent model so approved, is cheaper than the model already mentioned in item/approved makes list, the price adjustment will be made based on the difference in market rate. In case, the rate of subsequently approved model is more, no extra payment will be made on this account.

16.0 Ultrasonic Pulse Velocity Method of Test for RCC

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

Velocity criterion for Concrete Quality Grading.

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

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

- iii) Pulse velocity method of test of concrete is to be conducted for DOP (Civil Wing) works as a routine test. The acceptance criteria as per the above table will be applicable which is as per IS 13311 (part-1): 1992. From the above “Good” and “Excellent” grading are acceptable and below these grading the concrete will not be acceptable.
- iv) 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, where continuous seepage is observed, construction joints and visible loose pockets will also be tested.
- v) The test results are to be examined in view of the above acceptance criteria “Good” and “Excellent” and wherever concrete is found with less than required quality as per acceptance criteria, repairs to concrete will be made. Honeycombed areas and loose pockets will be repaired by grouting using Portland Cement Mortar/Polymer Modified Cement Mortar /Epoxy Mortar, etc. after chipping loose concrete in appropriate manner. In areas where concrete is found below acceptance criteria and defects are not apparently visible on surface, injecting approved grout in appropriate proportion using epoxy grout /acrylic Polymer modified cements slurry made with shrinkage compensating cement / plain cement slurry etc will be resorted to for repairs.(refer relevant chapters from CPWD Hand Book on Repairs and Rehabilitation of RCC Buildings).Repair to concrete will be done till satisfactory results are obtained as per the acceptance criteria by retesting of the repaired area. If satisfactory results are not obtained dismantling and relaying of concrete will be done.

Contractor

Engineer-in-charge

ADDITIONAL CONDITIONS OF CONTRACT SPECIFIC TO GREEN BUILDING PRACTICES

- 1.0** The contractor shall strictly adhere to the following conditions as part of his contractual obligations:
 - 1.1 SITE**
 - 1.1.1 The contractor shall ensure that adequate measures are taken for the prevention of erosion of the topsoil during the construction phase.
 - 1.1.2 The Contractor should follow the construction plan as proposed by the Architect /Engineer in Charge to minimize the site disturbance such as soil pollution due to spilling
 - 1.1.3 No excavated earth shall be removed from the campus unless suggested otherwise by Engineer in Charge. All subsoil shall be reused in backfilling/landscape, etc. as per the instructions of the Engineer in Charge. The surplus excavated earth shall be disposed of by the contractor at his own cost for reuse. Royalty on the soil is to be deposited with the State Govt. Department.
 - 1.1.4 The contractor shall not change the natural gradient of the ground unless specifically instructed by the Engineer in Charge. This shall cover all natural features like water bodies, drainage gullies, slopes, mounds, depressions, etc. Existing drainage patterns through or into any preservation area shall not be modified unless specifically directed by the Engineer-in-charge.
 - 1.1.5 The contractor shall not carry out any work which results in the blockage of natural drainage.
 - 1.1.6 The contractor shall ensure that existing grades of soil shall be maintained around existing vegetation and lowering or raising the levels around the vegetation is not allowed unless specifically directed by the Engineer-in-charge.
 - 1.1.8 Overloading of trucks is unlawful and creates the erosion and sedimentation problems, especially when loose materials like stone dust, excavated earth, sand etc. are moved. Proper covering must take place. No overloading shall be permitted.
 - 1.2 CONSTRUCTION PHASE AND WORKER FACILITIES**
 - 1.2.1 The contractor shall specify and limit construction activity in pre- planned/designated areas and shall start construction work after securing the approval for the same from the Engineer in Charge. This shall include areas of construction, storage of materials, and material and personnel movement.
 - 1.2.2 Preserve and Protect Landscape during Construction**
 - (a) The contractor shall ensure that construction activities should be restricted to the areas outside of the canopy of the tree, or, from a safe distance from the tree/plant by means of barricading. Trees will not be used for support; their trunks shall not be damaged by cutting and carving or by nailing posters, advertisements or other material. Lighting of fires or carrying out heat or gas emitting construction activity within the ground, covered by canopy of the tree is not to be permitted.
 - (b) The contractor shall take steps to protect trees or saplings identified for preservation within the construction site using tree guards of approved specification.
 - (c) Contractor should limit all construction activity within the specified area as per the Construction Management Plan (CMP) approved by Engineer in Charge.
 - (d) The contractor shall ensure that maintenance activities during construction period shall be performed as needed to ensure that the vegetation remains healthy.
 - 1.2.3 The contractor shall provide potable water for all workers.
 - 1.2.4 The contractor shall provide the minimum level of sanitation and safety facilities for the workers at site. The contractor shall ensure cleanliness of workplace with regard to the disposal of waste and effluent; provide clean drinking water and latrines and urinals as per applicable standard. Adequate toilet facilities shall be provided for the workman within easy access of their place of work. Toilet facilities shall be provided from the start of building operations, connection to a sewer shall be made as soon as practicable. Every toilet shall be so constructed that the occupant is sheltered from view and protected from the weather and falling objects. Toilet facilities shall be maintained in a sanitary condition. A sufficient quantity of disinfectant shall be provided. Natural or artificial illumination shall be provided.
 - 1.2.5 The contractor shall ensure that air pollution due to dust/generators is kept to a minimum, preventing any adverse effects on the workers and other people in and around the site. The contractor shall ensure that the speed of vehicles within the site is limited to 10 km/hr. Spills of dirt or dusty materials will be cleaned up promptly so that spilled material does not become a source of fugitive dust and also to prevent of seepage of pollutant laden water into the ground aquifers.

- 1.2.6 The contractor shall ensure that no construction leachate (e.g. cement slurry etc.), is allowed to percolate into the ground.
- 1.2.7 Staging (dividing a construction area into two or more areas to minimize the area of soil that will be exposed at any given time) should be done to separate undisturbed land from land disturbed by construction activity and material storage.
- 1.2.8 The contractor shall comply with the safety procedures, norms and guidelines (as applicable).
- 1.2.9 The contractor shall ensure the following activities for construction workers safety, among other measures:
 - Guarding all parts of dangerous machinery.
 - Precautionary signs for working on machinery
 - Maintaining hoists and lifts, lifting machines, chains, ropes, and other lifting tackles in good condition.
 - Durable and reusable formwork systems to replace timber formwork and ensure that formwork where used is properly maintained.
- 1.2.10 The storage of material shall be as per standard good practices to the satisfaction of the Engineer in Charge. Watch and ward of the Contractor's materials shall be his own responsibility.
- 1.2.11 The contractor shall provide for adequate number of garbage bins around the construction site and the workers facilities and will be responsible for the proper utilization of these bins for any solid waste generated during the construction
- 1.2.12 Where possible, the contractor shall select materials / vendors, harvested and manufactured regionally, within a 800-km radius of the project site.
- 1.2.13 The contractor shall ensure that a flush out of all internal spaces is conducted prior to handover. This shall comprise an opening of all doors and windows for 14 days to vent out any toxic fumes due to paints, varnishes, polishes, etc.
- 1.2.14 Contractor shall make efforts to reduce the quantity of indoor air contaminants that are odorous or potentially irritating harmful to the comfort and well-being of installer and building occupants. Contractor shall ensure that the VOC (Volatile Organic Compounds) content of paints, coatings and primers are low.
- 1.2.15 **Water Use during Construction**
Contractor should spray curing water on concrete structure and shall not allow free flow of water. Concrete structures should be kept covered with thick cloth/gunny bags and water should be sprayed on them. Contractor shall do water poundings on all sunken slabs using cement and sand mortar.
- 1.2.16 The contractor shall provide O & M Manuals wherever applicable.
- 1.2.17 **MATERIALS & FIXTURES FOR THE PROJECT**
 - (i) Contractor will produce wherever feasible certificate regarding distance of the source of the relevant material.
 - (ii) Unless otherwise stated cement used at site for mortar, plaster, building blocks, etc. shall be PPC (Portland Pozzolana Cement). The PPC must meet the requirements of IS 1489 (Part I) as regards to fly ash content in cement.
 - (iii) The contractor shall ensure that all paints, polishes, adhesives and sealants used both internally and externally, on any surface, shall be Low VOC products. The contractor shall get prior approval from the Engineer in Charge before the application of any such material.
 - (iv) The contractor shall ensure that all composite wood products/agro-fiber products used for cabinet work, etc. do not contain any added urea formaldehyde resin.
- 1.2.18 **RESOURCES CONSUMED DURING CONSTRUCTION**
 - (a) The contractor shall ensure that the water and electricity is not wasted during construction. The Engineer in Charge can bring to the attention any such wastage and the contractor will have to ensure that such bad practices are corrected.
 - (b) The contractor shall ensure that all run-off water from the site, during construction is collected and reused to the maximum.
- 1.2.19 **EQUIPMENT**
 - (a) To ensure energy efficiency during and post construction all pumps, motors and engines used during construction or installed, shall be subject to approval and as per the specifications of the Engineer in Charge.
 - (b) Generally, the lighting installed by the contractor around the site and at the labour quarters during construction shall be CFL bulbs of the appropriate illumination levels.

1.0 EARTH WORK:-

- 1.1 Earth work shall be executed as per CPWD **specifications 2019**, Volume-I with up-to date correction slips. In addition to that following specifications shall also be followed:

1.2 EARTH WORK FOR MAJOR WORKS

- 1.2.1 Excavation shall be undertaken to the width of the Basement/Retaining wall footing including necessary margins for construction operation as per drawing or directed otherwise. Where the nature of soil or the depth of the trench and season of the year, do not permit vertical sides, the contractor at his own expense shall put up the necessary shoring, strutting and planking or cut slopes with or without steps, to a safer angle or both with due regard to the safety of personnel and works and to the satisfaction of the Engineer in Charge. Measurement of plan area of excavation for payment shall be permitted only.
- 1.2.2 All the major excavation shall be carried out by mechanical excavator. No extra payment shall be made for that.
- 1.2.3 The contractor shall make at his own cost all necessary arrangements for maintaining water level, in the area where works are under execution low enough so as not to cause any harm to the work shall be considered as inclusive of pumping out or bailing out water, if required, for which no extra payment shall be made. This will include water coming from any source, such as rains, accumulated rain water, floods, leakages from sewer and water mains subsoil water table being high or due to any other cause whatsoever. The contractor shall make necessary provision of pumping, dredging 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. In order to avoid possibility of basement floor of main building being getting uplifted/damaged due to water pressure, the contractor shall lower the ground water table below the proposed foundation level by boring tube wells all around the proposed building using well point sinking method or any suitable method as approved by Engineer-in-charge. Sub soil water table shall be maintained at least 50 cm. below the P.C.C. level during laying of P.C.C. water proofing treatment, laying of basement raft and beams including filling of earth/sand under the basement floor. The water table shall not be allowed to rise above base of raft level until completion of outer retaining walls including water proofing of vertical surface of walls and back filling along the walls upto ground level and until the structure attains such height to counter balance the uplift pressure. However, the contractor should inspect the site and make his own assessment about sub-soil water level likely to be encountered at the time of execution and quote his rates accordingly. Rate of all items are inclusive of pumping out or bailing out water, if required. Nothing extra on this account whatsoever shall be paid to him. The sequence of construction shall be got approved by the Engineer-in-charge.
- 1.2.4 The contractor shall take all necessary measures for the safety of traffic during construction and provide, erect and maintain such barricades including signs, markings, flags, lights and flagman, as necessary at either end of the excavation/embankment and at such intermediate points as directed by the Engineer-in-charge for the proper identification of construction area. He shall be responsible for all damages and accidents caused due to negligence on his part.
- 1.2.5 The contractor shall provide suitable barricading with suitably painted single row of G.I. Sheets about 3'- 0" wide (90 cms.) nailed or bolted with wooden poles spaced 2 to 3 metre apart and each pole 1.6 m to 2 m long 8 cm. to 10 cm. dia. The poles will be embedded in mobile iron pedestal rings suitably framed for giving stable support as per direction of the Engineer-in-charge. All management (including watch and ward) of barricades shall be the full responsibility of the contractor. The barricades shall be removed only after completion of the work or part of the work. The contractor's rate shall include all above items of work and nothing extra shall be paid to the contractor over and above his quoted rates.

2.0 R.C.C. WORK:- The contractor shall use Design mix concrete.**2.1 DESIGN MIX OF CONCRETE FOR RMC.**

- 2.1.1 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 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.

- (a) The contractor has to submit design mix without use of admixtures.
- (b) Admixture may be added (by maintaining the minimum cement content as given under para- 2.1.3) 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.

2.1.2 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-InCharge.

- (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. If on testing, water from the source is not found fit for construction, the necessary arrangement for treatment of water shall have to be made by the contractor at the site and nothing extra shall be payable for the same.
- (d) **Cement:-** 43 grade ordinary Portland Cement conforming to IS: 8112 / Portland Pozzolana Cement (PPC) conforming to IS: 1489 (Part-1) as required in the work from reputed manufacturers of cement such as ACC, ULTRATECH, VIKRAM, SHREE CEMENT, AMBUJA, JAYPEE CEMENT, CENTURY CEMENT & J.K. CEMENT etc. 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 (PPC) is to be used for RCC works only subject to fulfillment of conditions of circular No. CDO/SE(RR)/Fly ash (MAN) 02 dated 09.04.2009. However, if the contractor uses higher grade of cement or uses Ordinary Portland Cement (OPC) only nothing extra shall be paid.
- (e) **Admixture/ Plasticizer:-** The admixture shall conform to IS: 9103. 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.

2.1.3 Water Cement Ratio and Slump:-

- 2.1.3.1 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 0.5.
- 2.1.3.2 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. For normal methods of placing concrete, maximum slump shall be restricted to 100mm when measured in accordance with IS:1199.
- 2.1.3.3 The minimum cement content, maximum free water-cement ratio and minimum grade of concrete are individually related to exposure as per Table 5 of IS: 456, 2000 and As per **CPWD Specifications (Volume-I) 2019** with up-to date correction slips.

2.1.4 Characteristic Compressive Strength Compliance Requirement

Specified Grade	Mean of the Group of 4 Non-overlapping consecutive test results in N/mm ² (Min)	Individual Test Results in N/mm ² (Min)
(1)	(2)	(3)
M15 Or Above	$\geq F_{ck} + 0.825 \times \text{established standard deviation}$ (rounded off to nearest 0.5 N/mm ²) Or $F_{ck} + 3\text{N/mm}^2$, whichever is greater where F_{ck} is characteristic compressive strength of CC cube at 28 days.	$\geq F_{ck} - 3 \text{ N/mm}^2$

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) For concrete of quantity up to 30 m³ (where the number of samples to be taken is less than four as per frequency of sampling given in para 2.4, the mean of test results of all such samples shall be $F_{ck} + 4 \text{ N/mm}^2$, minimum and requirement of minimum individual test result shall be $F_{ck} - 2 \text{ N/mm}^2$, minimum. However, when the number of samples is only on as per para 2.4, the requirement shall be $F_{ck} + 4 \text{ N/mm}^2$, minimum

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

- i) Any IIT/ Any NIT
- ii) **Approved Lab/Govt. Engineering Institutions as directed by the Engineer-in-Charge with prior approval of the Chief Engineer-II.**

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.

- 2.1.6 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 White Portland Cement and the likely use of admixtures in concrete with ordinary Portland/White Portland Cement, the contractor shall design and test the concrete mix by using trial mixes with white cement and / or admixtures also, for which nothing extra shall be payable.

- 2.1.7 In case of change of source or characteristic properties of the ingredients used in the concrete mix during the work, the contractor as per the directions of the Engineer-in-charge shall submit a revised laboratory mix design report conducted at laboratory established at site.

- 2.1.8 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.

- 2.1.9 The mix design for a specified grade of concrete shall be done for a target mean compressive strength

$$T_{ck} = F_{ck} + 1.65s$$

Where F_{ck} = Characteristic compressive strength at 28 days.
 s = Standard deviation which depends on degree of quality control.

The assumed values of standard deviation for different grades of concrete shall be as follows:

GRADE OF CONCRETE	STANDARD DEVIATION
M-20	4.0
M-25	4.0
M-30	5.0
M-35	5.0

Note: The above values correspond to the site control having proper storage of cement; weight batching of all materials; controlled addition of water; regular checking of all materials, aggregate gradings and moisture content; and periodical checking of workability and strength. Where there is deviation from the above the values given in the above table shall be increased by 1 N/mm².

2.1.10 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 + 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.

2.1.11 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 (T_{ck}).
- (b) The strength of any specimen cube is not less than $0.85 T_{ck}$.
- (c) The concrete mix is of required degree of workability and acceptable concrete finish.

2.2 General Requirement of Ready Mix Concrete (RMC):-

- (a) The contractor shall have to use Ready Mix Concrete (RMC) as per IS: 4926. The contractor shall ensure that transit mixtures shall transport the concrete to site. All the precautions shall be taken during the transportation and handling of concrete to achieve the desired strength, durability, etc. as envisaged in the Mix Design. Contractor has to get the approval from Engineer-In-Charge regarding source of RMC by giving the details of such plants indicating name of owner / company, its location, technical establishment, past experience and text of Memorandum of Understanding (proposed to be entered between purchaser and supplier). The Engineer-in-Charge, after satisfying himself about quality / capability of the company shall give approval in writing (subject to drawing of MOU). The MOU shall be drawn with RMC plant owner / company and submitted to Engineer-in-Charge within a week of such approval. The contractor will not be allowed to purchase RMC without completion of above formalities for use in the project. Notwithstanding the approval granted by Engineer-in-Charge in aforesaid manner, the contractor shall be fully responsible for quality of concrete including input control, production, transportation and placement etc. The Engineer-in-Charge will reserve the right to deploy his supervisor at plant site to inspect at any such stage and reject the material / concrete etc. if he is not satisfied about quality of material / product.
- (c) All measuring equipment shall be maintained in a clean and serviceable condition and their accuracy shall be checked at least once a month.
- (d) Only single sized excellent quality stone aggregate shall be brought to site of work from the approved source. The grading of the stone aggregate shall be controlled by blending the aggregate of different sizes in the required proportions at site of work. The aggregate of different sizes shall be stock-piled separately, preferably a day before use. The grading of coarse and fine aggregates shall be checked as frequently as possible and as directed by the Engineer-In-Charge to ensure that the specified grading and quality of aggregate is maintained.
- (e) It is important to maintain the Water Cement Ratio constant at its specified or approved value by making adjustment for the moisture contents of both fine and coarse aggregates. The moisture contents in the aggregate shall be determined as frequently as possible in keeping with the weather conditions and as per the provisions of IS: 2386 (Part-III).

2.3 OTHER OPERATIONS: -

All other operations in concreting work like mixing, slump, laying, placing of concrete, compaction, curing etc. not mentioned in this particular specifications for Ready Mix of Concrete shall be as per CPWD Specifications.

2.4 SAMPLING: -

2.4.1 General:

Samples from fresh concrete shall be taken as per IS 1199 and cubes shall be made, cured and tested at 28 days in accordance with IS 516. 15.1.1 In order to get a relatively quicker idea of the quality of concrete, optional tests on beams for modulus of rupture at 72 + 2 h or at 7 days, or compressive strength tests at 7 days may be carried out in addition to 28 days compressive strength test. For this purpose the values should be arrived at based on actual testing. In all cases, the 28 days compressive strength specified in Table 2 of code of practice, IS:456 2000 shall alone be the criterion for acceptance or rejection of the concrete.

(a) FREQUENCY OF SAMPLING: -

- (i) A random sampling procedure shall be adopted to ensure that the sampling is spread over the entire period of concreting and cover all mixing units. The concrete work shall be notionally divided into lots as under for the purpose of sampling conditions.
 - Footings, rafts etc.
 - Columns and walls at all levels.
 - Beams at all levels.
 - Slabs at all levels.
- (ii) At least one test sample shall be taken for each lot of concrete work.
- (iii) Each grade of concrete shall form different lot for testing.
- (iv) The minimum frequency of sampling of concrete of each grade shall be in accordance with CPWD specification 2019, Vol I with up to date correction slips.
- (v) The concrete work shall be assessed on day to day basis & samples shall be taken as specified.
- (vi) Work strength test shall be conducted in accordance with IS: 516 on random sampling.

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

Quantity of Concrete in the Work, (cum)	Number of Samples
1 – 5	1
6 – 15	2
16 – 30	3
31- 50	4
51 and above plus one additional sample for each additional 50 m ³ or part thereof	4

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

2.4.5 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.

2.4.6 TEST RESULTS OF SAMPLES: -

The test results of the sample shall be the average of the strength of three specimens. The individual variation shall not be more than $\pm 15\%$ percent of the average. If variation is more, the test results shall be treated as invalid. The tests shall be carried out at approved laboratory as directed by the Engineer-in-Charge.

2.4.7 ACCEPTANCE CRITERIA

2.4.8 Compressive Strength

The concrete shall be deemed to comply with the strength requirements when both the following conditions 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 2.1.4 above.

- b) Any individual test result complies with the appropriate limits in col 3 of Table given under para 2.1.4 above.

2.4.9 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 m3.

2.4.10 Concrete of each grade shall be assessed separately.

2.4.11 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.

2.5 MEASUREMENT –

- (i) As per CPWD Specifications (Volume-I) 2019 with up-to date correction slips
- (ii) In respect of all projected slabs at all levels including cantilever, canopy, the payment for the RCC work shall be made under the item RCC slabs. The payment for shuttering at the edges shall be made under item of centering and shuttering for RCC slabs. Nothing extra shall be paid for the side shuttering at the edge of these projected balconies / projected verandah slabs.

2.6 TOLERANCES - As per CPWD Specifications.

2.7 RATES: -

- (i) The rate includes the cost of materials, labour and T&P, including mixing, placing, transportation involved in all the operations described above except for the cost of centring, shuttering & reinforcement which will be paid for separately. It includes finishing i.e. making the top surface of smooth/in required level with trowel etc.
- (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.

2.8 RCC WORK (ORDINARY)

2.8.1 The work shall be done in accordance with CPWD Specifications (Volume-I) 2019 with up-to date correction slips

2.8.2 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.

2.9 FORM WORK

2.9.1 The work shall be done in general as per CPWD Specifications.

2.9.2 Only M.S. centring / 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. But nothing extra shall be paid on this account.

2.9.3 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.

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

2.9.5 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.

- 2.9.6 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 shall be applied on the surface of the shuttering plates in the requisite quantity before assembly of steel reinforcement.

2.10 REINFORCEMENT:-

- 2.10.1 The reinforcement shall be done as per CPWD Specifications.

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

- 2.10.3 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 casted well in advance with approved proprietary pre-packed free flowing mortars (Conbextra as manufactured by M/s Fosroc Chemicals India Ltd. or of approved equivalent)** of high early strength and same colour as of 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, rate of RCC items is inclusive of cost of such cover blocks & Cover Guard Bars.

2.11 PRE-CAST RCC WORK

- 2.11.1 The work shall be done in accordance with CPWD Specifications.

- 2.11.2 Pre-cast reinforced concrete units shall be of grade or mix as specified. Provision shall be made in the mould to accommodate fixing devices such as hooks etc. and forming of notches and holes. Each unit shall be cast in one operation. A sample of the unit shall be got approved from Engineer-in-charge before taking up the work.

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

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

- 2.11.5 The compaction of the concrete shall be done by vibrating, table or external vibrator, as approved by Engineer-in-charge. The rate quoted for the item shall include the element for framework and mechanical vibration.

- 2.11.6 Rate for item includes cost of all materials, labour, and all operations involved. Cost of M.S. frames, lugs including their welding, lifting hooks is also included.

- 2.11.7 In the item of providing and fixing precast reinforced cement concrete in shelves the cost of cutting chases and making good the same shall be inclusive in the item and nothing extra shall be paid on this account.

3.0 BRICK WORK:-

- 3.1 The brickwork shall be carried out with good quality well burnt FPS bricks of class designation 75 as per CPWD Specifications. Exposed brick work for ground level to plinth level shall be executed with selected FPS bricks of class designation 75.

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

- 3.3 Brick work provided around shaft or lifts walls or around slab cutouts shall be measured in the brick for corresponding floor level. Nothing extra shall be paid on this account.

- 3.4 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.

4.0 AUTOCLAVED AERATED CEMENT BLOCKS:

Only ISI marked Autoclaved Aerated Cement Blocks of Grade- I as per IS: 2185 (Part-III): 1984 shall be used in the work. These Autoclaved Aerated Cement Blocks shall be manufactured & tested as per IS 2185 (Part-III): 1984, except sizes of the blocks which may be as per site

requirements and approved by Engineer-in-charge. The 28 days compressive strength of these blocks should not be less than 4 N/mm². All other parameters including physical requirements thereof shall conform to IS: 2185 (Part-III): 1984.

5.0 STONE / MARBLE WORK

- 5.1 General: - The execution of stones work shall be in general as per CPWD Specifications (Volume-I) 2019, with up-to-date correction slips.

5.2 GRANITE/ MARBLE WORKS

- 5.2.1 The granite/ marble 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 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 stone shall be as per the CPWD Specifications for Marble work Sub Head.
- 5.2.2 The decision of the Engineer-in-Charge as regards the approval of the samples for the various types of the granite/ marble 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 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.
- 5.2.3 That the curvilinear profile of the entrance steps for the building shall be negotiated in segmental manner (using trapezoidal shaped granite stone pieces with straight edges for treads and rectangular stone pieces for the risers) and not in curved profiles as specified earlier. However the granite/ marble 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 stone as laid shall be measured.
- 5.2.4 For the steps (risers and treads) in the linear profile, the granite/ marble stone shall be provided in single pieces up to 2.0m 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.
- 5.2.5. The granite/ marble slabs used for providing and fixing in the sills, soffits and jambs of doors, windows, ventilators and similar locations shall be in single piece unless otherwise directed by the Engineer-in-Charge. Wherever stone slab other than in single piece is allowed to be fixed, the joints shall be provided as per the architectural drawings and as per the directions of the Engineer-in-Charge. In the cabin areas, the joints in sills shall preferably be provided in line with the partition wall. Depending on the number of joints, as far as possible, the stone slabs shall be procured and fixed in slabs of equal lengths as per the architectural drawings and as directed by Engineer-in-Charge.
- 5.2.6 While fixing the granite/ marble 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 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 granite/ marble stone slab shall be fixed over low level storage cabinets using necessary adhesive as per the manufacturer's specification. 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.

- 5.2.7 The granite/ marble 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.

- 5.2.8 **Acceptance Criteria:** - The stone/tile work shall carry Five years guarantee after completion of work against unsound material, workmanship as per guarantee bond. Five years guarantee in prescribed Performa attached under **PageNo. 97 of Part-B** must be given by the specified firm, which shall be counter signed by the contractor, in token of his overall responsibility. If any defect is noticed during the guarantee period, the contractor should rectify it within seven days and if not attended to the same will be got done from another agency at the risk and cost of contractor.

5.3 SAMPLES FOR STONE WORK

Samples of each item of stone work either individually or in combination shall be prepared for approval of Engineer-in-charge before commencement of work.

6.0 WOOD WORK

- 6.1 The wood work in general shall be carried out as per **CPWD Specifications (Volume-I) 2019**, with up-to-date correction slips.
- 6.2 The factory shall be got approved from the Engineer-in-charge before commencement of work for factory made wood work. The sample of timber to be used shall be deposited by the contractor with Engineer-in-charge before commencement of work.
- 6.3 The shape and size of beading shall be as per drawings. The joints of beading shall be metred.
- 6.4 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.
- 6.5 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.
- 6.6 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 so accepted as kiln seasoned and/or chemically treated.
- 6.7 Transparent sheet glass conforming to IS: 2835 – 1977 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	6.0 mm

- 6.8 Factory made wooden flush door shutters shall be carried out as per **CPWD specifications (Volume-I) 2019** with upto date correction slips).
- 6.9 The work shall be executed through specialized agencies to be approved by the Engineer in Charge.
- 6.10 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.
- 6.11 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.
- 6.12 The shutters should be brought at site without primer / painting.

7.0 Fire Rated Doors

Fire rate doors shall conform to specifications lay down by NBC and/or relevant BIS codes etc. and shall have the following additional specifications:

7.1 General Steel Door:

Providing and fixing 45 ± 2 mm thick pure polyester steel door shutter with double skinned with 0.8 mm (22 gauge) galvanized steel sheets (bending radius 1.2 mm) spangle free of size to fit the above frame, stressed-skin design, (no visible joint on faces), lock seam joint (without any visible weld joints on the vertical edges also) and flush top with inverted channel; and with paper honey-comb infill bonded to the skin with pu/co-polymer resins, pre-punched /pre-drilled to receive ironmongery manufactured by approved vendor. Suitable reinforcement is to be provided in the door shutter to receive the hardware.

The doors with double shutters are to be provided with astragals on both sides & astragals to be fitted to the door without any fasteners. The shutter to be fixed with SS hinges 304 grades (size 100x75x3mm). The door frame (section size 100x57) should be made from 1.2mm thick GI steel /GP steel pressed to single rebate profile for better structural strength. Frames are to be fixed with fasteners. The entire assembly pre-finished with epoxy/PU/co-polymer or powder coated, as approved, tested to 4020 (type tests for doors) as applicable like slamming, edge-loading, racking, misuse etc. & guaranteed for 1, 00,000 slams test. Complete door shutter including frame shall be measured for payment. All fittings, fixtures, hinges & vision panel shall be paid separately.

7.2.2 Hrs GI - Steel Fire Rated Door:

Providing and fixing 45 ± 2mm Fire rated door of Pure Polyester (UV Resistant Grade) Powder coated, 120 minutes Fire Rated (for Stability & Integrity) Galvanized (Zinc Coated) Steel Door and frame conforming to IS 3614 Part 2 & BS 476 part 22. The Door Shutter should be made of 1.2mm thick steel pressed formed to provide a 45mm thick fully flush double skin door shell with lock seam joints at stile edges or as per manufactures specification prototype passed at GQMC-Government Quality Marking Center or CBRI. The internal construction of the door to be phenolic resin impregnated specially designed rock wool with suitable internal reinforcement. Suitable reinforcement is to be provided in the door shutter to receive the hardware and hardware to be fixed on the door with no visible fasteners. The doors with double shutters are to be provided with astragals on both sides & astragals to be fitted to the door without any fasteners. The shutter to be fixed with SS hinges 304 grade (size 100x75x3mm). Including the door frame (section size 143x57) made from 1.6mm thick GI steel pressed to double rebate profile for better structural strength. Frames are to be fixed with fasteners. The Gap between the frame & shutter should not exceed 3mm on all side except at the bottom where the gap can go up-to a maximum of 7mm. The entire assembly to be pre-finished -factory finished heat ovened, powder coated, & made as per drawing. The shutter will be provided with Vision Panel with Clear fire rated glass from with proper beading all around etc. Complete door shutter including frame shall be measured for payment. All fittings, fixtures, hinges & vision panel shall be paid separately.

7.4 Door Threshold

Door thresholds shall be provided as shown on drawing. Doors without threshold shall have bottom tie of approved type.

7.5 Handling and Storage of Fabricated Materials

All doors, windows, etc. shall be packed and crated properly before dispatch, to ensure that there shall be no damage to the fabricated materials. Loading into wagons and trucks shall be done with all care to ensure safe delivery of materials at site in undamaged condition.

While taking delivery of items supplied by Owner, the Contractor shall satisfy himself that the items supplied are upto the specified standard. Any defect detected shall promptly be brought to the notice of the Engineer.

All doors, windows etc. shall be stored under cover in a way to prevent damage or distortion. Special care shall be taken to prevent staining of aluminium products by rust, mortar etc.

7.6 Assembly & Erection at Site

In general, the fixing of steel doors, windows, ventilators, louvers, etc. shall conform to IS: 1081 and as shown on drawings. The contractor shall assemble and install all steel doors. Sashes, fixed metal louvers etc. including transoms and mullions for composite units in respective places as shown on drawings, keeping proper lines and levels, and in approved workmanship manner, to give trouble free and leak-proof installations. The installation shall be done according to recommendation of the manufacturer, and/or as per direction of the Engineer-in-charge. The installation shall be carried out under the supervision of the

manufacturer's representative. The contractor shall take every precaution against damage of the components during installation. Necessary holes, chases, etc. required for fixing shall be made by the Contractor and made good again as per original, after installation, and nothing extra shall be payable to the contractor on this account.

After installation of steel doors all abrasions to shop-coat of paint shall be retouched and made good with the same quality of paint used in shop coat.

All coupling mullions, transoms, frame, etc. in contact with adjacent steel and other members, shall be well bedded in mastic. The Contractor shall bring to the site the mastic cement in original sealed containers of manufacturer and shall apply it as per the instructions. For all frames supplied by either the Owner or the contractor, mastic shall be supplied by the Contractor and caulking done properly as per drawings, Specifications and as per instructions of the Engineer.

Door shutters partition hardware fixtures etc. shall be fixed only after major equipment has been installed in rooms.

Wherever required, nylon cords of approved quality shall be supplied along with pivoted sashes and shall be of adequate length to terminate one metre from the floor. Loose ends of cards shall end in metal or plastic pull as approved by the Engineer-in-charge.

7.7 Acceptance Criteria

7.7.1 For Fabricated Items

Overall dimensions shall be within ± 1.5 mm of the size shown on drawings.

Mullions, transoms etc. shall be in one length and permissible deviations from straightness shall be limited to ± 1.5 mm from the axis of the member.

Door and window shutters shall open without jamming. The clearance at head and jamb for door shutters shall not exceed 1.5 mm. For double leaf doors, the gap at the meeting stiles shall not be more than 1.5 mm.

Door leaves shall be undercut where shown on drawings.

Doors, windows, frames etc. shall be on a true plane, free from warp or buckle.

All welds shall be dressed flush on exposed and contact surfaces.

Correctness of location and smoothness of operation of all shop installed hardware and fixtures.

Provision for hardwares and fixtures to be installed at site.

Glazing beads shall be cut with metred corners.

Glazing clips, fixing devices etc. shall be supplied in adequate numbers.

Shop coats shall be properly applied.

Exposed aluminium surface shall be free from scratches, stains and discoloration; Anodised surfaces shall present a uniform and pleasing look.

7.7.2. For Installed Items

Installations shall be at correct location, elevation and in general on a true vertical plane.

Fixing details shall be strictly as shown on drawings.

Assembly of composite units shall be strictly as per drawings, with mastic caulking at transoms and mullions, gaskets, weather strips etc. complete.

All frames on external walls shall be sealed with polysulphide or mastic caulked to prevent leakage through joint between frames and masonry.

All openable sections shall operate smoothly without jamming.

Cutting to concrete or masonry shall be made good and all abrasions to shop paint shall be touched up with paint of same quality as shop paint.

Aluminium doors, windows etc. shall be free from scratches, stain or discolouration. Hinges, Tower bolts, locks.

Before bulk supply, he shall submit for the approval of the Engineer-in-charge, samples of all bought out items and samples of each type of fabricated item. The samples shall be retained by the Engineer-in-charge for comparison of bulk supply and returned to the Contractor towards the end for the final incorporation in the job.

8.0 STEEL WORK

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

9.0 FLOORING

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

- 9.2 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.
- 9.3 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.
- 9.4 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. 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.
- 9.5 The Marble/ Kota/ Granite or any other stone shall be fully supported by the details establishing the quarry and its location.
- 9.6 Full width Marble/ Kota/ Granite stone over kitchen platform shall be provided which shall not be less than 900mm long except to adjust for closing pieces. The marble / stone flooring in treads and risers of staircase shall not be less than 1500mm long except to adjust the closing pieces. Nothing extra shall be paid on these accounts
- 9.7 Vitrified Tile Flooring**
The tiles shall be of approved make and shall generally conform to Table 12 of IS 15622. The full body Vitrified tiles of specified sizes shall be used & sample of tiles shall be got approved from the Engineer-in-Charge. All tiles shall be rectified and double charge minimum. The Mandatory tests for vitrified tiles shall be got done as per CPWD Specifications (volume-1)/relevant BIS Code.
- 9.8 Ceramic Tiles Flooring**
The tiles shall be procured from the approved manufactures of the specified shade colour. The floor & wall tiles shall be conforming to IS:15622 for floor and wall tiles respectively. Tiles for dado shall be 300mm x 450mm (minimum size) or more (GROUP-III) as approved. Tiles for flooring shall be 300mm x 300mm (minimum size) or more (GROUP-V) as approved. Test shall be conducted to satisfy the quality of material as per CPWD Specifications
- 9.9 The rate of items of flooring is inclusive of providing sunken flooring in bathrooms, kitchen etc. and nothing extra on this account is admissible. The proper gradient shall be given to flooring for toilets, verandah, kitchen, courtyard, etc. as per the directions of Engineer-in-charge.
- 9.10 The entire responsibility for the quality of work will however rest with the building contractor only and he shall submit a Guarantee Bond as per Proforma at **PageNo. 97-99 of Part-B**. If any defect is noticed during the guarantee period, the contractor should rectify it within seven days and if not attended to the same will be got done from another agency at the risk and cost of contractor.
- 10.0 Wooden laminated flooring 12 mm thick AC-5 grade**
Providing and fixing wooden laminated flooring 12 mm thick AC-5 grade with 0.10 mm thick polythene sheet as moisture barrier and 2 mm thick foam for hush factor as per approved colour, shade and design complete by Engineer-in-Charge.

Materials and T&P: As mentioned in the item

Wooden laminated flooring 12 mm thick AC-5 grade of approved brand as decided by Engineer in Charge.

0.10 mm thick polythene sheet of superior quality, as approved by Engineer in Charge, as moisture barrier.

2 mm thick foam (heavy duty), as approved by Engineer in Charge, for hush factor. All related accessories and materials.

(a) **Testing:** The all material and equipments shall be tested for effectiveness before taking up the operation as per direction of Engineer in Charge.

(b) **Procedure:**

- **Step-1:** Follow the guidelines for Safety, Quality Assurance, Environmental Protection, Product delivery, Personnel, Supervision, Storage and Handling, etc. given in contract documents.

- **Step-2:** The hard base surface on which the wooden flooring shall be fixed shall be checked for dampness and corrected to levels. If any kind of dampness is observed effective measure shall be taken to prevent causes of dampness, so as to make surface damp free, before any installation operation of flooring.
 - **Step-3:** 0.10 mm thick polythene sheet as moisture barrier shall be cut to the required length, brushed clean of dusting material and laid out flat on the hard base surface corrected to required levels to eliminate curls and subsequent stretching, in such way that it is continued and raised by minimum 30 mm along the edge wall junction.
 - **Step-4:** 2 mm thick foam (for hush factor) shall be cut to the required length, brushed clean of dusting material and laid out flat on wrinkle free surface of already laid polythene sheet to eliminate curls and subsequent stretching.
 - **Step-5:** The end Wooden laminated flooring 12 mm thick AC-5 grade boards shall be accurately fixed with the sides parallel and close to the walls leaving a breathing gap of 10 mm along the edge of wall. Each adjoining board shall be carefully jointed and shall be tightened in position with proper inter locking. The flooring shall be truly level and plane. The joints shall be truly parallel and or perpendicular to the walls, unless otherwise specified or as directed by Engineer in charge. The floor shall be plane in both directions and made perfectly even, true and smooth.
 - **Step-6:** After installation of flooring boarding, company recommended corner gola beading of required shape/pattern, matching colour/ shade, finish as approved by Engineer in charge shall be fixed with suitable nails along the edges of walls over the edge gaps taking the raised polythene sheet extending out. Extra part of polythene sheet visible beyond the beading shall be cut.
 - **Step-7:** At the door openings company recommended edge beading of required shape/pattern, matching colour/shade, finish as approved by Engineer in charge shall be fixed along the edges taking polythene sheet extending out. Extra part of polythene sheet visible beyond the beading shall be cut.
- (c) **Measurements:** Length and breadth of superficial area of the finished work shall be measured correct to a cm. Area shall be calculated in square meter correct to two places of decimal. No deduction will be made of openings of areas correct to 0.40 Sqm nor shall extra payment be made either for any extra material or labour involved in forming such openings. For openings exceeding 0.40 Sqm. in area, deduction in measurements shall be made.
- (d) **Rates:** The rates shall cover cost of all materials, labour and T&P involved in all the operations described above at all levels.

11.0 **WATER PROOFING FOR SUNKEN FLOORS:-**

- 11.1 The work shall be got executed from the specialized agency as approved by the Engineer in Charge.
- 11.2 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.
- 11.3 The finished surface after water proofing treatment shall have adequate smooth slope as per the direction of the Engineer-in-charge.
- 11.4 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.

11.5 **GUARANTEE BOND FOR ALL WATER PROOFING ITEMS:-**

Five years Guarantee bond in prescribed proforma at **Page No. 95 of Part-B** 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. **Ten per cent (10%) of the cost of water-proofing work shall be retained as Security Deposit in addition to normal security deposit of the whole work and the amount so deducted would be released after five (05) years from the date of completion of the entire work under the agreement, if the performance of the treatment is found satisfactory.** If any defect is noticed during the guarantee period, the contractor shall rectify it within 15 days of

receipt of intimation of defects in the work. If the defects pointed out are not attended to within the specified period, the same will be got done from another agency at the risk and cost of contractor.

12.0 FINISHING:-

12.1 The work shall be done in accordance with **CPWD Specifications (Volume-II) 2019** with up-to-date correction slips and/or manufacturers specifications wherever applicable.

12.2 All painting material of approved brand and manufacturer shall be brought to the site of work in the original sealed containers. The material brought to the site of work shall be sufficient for at least 30 days of work. The material shall be kept under the joint custody of contractor and representative of the Engineer-in-charge. The empty containers shall not be removed from the site till the completion of the work without permission of the Engineer-in-charge.

12.3 In the item of finishing walls with water proofing cement paint, only the plain/flat area shall be measured for payment and nothing extra shall be paid on account of pointed wall surface.

13.0 Gypsum Light Weight Plaster

13.1 The contractor shall procure Gypsum Light Weight Plaster conforming to IS: 2547 (Part-I & II) as required in the work from reputed manufacturers of Gypsum Light Weight Plaster as per approved list. The Gypsum Light Weight Plaster of approved make as aforesaid in packages bearing manufacturer's name along with **manufacturers test certificate** for each lot shall be procured by the contractor.

13.2 In any consignment, all the packages of the Gypsum Light Weight Plaster of the same class and type and from the same batch of manufacture shall be grouped together to constitute a lot.

13.3 Samples shall be selected and tested separately from each lot to determine its conformity or otherwise to the requirement of the specification.

13.4 The packages for the sample shall be selected at random from the lot and in order to ensure the randomness of selection the procedures given in IS: 4905- 1968 may be adopted.

13.5 The number of packages to be selected for the sample from a lot shall depend upon the size of the lot and shall be in accordance with Col 1 and 2 of table below:-

Sl. No.	LOT SIZE (No. of Packages in the lot) (1)	SAMPLE SIZE (No. of Packages to be selected for the sample) (2)
1.	Up to 100	3
2.	101 to 150	4
3	151 to 300	5
4.	301 to 500	7
5.	501 and above	10

Samples of Gypsum Light Weight Plaster arranged by the contractor shall be taken by the Engineer-in-Charge and got tested in accordance with provisions of relevant BIS Codes. The material for such testing purpose shall be supplied by the contractor free of charge. In case test results indicate that the material arranged by the contractor does not conform to the relevant BIS Codes, the same shall stand rejected and shall be removed from the site by the contractor at his own cost within a week's time of

written order from the Engineer-in-Charge to do so. The cost of tests shall be borne by the contractor/department in the manner indicated below:

i) By the contractor, if the results show that the Gypsum Light Weight Plaster does not conform to relevant BIS Codes. ii) By the department, if the results show that the Gypsum Light Weight Plaster conforms to relevant BIS Codes.

13.5.1 The test results of the samples so obtained shall be in full compliance with the requirements of IS: 2547 (Part-I & II) in terms of composition of material, physical properties, chemical properties and other requirements laid down in the said standards. The setting time of the material should not be less than 30 minute in any case.

13.5.2 Work shall be carried out as per **CPWD Specifications (Volume-II) 2019** with up-to date correction slips. RCC and brick work surfaces shall be properly hacked and raked respectively before application of plaster. PVC mesh of approved make shall be provided at joints of dissimilar materials.

13.5.3 The entire responsibility for the quality of work will however rest with the building contractor only and he shall submit a Guarantee Bond as per Proforma at **Page No. 99 of Part-B**. If any defect is noticed during the guarantee period, the contractor should rectify it within seven days and if not attended to the same will be got done from another agency at the risk and cost of contractor.

- 13.5.4 Rate shall include the cost of all labour & material including PVC mesh involved, in all the operations described above and in CPWD Specifications (Volume-II) 2019 with upto date correction slips.

14.0 **SANITARY INSTALLATIONS /WATER SUPPLY / DRAINAGE:-**

- 14.1 The contractor shall submit schematic drawing of water supply and sanitary installation showing details of layout, including internal water supply and drainage details, showing the detail of water supply lines including fittings diameter wise and fixtures connecting to soil waste through traps and connection of W.C. to main shaft pipe for drainage including its ventilation system for approval of Engineer-in-Charge.
- 14.2 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.
- 14.3 The work in general shall be carried out as per CPWD Specifications (Volume-II) 2019 with up-to-date correction slips.
- 14.4 The tendered rates shall include the cost of cutting holes/cores in walls, floors, RCC slabs etc. wherever required and making good the same for which nothing extra shall be paid.
- 14.5 The Centrifugally spun cast iron pipe IS: 3989-1984 wherever necessary shall be fixed to RCC columns, beams etc. with rawl plugs of approved quality and nothing extra shall be paid for on this account.
- 14.6 The jointing should be as per CPWD specifications.
- 14.7 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.
- 14.8 The entire responsibility for the quality of work will however rest with the building contractor only and he shall submit a Guarantee Bond as per Performa at PageNo. 96 of Part-B. If any defect is noticed during the guarantee period, the contractor should rectify it within seven days and if not attended to the same will be got done from another agency at the risk and cost of contractor.

15.0 **Aluminium doors, windows, ventilators etc. glazing specifications**

- 15.1 **Extent and Intent:** - The work shall be carried out in the factory through an approved Special Agency, who shall furnish all material, labour, accessories, equipment, tool and plants and incidentals required for providing and installing anodized/powder coated aluminium doors, windows, claddings, louvers and other items as called for on the drawings. The drawings and specifications cover the major requirements only. The supplying of additional fastenings, accessories, fixtures and other items not mentioned specifically herein, but which are necessary to make a complete installation shall be a part of this contract. Hinges for openable panel shall be stainless steel friction hinges / stays selected for specified wind load and dead loads or specifically extruded in-built hinges.
- 15.2 **General:** - Aluminium doors, windows etc. shall be of sizes, section details as shown on the Architectural drawings. The details shown on the drawings indicate generally the sizes of the component parts and general standards. These may be varied slightly to suit the standard adopted by the manufacturers. Before proceeding with any manufacturing, the contractor shall prepare and submit complete manufacturing and installation drawings for approval of the Engineer-in-Charge and no work shall be performed until the approval of these drawings is obtained.
- 15.3 **Shop Drawings:** - The contractor shall submit the shop drawings of doors, windows, louvers, cladding and other aluminium work, based on the architectural drawings to the Engineer-in-Charge for his approval. The shop drawing shall show full size sections of doors, windows etc. thickness of metal (i.e. wall thickness) details of construction, sub frame/rough ground profile, anchoring details hardware as well as connection of windows, doors and other metal work to adjacent work. Samples of all joints and methods of fastening and joining shall be submitted to the Engineer-in-Charge for approval well in advance of commencing the work.
- 15.4 **Samples:** - Samples of doors, windows louvers etc. shall be fabricated, assembled in the

- factory and submitted to Engineer-in-Charge for his approval. They shall be of sizes, types etc. as decided by Engineer-in-Charge. All samples shall be provided at the cost of the contractor.
- 15.5 **Sections:** - Aluminium doors and windows shall be fabricated from extruded sections of profiles as detailed on drawings. The sections shall be extruded by the manufacturers approved by the Engineer-in-Charge. The aluminium extruded sections shall conform to BIS designation IIE/IIV 9 WP alloy, with chemical composition technical properties, as per IS: 733 and IS: 1285. The permissible tolerance of the extruded sections shall be such as not to impair the proper and smooth function/ operations and appearance of doors and windows.
- 15.6 **Fabrication:** - Doors, windows etc. shall be fabricated to sizes at factory and shall be of section, sizes, combinations and details as shown on the drawings. All doors, windows etc. shall have mechanical joints. The joints shall be designed to withstand a minimum wind load of 150 Kg. per Sqm. The design shall also incur that the maximum deflection of any member shall not exceed 1/175 of the span of the member. All members shall be accurately machined and fitted to form hairline joints prior to assembly. The joints accessories such as cleats, brackets etc. shall be of such material as not to cause any bimetallic action. The design of the joints and accessories shall be such that the accessories are fully concealed. The fabrication of doors, windows, etc. shall be done in suitable sections to facilitate easy transportation, handling and installation. Adequate provision shall be made in the door and window members for anchoring to support and fixing of hardware and other fixture as approved by the Architect.
- 15.7 **Anodizing/ powder coating:** -All aluminium sections shall be Powder coated (minimum 50 micron thickness) as per requirement as per IS: 7088 and to required colour as specified in the item as per IS: 1868 grading as specified in item schedule after cutting the member to requisite sizes before the final assembly. Powder coating shall be of minimum 50 micron thickness. Anodizing conforming to specified grade with minimum average thickness of 15 microns when measured as per IS: 612. The anodic coating shall be properly sealed by steams or in boiling water are cold sealing process as per IS:1868/IS: 6057. Polythene tape protection shall be applied on the anodised section before they are brought to site. All care shall be taken to ensure surface protection during transportation, storage at site and installation. The tape protection shall be removed on installation. The sample will be tested in the approved laboratory and cost of samples; etc. shall be borne by the contractor.
- 15.8 **Protection of finish:** - All aluminium members shall be wrapped with approved self-adhesive non-staining. PVC tapes.
- 15.9 **Handling and Stacking:-**
- 15.9.1 Fabricated materials shall be carried in an approved manner to protect the material against any damage during transportation. The loading and unloading shall be carried out with utmost care. On receipt of material at site, it shall be carefully examined to detect any damaged pieces. Arrangements shall be made for expeditious replacement of damaged pieces/ parts. Materials found to be acceptable on inspections shall be repacked in crates and stored safely.
- 15.9.2 In the case of composite windows and doors, the different units are to be assembled first. The assembled composite units should be checked for line, level and plumb before final fixing is done. Units may be serial numbered and identified as out how to be assembled in their final locations if situation so warrants.
- 15.9.3 The contractor shall be responsible for assembling composite, bedding and filling the grove with polysulphide sealant inside and outside, at transoms and mullions placing the doors, windows etc. in their respective openings. After the doors/ windows have been fixed in their correct assigned position, the open hollow sections abutting masonry concrete shall be fitted with approved poly-sulphide sealant densely packed and finished neat.
- 15.9.4 The contractor shall be responsible for doors, windows, etc. being set straight, plumb, level and for their satisfactory operation after fixing is complete.
- 15.10 **Installation:**
- 15.10.1 Just prior to installation the doors, windows, etc. shall be uncreated and stacked on edge on level bearers and supported evenly. The frame shall be fixed into position true to line and level using adequate number of expansion machine bolts, anchor fasteners, of approved size and manufacture and in an approved manner. The holes in concrete/masonry members for housing anchor bolts shall be drilled with an electric drill.
- 15.10.2 The doors/ windows assembled as shown on drawings shall be placed in correct final position on the opening and marks made on concrete members at jambs, sills and heads against the holes provided in frames for anchoring. The frame shall then be removed from the opening and laid aside. Neat holes with parallel sides of appropriate size shall then be drilled in the

concrete members with an electric drill at the marking to house the expansion bolts. The expansion bolts shall then be inserted in the holes, struck with a light hammer till the nut is forced into the anchor shell. The frame shall then be placed in final position in the opening and anchored to the support through cadmium plated machine screws of required size and anchored to the support through cadmium plated machine screws of required size threaded to expansion bolts. The frame shall be set in the opening by using wooden wedges at supports and be plumbed in position. The wedges shall invariably be placed at the meeting at points of glazing bars and frame.

- 15.11 EPDM Rubber / Neoprene gaskets:** The contractor shall provide and install EPDM Rubber / Neoprene gaskets of approved size and profile at all locations as shown and as called for to render the doors, windows etc. absolutely air tight and weather tight. The contractor shall produce samples of the gaskets for approval and shall procure the same after approval only.
- 15.12 Fittings:** Hinges, stays, handles, tower bolts, locks and other fittings shall be of quality and manufacturer as approved by the Engineer-in-Charge.
- 15.12.1 Manufacturer's Attendance:** The manufacturer immediately prior to the commencement of glazing shall adjust and set all windows and doors and accept responsibility for the satisfactory working of the opening frames.
- 15.13 Poly-sulphide:** The gaps between frames and supports and also any gaps in the door and windows sections shall be raked out as directed and filled with poly-sulphide of approved colour and make to ensure complete water tightness. The poly-sulphide shall be of such colour and composition that it would not stain the masonry/concrete work, shall receive paint without bleeding, will not sag or run and shall not set hard or dry out under any conditions of weather. The sample of poly-sulphide to be used for this purpose shall be got approved from the Engineer-in-Charge before its actual use.

15.15 Details of Test:

- 15.15.1 The various tests on aluminium sections shall be conducted in accordance with the relevant IS codes.
- 15.15.2 The minimum number of tests for anodizing/powder coating and corrosion resistance shall be as given below: -

S.No.	Details	No. of Tests
1.	Doors, windows and ventilators	One test for every 1000 kg or part thereof.

- 15.15.3 The samples of major member of each unit of doors/ windows shall be selected at random by Engineer-in-Charge as such that all the aluminium section shall be got tested.
- 15.16 Acceptance Criteria:** - The entire responsibility for the quality of work will however rest with the building contractor only. The aluminium work shall carry Five years guarantee after completion of work against unsound material, workmanship and defective anodizing/ powder coating as per Guarantee Bond. Five years guarantee in prescribed Performa attached under **Page No.98 of Part –B** must be given by the specified firm, which shall be counter signed by the contractor, in token of his overall responsibility. If any defect is noticed during the guarantee period, the contractor should rectify it within seven days and if not attended to the same will be got done from another agency at the risk and cost of contractor.

15.17 Rates: -

- 15.17.1 The rates of the item shall include the cost of materials, labour required in all the above operations.
- 15.17.2 The rates exclude the cost of stainless steel friction hinges / stays selected for specified wind load and dead loads or specifically extruded in-built hinges, and rest of the fittings shall also be paid separately.

16.0 STRUCTURAL GLAZING/CURTAIN WALL GLAZING

16.1 SCOPE OF WORKS

The scope of works under this contract includes design, supply, installation, protection, guarantees, testing and maintenance up-to the defects liability period for Structural Glazing, Curtain Wall Glazing, etc. The fabrication work shall be done in approved factory.

The work under this section includes all Labour, materials, equipment and services as

required for the complete design, engineering, testing, fabrication, assembly, delivery, anchorage, installation, protection and waterproofing of the aluminium curtain wall / structural glazing system, and all in accordance with the true intent and meaning of the specifications and drawings taken together, regardless of whether the same may or may not be particularly shown on the drawings or described in the specification provided that the same can be reasonably inferred there from. Anchorage includes all primary and secondary anchor assemblies and supportive structural framing as required to secure aluminium structural glazing system, cladding and louvers to the building structure.

16.1.1 The detailed scope of works consists of:-

The aluminium structural glazing system described hereafter shall include but will not necessarily be limited to the following:-

- a) Frames, vision panels, spandrels, doors and ventilators.
- b) Openable panels where indicated, inclusive of all accessories, fittings etc.
- c) Copings, soffit trimmers, and external metal cladding panels for both the wall cladding and the curtain walling system.
- d) Aluminium doors, aluminium windows, aluminium fix glazing, louvers etc. wherever indicated.
- e) All caulking, sealing and flashing including sealing at junctions with roof waterproofing and exterior wall, flashing at doorway, raised kerbs and in window surrounds.
- f) Sealant within and around the perimeter of all work under this section.
- g) Separators, neoprene / EPDM / silicon gaskets, trims etc.
- h) All steel structural framing and beam supports, anchors and attachments as required for the complete installation of the whole system, wherever specified.
- i) Inserts in concrete, anchor fasteners etc. for the anchorage of all work under this section to the approval of Engineer in charge.
- j) Isolation of all dissimilar metal surfaces as well as moving surfaces similar or dissimilar.
- k) Fire-stops, Flashings, Sealing of all interfaces with buildings etc.
- l) Protection during storage and construction until handing over.
- m) Engineering proposals, drawings and data.
- n) Shop drawings, engineering data and structural calculations of all systems including framing, fasteners and cladding.
- o) Scheduling and monitoring of the work.
- p) All samples, mock-ups and test units.
- q) Co-ordination with work of Civil Works and other contractors employed on site.
- r) All final exterior and interior cleaning of the aluminium structural glazing system, cladding, doors, Louvers and window etc.
- s) Hoisting, staging, scaffolding and temporary services.
- t) Specified tests, inclusive of necessary reports.
- u) Maintenance manuals.
- v) Design and Performance guarantees.
- w) Periodic inspection, supervision and advice by Contractor's Senior Personnel of the System Principal as well as guarantee in approved Proforma for the quality and performance of works.
- x) Construction monitoring for regular quality control and technical inspection to ensure the work conforms to the shop drawing details (including any modification made during testing) and acceptable standards of quality.

16.2.1 Building Regulation

Design of the aluminum structural glazing system shall comply with all Government codes and regulations. For wind design, all calculations shall comply with the requirements of the relevant National Building Code and Indian Standard Code, unless specified otherwise.

16.2.2 Guarantee

The Contractor shall be fully responsible for and shall guarantee proper design and performance of his installed system for a period of 5 years from the date of completion of work.

The design and installation shall be to the best international standards and shall specially take account of wind and seismic loads, storms, air pollution, thermal stresses, building movements and the like

In addition specific 5year guarantees in enclosed Proforma shall be given for performance of glass, aluminium, glazed units, anodizing, PVDF coating to cladding sheets / aluminium sections, EPDM / silicon gaskets and sealants. All the Guarantees shall be submitted before

Final payment and shall not in any way limit any other rights to correction which the Employer may have under the Contract.

16.4 **CONTRACTOR'S RESPONSIBILITIES**

The Contractor's responsibilities include but are not necessarily limited to the following items:

a) The Contractor shall provide and install all supplementary parts necessary to complete all items generally implied in the drawings and in the specifications though not specifically shown or mentioned. This shall include the design and sizing of all sections and anchor assemblies to meet the performance and design requirements, furnishing and installation of all inserts, fasteners, clips, bracing and framework as required for the proper anchorage of the structural glazing system elements to the structure, unless otherwise noted or specified to be furnished / installed by another contractor. Alternate anchorage proposals will be considered, if, in the opinion of the Engineer-in-charge the general design and intent of the drawings and specifications are maintained. The Contractor's system therefore must perform satisfactorily as a whole.

b) Design Responsibility:

Drawings and specifications indicate the required basic dimensions, profiles and performance criteria. The Contractor shall have the option of modification and addition of details provided the visual concept and performance requirements are fulfilled. Proposed modifications shall be clearly shown on shop drawings as "Design Modifications" and acceptance of the same will not relieve the Contractor from sole responsibility for performance of the aluminium structural glazing system and cladding. The Contractor shall be solely and fully responsible for due performance of his installation based on his own design and details.

c) In-plant and job site inspection: The Contractor shall allow the Engineer-in-Charge or his authorized representative full access to plants, shops and assembly points to view and inspect the processes and methods employed in the fabrication, assembly and finishing of the aluminium structural glazing system and cladding for this project.

The Engineer-in-Charge will have the right to reject any and all aluminium structural curtain wall / structural glazing system and cladding components and assemblies during assembly and erection if the workmanship and intent are not in strict conformity with the approved shop drawings, structural calculations, documentation, certifications, samples and mock-up.

d) Glass, sealants and other items or materials procured by purchase shall be back to back guaranteed by the manufacturer.

16.5 **SHOP DRAWINGS**

16.5.1 The contractor shall prepare necessary shop drawings based on the preliminary Architectural drawings and four (4) copies of all shop drawings shall be submitted to the Engineer-in-Charge for review and approval. The Engineer-in-Charge's review of all shop drawings will be limited to their conformity to the design concept & specifications. Engineer-in-Charge's approval of the shop drawings will not relieve the contractor from any of the responsibilities and requirements as stated drawings and all other related submissions, documentation, certifications, samples and the mock-up for that work have been reviewed and approved by the Engineer-in-Charge. On approval of the drawings by Engineer-in-Charge, the Contractor shall submit six (6) copies of all drawings with softcopy to Engineer-in-Charge for release to execution. Shop drawings shall incorporate scaled and dimensioned plans, elevations, sections and full size details for all work in this section.

Shop drawings shall indicate the desired dimensional profiles and modules, function, design and performance standards and, in general, delineate the scope of work. The contractor shall verify and coordinate these items with all applicable and/or related trades, contract drawings and specifications. Since the dimensions and modular references shown on the drawings are for specific and/or typical detail, the shop drawings shall include a full complete layout of all modular and referenced dimensions for all the aluminum structural glazing, cladding, doors, windows and louvers and their related elements. All dimensions / modules, etc., shall be field checked as required.

The full size details shall show and specify all metal sections, types of finishes; areas to be sealed and sealant materials; gaskets; direction and magnitude of thermal expansion; direction and magnitude of all applicable construction including fasteners and welds; all anchorage assemblies and components; the fabrication and erection tolerances for the work and applicable related works adjoining, attached to or in some way related to the work covered by these specifications. The location of all static and dynamic anchor assemblies, the

- direction of thermal and other applicable building movements, coordination with concrete works and the sequence of installation shall be designated on the applicable plans, elevations and / or sections. All details shall be subject to Engineer-in-Charge approval.
- 16.5.2 Shop drawings shall indicate the desired profiles, dimensions, details of metal finish and in general delineate the scope of the work. Profile adjustments in the interest of economy, fabrication, erection, weather-ability or ability to satisfy the performance requirements may be made only with the written approval of the Engineer-in-Charge, provided that the general design and intent of the drawings and specifications are maintained.
- 16.5.3 Shop drawings to be vetted by the Principal of the Structural Glazing & Cladding System. Six (6) copies each of all final approved shop drawings shall be submitted to Engineer-in-Charge
- 16.6 **STRUCTURAL CALCULATIONS**
- 16.6.1 The Contractor shall guarantee that his design will ensure the structural safety and integrity of the curtain wall, cladding and glass panels against all natural forces, superimposed loads, environment and consequent movements. For that purpose the contractor shall employ a competent design engineer to design his systems and components. During the design stage, the Contractor shall interact actively with the Architect concerning all aspects of design and shall obtain all the information from them concerning the structure, probable deflections and other building movements etc. The Contractor shall take full account of all possible building movements as well as the movements of his curtain wall and cladding systems in his design. The Contractor shall submit his detailed structural calculations for the systems and each of their components and shall guarantee that his design will ensure the structural safety and integrity of the curtain wall, cladding and glass panels against all natural forces, superimposed loads, environment and consequent movements.
- The structure and functional design of curtain wall system must be vetted and approved by the Principals of the curtain wall system. The Contractor shall obtain the Engineer-in-Charge's approval to his design calculations and to the provisions made in his design for all the building movements, and shall be responsible for the correctness of the fixing and interaction of the curtain wall with the structure so as to ensure that all the movements envisaged between the structure and the curtain wall area are fully taken care of. The Contractor shall be responsible for the workmanship of fabrication and installation and shall indemnify the Employer against all claims due to defects or non-performance during the specified 10 year Guarantee period. The provisions of this clause shall not in any way limit the department rights under other clauses of the Contract.
- 16.6.2 The R.C.C. in the building structure is **Grade M25** or anyother grade as per structure design and as per direction of Engineer-in-charge. The Contractor shall design anchorages for this grade of concrete with adequate safety factor.
- 16.6.3 Three (3) sets of approved design calculations which is compatible with R.C.C. and steel structure shall be submitted to Engineer-in-Charge.
- 16.7 **DOCUMENTATION AND CERTIFICATION**
- 16.7.1 **Glass and Glazing Documentation:**
- The applicable glass manufacturer(s) shall submit written certification for Engineer-in-Charge's review and approval stating that all glass and glazing requirements as detailed and specified on the shop drawings have been reviewed and approved for use relative to their specific application and / or design parameters, compatibility to adjacent materials and in conformity with all requirements as detailed and specified in the Contract Documents. Certification shall further state that the proposed glass and glazing materials are most appropriately suited for the use or uses intended and recommended for the specific use or the selection of the glass and the glazing materials including, but not limited to, gaskets, setting blocks, sealant, the design and dimensional parameters of the glass pockets and the compatibility of materials. Test Certificate from approved laboratories for U-values and shading factor claimed by the Manufacturer shall be submitted.
- 16.7.2 **Sealants Documents:**
- All sealant applications must be clearly designated on the applicable shop drawing details and referenced to a master sealant schedule specifying materials, special instructions and application procedures. The applicable sealant manufacturer(s) shall submit in writing that all sealant requirements as detailed and specified on the shop drawings have been reviewed and approved for use relative to their specific application and / or design intent, compatibility to adjacent materials and in conformity with all the requirements as detailed and specified in the contract documents. The manufacturer's certification shall specify the optimum life expectancy, in years, for the proposed sealant materials as detailed and specified on the shop drawings and/or master sealant schedule and shall further state that the proposed materials

are most appropriately suited for the use or uses intended and recommended for the specific use or uses.

16.7.3 Quality Control Documentation:

In-plant and job site quality control procedures shall be documented in writing for review of Engineer-in-Charge and approval to ensure the design integrity and performance of the as-built product. Documentation shall include schedule, details, isometric and/or schematic explanatory sketches crossreferences to the shop drawings, data sheets, etc., all as required to intelligently witness and assess methods and materials; and to ensure that both the fabrication and installation are in accordance with the contract documents.

The Engineer-in-Charge or his authorized representative shall be given free access to the plant to inspect fabrication procedures. No fabrication or assembly of job site materials shall commence until the first production unit is inspected and approved by Engineer-in-Charge.

The in-plant quality control procedures shall include but not necessarily be limited to the following items:

Fabrication	Tolerances, Joinery, Sleeves, etc.
Finish Match	Approved finish controls required for matching the exposed surfaces.
Assembly	Welds, fastener, sealants, gaskets, separators, glazing etc.
Protection	Handling, protection, shipping etc.

The job site quality control procedures shall include, but not necessarily be limited to the following items:

Anchorage	Lines, grades and related building tolerances
Installation	Tolerances, finish, match, joinery, sleeves, flashing, welds, fasteners, sealants, etc.
Sealing	As recommended by the applicable sealant manufacturer(s)
Protection & Cleaning	As recommended by the applicable sealant manufacturer(s)

16.8 SAMPLES AND MANUALS:

16.8.1 The following samples of actual job site materials together with detailed technical data / catalogues shall be submitted in duplicate, unless otherwise noted, and in the sizes noted, for Engineer-in-Charge's review and approval. Any omission of an item, or items which require the Contractor's compliance with these documents does not relieve him from such responsibility.

- (a) Aluminium sheet panel: Each type and thickness; 600 x 600 mm of the specified thickness.
- (b) Aluminium extrusions; one only of each section; 300 mm long of specified thickness.
- (c) Glass; Each type and kind, 300 x 250 mm of specified thickness and including frame.
- (d) Glazing gaskets, tapes, separators, glass setting blocks, etc. each section or unit, 300 mm long or unit.
- (e) Fasteners and connections devices: Each type and size.
- (f) Finish samples: After approval of the final finish coating the Engineer-in-Charge is to be provided with six (6) approved samples.
- (g) Window and door ironmongery and accessories, as applicable.
- (h) Flashings and finish samples.
- (i) Cladding.
- (j) Samples submitted should be also include assembly of various components forming a typical fixing and details complete with flat sheets, glazing, extrusion, fastener, sealants etc.

16.8.2 Maintenance Manual:

Submit Maintenance Manuals approved by Engineer-in-Charge in three (3) copies each indicating the detailed procedures for the periodical inspection maintenance and cleaning of all the structural glazing, cladding, doors, windows and louver elements, finishes etc.

16.9 WORK SCHEDULE:

16.9.1 Immediately on receipt of the Award Letter the Contractor shall submit the final programme of work schedule for the completion of the whole of the works including submittals, approvals, fabrication, supply at site & installation. The time schedule shall be got approved from the Engineer-in-Charge.

16.9.2 The time schedule shall be prepared in consultation with Engineer-in-Charge to suit the overall project schedule and shall be updated from time to time to suit prevailing conditions and co-ordination with other Contractors employed on site.

16.10 INSPECTION OF COMPONENTS

- 16.10.1 The Contractor shall submit a schedule of material specification and procedure for inspection of the quality of components of the metal wall cladding / curtain walling the fabrication in the plant.
- 16.10.2 The Contractor shall submit fortnightly report on the results of the inspection of the components, in a format approved by the Engineer-in-Charge.
- 16.10.3 The Contractor shall submit a description of the procedure of delivery, hoisting, storage, handling, fixing, scaffolding, temporary working stage or gondola, protection and cleaning.
- 16.11 STORAGE, PROTECTION AND PROGRAMME**
- 16.11.1 The Contractor shall submit a schedule on the procedure for inspection during installation so as to maintain quality control on the site.
- 16.11.2 The Contractor shall submit a detailed method statement for the protection of the surface of the aluminium structural glazing & cladding members during delivery and erection, with description as to when the protection can be removed.
- 16.11.3 The Contractor shall submit weekly reports on the inspection of erection and installation as direction by the Engineer-in-Charge.
- 16.11.4 Delivery and Storage and Materials: All materials delivered to site shall be stored in allocated spaces where the stored materials will not be exposed to rainwater, moisture or damage, and shall permit easy access to and handling of the materials. Materials shall be stored neatly and properly stacked.
- Factory made structural glazing units and / or their components shall be transported, handled and stored in a manner to preclude damage of any nature.
 - Accessory materials, required for erection at the site shall be delivered to the site in labeled containers by the manufacturer.
 - Remove all units or components which are cracked, bent, chipped, scratched or otherwise unsuitable for installation and replace them promptly. And nothing extra shall be payable on this account.
- 16.12 PERFORMANCE REQUIREMENTS**
- 16.12.1 All components, assemblies and completed work included in or permit to the work of this section shall conform to or exceed the following performance standards and comply with all applicable and governing building codes and regulations.
- 16.12.2 Thermal Movement: Provide for noiseless contraction and expansion of component materials for an ambient temperature range of +10°C to 70°C and a material temperature range of 100°C without buckling, opening joints, glass breakage, undue stress on fasteners, or other detrimental effects. Make allowance for vertical and horizontal expansion. For fabrication, assembly and erection, procedures shall take into account the ambient temperature range at the time of respective operations.
- 16.12.3 Building Movement and Related Building tolerance. The design and installation of the structural glazing system shall accommodate all inherent building movements and/ or deflections and the fabrication and installation tolerances of all related work not involved in this section without the loss of, or any detrimental effect to, the performance requirements herein specified. The Contractor shall verify and co-ordinate all such movements and / or tolerances with the Engineer-in-Charge and the Engineer-in-Charge before designing all the components of structural glazing and aluminium cladding so that movements and deflections in the structure do not at any time affect the integrity and safety of curtain wall and aluminium cladding and vice versa.
- 16.13 Thermal property:**
All insulation materials, fire-stops and smoke seals shall comply with the current requirements of the Chief Fire Officer, Fire Brigade and other authorities.
- 16.14 Structural Properties:**
- The design of curtain wall / structural glazing system and aluminium cladding and all related components shall comply with the requirements of National Building Code I.S. 875 and Indian Standard Code IS: 456.
 - No curtain wall / structural glazing system and aluminium cladding elements including sealants and sealed joints shall sustain permanent deformation or failure under loading equivalent to 1.5 times the design wind pressure herein specified.
 - Deflections: The specified deflections must be reduced if they are in any way detrimental to the aluminium structural glazing and cladding elements and sealants.(Refer to para 13.28 Design data)

16.15 General

- 1) All braces, supports and connections for the aluminium curtain wall / structural glazing and cladding shall be designed, provided and installed complete as required.
- 2) Anchors for curtain wall shall be located within a maximum distance of 500 mm above or below the R.C.C. floor slab unless specifically approved otherwise by the Engineer-in-Charge.
- 3) Variations from schematic layouts indicated on the drawings may be permitted but only if a proposed revision does not, in the Engineer-in-charge's opinion, deviate from the design intent, cause excessive stress in the structure, cause excessive deflection, inhibit thermal and building movement or conflict with other requirements.
- 4) Member shapes and / or profiles if schematically shown on the Architect's drawings are not necessarily the exact shapes required or best suited for the particular condition. Final shapes and locations shall be as designed by the contractor and are subject to the Engineer-in-Charge's review and approval.
- 5) The height-from the finished floor level to the top of the window sill shall not be less than as shown in the drawing.

The horizontal or lateral load on such transom / railing (where not backed by an R.C.C. parapet) shall be designed in accordance with the following criteria i.e. a horizontal UDL at 0.74 KN/m run, UDL supplied to the infill of 1.0 KN/m² and a point load applied to part of the infill at 0.5 KN.
- 6) No holes shall be burned, filed or drilled in any structural steel members unless approved by the Engineer-in-Charge in writing.
- 7) The contractor shall provide detailed layouts, alignment jigs etc. for the proper and exact placement of all welded anchor studs, anchorage components, embedded anchor assemblies etc.
- 8) All metal structural glazing and cladding elements and their applicable anchorage assemblies shall be designed to accommodate all thermal and building movements without any harmful effect to the structural glazing and cladding.
- 9) No field forming, cutting and/or alterations of primary wall elements will be allowed. All framing members shall be shop fabricated and finish coated. No unfinished surfaces will be permitted on exposed surfaces.

16.16 Concrete Tolerances:

- a) The contractor shall take into account tolerance in concrete and masonry surfaces to which the structural and glazing framework is fixed.
- b) In general, the construction tolerances in the building shall be as follows.
- | | |
|--|----------|
| • Surface level of floor slab, sills and lintels | +/-10 mm |
| • Plumb in a storey height | +/-10 mm |
| • Plumb in full height of building | +/-14 mm |
| • Cross – diagonal distortion between columns | +/-14 mm |
| • Max. displacement of any point on External Fascia from its true location | +/-14 mm |

16.17 MATERIALS

16.17.1 GENERAL

- 16.17.1.1 Materials and components used shall be of the best quality and suitable for the purpose to Engineer-in-charge's approval and shall have been tried and tested in similar environments.
- 16.17.1.2 All materials shall be free from any defect that may impair the strength, functioning or appearance of the glazing and cladding system or adjacent construction.
- 16.17.1.3 Testing by independent testing laboratories or review of data by the Engineer-in-charge shall not relieve the Contractor's responsibility to verify for himself that the work conforms to the intent of the contract documents.

16.18 METALS

- 16.18.1 In general, metals shall comply with relevant Indian and International Standards.

16.18.2 Fasteners:

The type, size, alloy, quantity and spacing of all fasteners and / or anchorage devices shall be as required for the specified performance standards.

- a) Bolts, anchors and other fastening devices shall be of approved types as required for the strength of the connections, shall be self-locking, unless otherwise noted, shall be suitable for the conditions encountered, and shall be torque tightened, where required, to achieve

- the maximum torque tension relationship in the fasteners. Washers, nuts and all accessory items shall be of the same material as fasteners.
- b) Fastening devices between aluminium and aluminium shall be Grade 304 of AISI non-magnetic stainless steel unless otherwise approved.
 - c) Fastening devices between aluminium and dissimilar materials shall be Grade 304 of AISI nonmagnetic stainless steel unless otherwise approved.
 - d) Exposed fasteners are subject to Engineer-in-charge's approval and shall be M.S. epoxy coated.
 - e) Self-locking fasteners shall be stainless steel of grade 304 with nylon inserts or patches.
- 16.18.3 Extrusions:**
All aluminium extrusions shall conform to the system principal's specification for tolerances which shall, in any case, be better than DIN standards. Any section not conforming to the tolerances shall be rejected.
In general aluminium alloy for extrusions shall be 6063 T5 or T6 as per B.S.1474. However, the grade and tempering specifications shall be as recommended by the supplier for each application and shall be approved by the system principal.
All surfaces abutting the parent sections and designed to receive sealants shall have adequate sealant contact and adhesion. They shall be finished to match parent sections.
- 16.19 Soffits and Suspended Ceiling System**
Soffits and suspended ceiling system if required shall be of similar metal of the aluminium wall cladding with a similar finish. Colour and shape shall be selected by the Architect.
- 16.20 Brackets:**
Brackets shall be of chromotised Aluminum of grade 6161-T6 or 6005-T6 conforming to ASTM 6511/A and approved by Engineer-in-charge. Slots in brackets shall be pre-drilled / punched and not flame-cut.
- 16.21 Hardware and Fittings:**
All hardware and fittings such as patch fittings, handles, locks, stay-arms, floor springs etc. for doors windows and openable panels shall be stainless steel to best International standards and to Engineer-in-charge's approval. Hinges for openable panel shall be stainless steel friction hinges / stays selected for specified wind load and dead loads or specifically extruded in-built hinges. All fittings and locks shall be approved by the Engineer-in-charge.
- 16.22 SEALANTS & GASKETS**
- 16.22.1** All sealant applications must be clearly designated on the applicable shop drawings details and reference to a master sealant schedule specifying materials, special instructions and application procedures.
- 16.22.2** The compatibility and sequence of installation for all sealants must be carefully considered in all proposals in order to ensure the required cure and optimum performance. Sealants must not degrade and / or fail under all design conditions including, but not limited to thermal movement, water, ultraviolet exposure and / or other adverse environmental conditions. The following sealant materials are specified for performance standards only. All proposals must be equal to or better than the materials herein specified. The designation of sealant types noted on the drawings is intended for general design guidance. Final selection by the contractor for the sealant types shall be based on their conformity with the Performance Requirements herein specified and meets with the Engineer-in-Charge's approval.
Maximum precautions shall be taken to prevent failure of sealant.
- 16.22.3 Structural sealant:**
Structural sealant shall be Dow Corning Silicone sealant 995, GE ultraglaze 4000, or approved equivalent recommended by manufacturer. All exposed and concealed metal to metal (including tight or butt type metal to metal assembly prior to assembly), perimeter metal to concrete joints shall be silicone base sealant, preferably 2 component, in approved colour, conforming to the manufacturer's recommendations for the specific uses and performance criteria. The manufacturer shall conduct laboratory test for adhesion for each lot of aluminium sections and glass. Laboratory reports shall be submitted to the Engineer-in-Charge for approval.
- 16.22.4 Weather Sealant:**
The grades of sealants for concealed metal to metal and metal to concrete joints such as embedment and lapping of flashings elements to be installed or embedded in a full bed sealant shall be the best recommended by the manufacturer for the application. (Dow Corning, GE or equivalent).
- 16.22.5** Joint fillers and back-up materials shall be non-gaseous polyethylene foam, sponge neoprene as per written recommendations from the applicable sealant manufactures for each specific

application. Shape, size, hardness, compatibility and bond breaking requirements are all factors to be considered.

16.22.6 All sealant must be non-staining and compatible with adjoining sealants, backup materials, substrate materials and their respective finishes and / or applied colour coatings.

16.22.7 Exposed assembly sealant will not be permitted at any wall area.

16.22.8 All sealants shall be given 5 years Guarantee for materials, workmanship and performance from the date of completion of Contract.

16.22.9 Caulking compound: Dow Corning 991 or approved equivalent, one part gun grade consistency, colour to match adjacent material or approved by Engineer-in-Charge for use around frame or between frame and floor slab.

16.23 **GASKETS:**

A) Silicon Gasket: All Gaskets and seals shall be SILICON of approved quality, compatible with substrates, finishes and other components they are in contact with.

16.24 **SEPARATORS**

16.24.1 Separators between steel and aluminium members and wherever required shall be rigid type, high impact, smooth both side Teflon with a minimum thickness of 0.8 mm or other non-conducting materials as approved by the Engineer-in-Charge.

16.25 **STRUCTURAL GLAZING SYSTEMS**

16.25.1 The method of assembly, reinforcing and anchorage of the aluminium structural glazing system, where indicated, is schematic. Locations and method of providing same shall be the Contractor's responsibility, who shall design the assembly, reinforcing and anchorage to suit each specified conditions in an acceptable manner complying with the requirements specified herein after.

16.25.2 Visible joints shall be as shown in the Architectural drawings.

16.25.3 All parts shall be secured by concealed means wherever possible and where exposed to view, screw positions are to be indicated on the preliminary drawings. Exposed screws shall be of the countersunk type coloured in same finish as of aluminium or non magnetic stainless steel and shall be evenly and neatly located in an approved manner.

16.25.4 All components shall be assembled, secured anchored, reinforced, sealed and made weather-tight in a manner not restricting thermal or wind movements of the structural glazing. Sealants shall be concealed wherever possible.

16.25.5 All fastening into or through aluminium shall be SS-306 as approved by Engineer-in-Charge.

16.25.6 Free and noiseless movement of all the components of the Curtain Walling system due to thermal effect, structural effect, wind pressure, seismic forces, erection or dead loads, shall be achieved without strain to the glass, without buckling of any components and without excessive stress to any members or assemblies.

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

16.25.8 **Waterproofing:**

a) A complete drainage system must be incorporated into the structural glazing frame work. Water leakage and condensation shall be drained or discharged to exterior face of the wall and all internal spaces vented by acceptable means to ensure air pressure equalization wherever possible.

b) Drainage system will be sealed off at every floor to prevent infiltrated water from leaking to lower floors.

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

d) The junction of bracket connecting S.S. Screen with reflector system & structural Glazing system shall be fully protected against ingress of water by providing suitable water proofing systems as approved by Engineer-in-Charge.

16.25.9 **Anchorage System and Building Frame**

Each glazed unit shall be fixed to the structural slab at each floor level. All fasteners shall be SS-304 of AISI as approved by Engineer-in-Charge. The contractor shall also make necessary modifications to the anchor fasteners to suit existing site conditions of steel reinforcement without additional charge.

16.25.10 **Mullions and Transoms**

a) The sections of mullions and transoms shall be designed to restrict deflection under wind pressure as specified and shall be rigid enough to support and retain the glass spandrel under all conditions. The mullions shall be designed if required, to act as guide

- tracks for gondolas to permit its free movement in vertical direction for window washing and to sustain concentrated loading by the gondola cage. The mullions & transoms shall also to be designed to cater for the loading of S.S Screen with reflector.
- b) Reinforcing members, where used, shall be completely enclosed and if fabricated from steel shall be galvanized and protected with primer and two coats of zinc chromate.
- 16.26 **Window units (Vision Panels)**
All windows shall be glazed from inside where possible. All cladding as well as internal glazing beads, if any (unless otherwise specified) shall be in anodized aluminum.
- 16.27 **Spandrel Units**
- Spandrel shall be of glass having equal colour matching with vision areas with opacifier coating.
 - Structural spandrel beam, structural glazing fasteners and other construction shall not be seen through the glass from the exterior and shall be fully concealed behind shadow box.
 - A shadow box shall be provided a distance behind the spandrel glass panel. It shall consist of 50 mm semi-rigid fiber glass insulation of minimum density of 48 Kg/cum., and 0.8 mm galvanised sheet steel tray natural finished. The periphery shall be properly sealed. Surface #1 shall be adequately protected against damage until spandrel glazing is done.
 - Two hour rating fire stops-cum-smoke seals shall be constructed continuously at the spandrel to the approval of the Chief Fire Officer and other authorities.
- 16.28 **Ventilators, Openable Windows and Doors**
- Ventilators, windows and doors shall be provided at positions as shown on the drawings. The ventilators when in closed position shall remain watertight under all weather conditions and pass the water tightness tests as specified.
 - All hardware and accessories shall be supplied by the contractor and when exposed shall be of stainless steel or approved aluminium alloys in approved finish.
 - Minimum aggregate openable area of the ventilator shall be as given in the Architectural drawings.
 - The detailed system of the ventilators and doors must be proposed by the tenderer keeping the position as shown on the drawings.
- 16.29 **Coping and Soffit Trimmer**
- All coping and soffit panels shall have suitably designed frame reinforcement and be fixed rigidly to the structure.
 - All joints between coping /soffit panels and between coping / soffit panels to structural glazing frame and other sections of the work shall be tightly sealed up. Effective drainage system shall be provided to drain out the water that may penetrate through the joints.
- 16.30 **FABRICATION**
- 16.30.1 **General:** All assemblies shall be fabricated and assembled in accordance with the drawings and the requirements of these specifications. Deviations of any nature, without approval of the Architect /PMC shall not be permitted.
- 16.30.2 **Tolerances:** Furnish a schedule of fabrication tolerances for all major wall cladding components. In addition to the fabrication tolerances, provide for and schedule thermal movement including assembly and installation tolerances for all major and/or applicable wall cladding components and/or assemblies.
- 16.30.3 **Workmanship**
- All work shall be performed by skilled workmen, specially trained and experienced in the applicable trades and in full conformity with the applicable provisions of the listed References and Standards and/or otherwise noted on the drawings or as specified herein.
 - All work shall be carefully fabricated and assembled with proper and approved provisions for thermal expansion and contraction, fabrication and installation tolerances and design criteria.
 - All forming and welding operations shall be done prior to finishing. Unless otherwise noted.
 - All work shall be true to detail with sharp, clean profiles, straight and free from defects, dents, marks, waves or flaws of any nature impairing strength or appearances; fitted with proper joints and intersections and with specified finishes.
 - All work shall be erected true to plumb, level, square to line, securely anchored, in proper alignment and relationship to work of other trades and free from waves, sags or other defects.
 - Sealants.

16.31 Shop Assembly

As far as practicable, all fitting and assembly of the work shall be done in the shop. Work that cannot be permanently shop assembled shall be temporarily assembled in the shop and marked with the approval of Engineer-in-Charge, before disassembly to ensure proper assembly later in the building.

16.32 Sleeves

Unless otherwise noted, all aluminum sleeves shall be extruded sections designed to accurately interlock with adjacent sections and incorporate serrated surfaces for the secure bedding of sealant between the parent metal and the sleeve.

16.33 Fasteners

- 1) All fasteners shall be of SS-304 of AISI **stainless steel** with self locking devices, unless otherwise specified, and of sufficient size and strength to withstand the applicable design wind load and dead load forces with safety allowance factors as required for the specific materials. The spacing and quantities of fasteners shall be as required to develop the maximum strength of the member they secure or support. Washers and/or other accessory items shall be of the same material as the fastener. Torquetighten all assembly fasteners to achieve the maximum torque tension relationship in the fastener.
- 2) All fasteners shall be concealed unless otherwise shown or approved. The head style for all exposed fasteners shall be countersunk oval head unless otherwise specified on the drawings. Exposed fasteners shall be finished to match surrounding metal finish.
- 3) All fasteners including washers and accessory items shall be scheduled and designated on the shop drawings so that anyone can witness and assess the assembled units to ensure that all fasteners conform to the designated and approved type, size, material, spacing, etc. When certain items are not readily apparent, such as material and alloy or torque tightening requirements, special instructions for the identification and appraisal of such items shall be issued.

16.34 Factory Application

As much as possible work shall be carried out in the factory.

All glazing shall be done in the factory. Gaskets shall be pre-positioned and welded in the factory as far as possible.

Site work shall be kept to a minimum.

16.35 Measurements & Payment:

All dimensions of the various extruded sections of aluminum used shall be measured correct to a cm and will be converted into weight based on actual weight of sampling of material done at site as per direction of Engineer-in-charge. The item shall include all the above materials and operations. Only the glazing, hardwares and fittings such as patch fittings, handles, locks, stay-arms, floor springs etc shall be paid separately in the relevant items.

WHEREAS, contractor..... (Name of contractor) (hereinafter called "the contractor") has submitted his tender dated (date) for the construction of (name of work) (hereinafter called "the Tender")

KNOW ALL PEOPLE by these presents that we registered office at (hereinafter called "the Bank") are bound unto **Executive Engineer(C),Postal Civil Division, Bengaluru** in the sum of Rs. (Rs. in words) for which payment well and truly to be made to the said **Executive Engineer(C),Postal Civil Division,** the Bank binds itself, his successors and assigns by these presents. SEALED with the Common Seal of the said Bank this day of 20.... THE CONDITIONS of this obligation are:

- (1) If after Eligibility Bid opening of tender; the Contractor withdraws, his tender during the period of validity of tender (including extended validity of tender) specified in the Form of Tender;
- (2) If the contractor having been notified of the acceptance of his tender by the **Executive Engineer(C),Postal Civil Division,**
 - (a) fails or refuses to execute the Form of Agreement in accordance with the Instructions to contractor, if required;
OR
 - (b) fails or refuses to furnish the Performance Guarantee, in accordance with the provisions of tender document and Instructions to contractor,
OR
 - (c) fails or refuses to start the work, in accordance with the provisions of the contract and Instructions to contractor,
OR
 - (d) fails or refuses to submit fresh Bank Guarantee of an equal amount of this Bank Guarantee, against Security Deposit after award of contract.

We undertake to pay to the **Executive Engineer(C),Postal Civil Division,** either up to the above amount or part thereof upon receipt of his first written demand, without the **Executive Engineer(C),Postal Civil Division,** having to substantiate his demand, provided that in his demand the **Executive Engineer(C),Postal Civil Division,** will note that the amount claimed by him is due to him owing to the occurrence of one or any of the above conditions, specifying the occurred condition or conditions.

This Guarantee will remain in force up to and including the date* after the deadline for submission of tender as such deadline is stated in the Instructions to contractor or as it may be extended by the **Executive Engineer(C),Postal Civil Division** notice of which extension(s) to the Bank is hereby waived. Any demand in respect of this Guarantee should reach the Bank not later than the above date.

DATE

SIGNATURE OF THE BANK

WITNESS

SEAL

(SIGNATURE, NAME AND ADDRESS)

*Date to be worked out on the basis of validity period of **180 days** or more from the last date of receipt of tender.

FORM OF PERFORMANCE SECURITY; BANK GUARANTEE BOND

In consideration of the President of India (hereinafter called "The Government") having offered to accept the terms and conditions of the proposed agreement between _____ and _____ (hereinafter called "the said contractor(s)" for the work _____ (hereinafter called "The said agreement") having agreed to production of a irrevocable Bank Guarantee for Rs. _____ (Rupees _____ only) as security/guarantee from the contractor(s) for compliance of his obligations in accordance with the terms and conditions in the said agreement.

1. 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.
 2. We _____ (indicate the name of the bank) do hereby undertake to pay the amounts due and payable under this Guarantee without any demure, merely on a demand from the Government stating that the amount claimed is required to meet the recoveries due or likely to be due from the said contractor(s). 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).
 3. We, the said bank further undertake to pay to the Government any money so demanded notwithstanding any dispute or disputes raised by the contractor(s) in any suit or proceeding pending before any court or Tribunal relating thereto, our liability under this present being absolute and unequivocal. The payment so made by us under this bond shall be a valid discharge of our liability for payment there under and the contractor(s) shall have no claim against us for making such payment.
 4. We _____ (indicate the name of the Bank) further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said agreement and that it shall continue to be enforceable till all the dues of the Government under or by virtue of the said agreement have been fully paid and its claims satisfied or discharged or till Engineer-in-Charge on behalf of the Government certified that the terms and conditions of the said agreement have been fully and properly carried out by the said contractor (s) and accordingly discharges this guarantee.
 5. We _____ (indicate name of the bank) further agree with the Government that the government shall have the fullest liberty without our consent and without effecting in any manner our obligations hereunder to vary any of the terms and conditions of the said agreement or to extend time of performance by the said contractor(s) 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(s) 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(s) or for any forbearance, act of omission on the part of the Government or any indulgence by the Government to the said contractor(s) 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. This guarantee will not be discharged due to the change in the constitution of the Bank or the contractor(s).
 7. We _____ (indicate the name of Bank) lastly undertake not to revoke this guarantee except with the previous consent of the Government in writing.
 8. This guarantee shall be valid upto _____ unless extended on demand by 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 six months of the date of expiry or the extended date of expiry of this guarantee all our liabilities under this guarantee shall stand discharged.
- Dated the _____ day of _____ for _____.

(indicate the name of Bank)

**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 recitedcompletely water and leak-proof.

AND WHEREAS THE GUARANTOR agreed to give a guarantee to the affect that the said work will remain water and leak proof, for ten years from the date of completion of work.

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 **Five(05) years**to be reckoned from the date of the completion of work.

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 thereunder, then the guarantor will indemnify the principal and his successor against all loss, damage, cost expense or otherwise which may be incurred by him by reason of any default on the part of the GUARANTOR in performance and observance of this supplementary agreement. As to the amount of loss and/or damage and / or cost incurred by the Government, the decision of the Engineer-in-charge will be final and binding on both the parties.

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

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

1. 2.

SIGNED FOR AND BEHALF OF THE PRESIDENT OF INDIA BY in the presence of:-

1. 2.

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

The agreement made this..... day of (Two Thousand only) 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 leak proof with sound material and workmanship.

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

NOW THE GUARANTOR hereby guarantee that work executed by him will be free from any leakage, seepage, cracks in pipes and guaranteed against faulty material and workmanship improper slope, defective galvanizing etc. for Five years to be reckoned from the date of completion of the work.

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

During this period of guarantee, the guarantor shall make good all defects and in case of any defect to satisfaction of Engineer-in-charge at his cost and shall commence the work for such rectification within seven days from the date of issue of the notice from the Engineer-in-charge calling upon him to rectify the defects failing which the work shall be got done by the Department by some other contractor at the guarantor's cost and risk. The decision of the Engineer-in-Charge as to the cost payable by the Guarantor shall be final and binding.

That if the guarantor fails to make good all defects or commits breach thereunder, then the guarantor will indemnify the principal and his successor against all loss, damage, cost expense or otherwise which may be incurred by him by reason of any default on the part of the GUARANTOR in 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.

GUARANTEE BOND TO BE EXECUTED BY THE CONTRACTOR FOR REMOVAL OF DEFECTS AFTER COMPLETION IN RESPECT OF STONE WORK/ TILE 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, finishing and use of sound materials.

AND WHEREAS THE GUARANTOR agreed to give a guarantee to the affect that the said work will remain structurally stable and guaranteed against faulty workmanship, improper slope, finishing and materials.

NOW THE GUARANTOR hereby guarantee that work executed by him will be free from any material defects, structural defects, cracks, hollow pockets, improper slope, faulty joints etc. for **five (05) years** to be reckoned from the date of completion of the work.

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 to the satisfaction of the Engineer-in-charge calling upon him to rectify the defects failing which the work shall be got done by the Department by some other contractor at the Guarantor's cost and risk. The decision of the Engineer-in-charge as to the cost payable by the Guarantor shall be final and binding.

That if the guarantor fails to make good all the defects, commits breach thereunder, then the guarantor will indemnify the principal and his successor against all loss, damage, cost expense or otherwise which may be incurred by him by reason of any default on the part of the GUARANTOR in performance and observance of this supplementary agreement. As to the amount of loss and/or damage and or cost incurred by the Government, the decision of the Engineer-in-charge will be final and binding on both the parties.

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

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

1. 2.

SIGNED FOR AND BEHALF OF THE PRESIDENT OF INDIA BY in the presence of:-

1. 2.

GUARANTEE BOND TO BE EXECUTED BY THE CONTRACTOR FOR REMOVAL OF DEFECTS AFTER COMPLETION IN RESPECT OF ALUMINIUM DOORS, WINDOWS, VENTILATOR 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 effect that the said work will remain structurally stable and guaranteed against faulty material and workmanship, defective anodizing/ powder coating for five years from the date of completion of work.

NOW THE GUARANTOR hereby guarantee that work executed by him will remain structurally stable and guaranteed against faulty material and workmanship, defective anodizing/ powder coating for five years to be reckoned from the date of completion of the work.

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.

GUARANTEE BOND TO BE EXECUTED BY THE CONTRACTOR FOR REMOVAL OF DEFECTS AFTER COMPLETION IN RESPECT OF GYPSUM LIGHT WEIGHT PLASTER.

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 effect that the said work will remain structurally stable and guaranteed against faulty material and workmanship, Cracks, peeling off plaster etc. for five years from the date of completion of work.

NOW THE GUARANTOR hereby guarantee that work executed by him will remain sound in quality and guaranteed against faulty material and workmanship, Cracks, peeling off plaster etc for five years to be reckoned from the date of completion of the work.

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.

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

FIELD TESTING EQUIPMENT AND INSTRUMENTS

A. Testing Equipment at Field Laboratories

- i) Balances
 - a) 7kg to 10 kg. Capacity, Semi-self indicating type-Accuracy 10 gm
 - b) 500 gm. Capacity, Semi-self indicating type Accuracy 1 gm
 - c) Pan Balance – 5 Kg. Capacity, accuracy 10 gm.
- ii) Sieves: as per IS 460-1962.
 - a) I.S. Sieves – 450 mm internal dia of sizes 100 mm, 80 mm, 63 mm, 50mm, 40 mm, 25 mm, 20 mm, 12.5 mm, 10 mm, 6.3 mm, 4.75 mm complete with lid and pan.
 - b) IS Sieves – 200 mm internal dia(brass frame) consisting of 2.36 mm, 1.18 mm, 600 microns, 425 microns, 300 microns, 212 microns, 150 microns, 90 microns, 75 microns with lid and pan.
- iii) Sieve shaker capable of 200 mm and 300 mm dia sieves, motorized operated with timing switch assembly.
- iv) Equipment for slump test – Slump Cone, Steel Plate, tamping rod, steel scale, scoop.
- v) Graduated measuring cylinders 200 ml capacity
- vi) Enamel trays (for efflorescence test for bricks and other tests)
 - a) 300 mm X 250 mm X 40 mm
 - b) Circular plates of 250 mm dia
 - c) 600 mm X 450 mm X 500 mm
 - d) 450 mm X 300 mm X 40 mm.
- vii) ISI marked 150X150X150 mm concrete cube moulds as per site requirement – 18 Nos.
- viii) Graduated cylinder 1000 ml. Capacity.
- ix) Pumps & pressure gauges for hydraulic testing of pipes.
- x) Moisture meter xi) Oven xii) PH Meter.
- xiii) Any other equipment for site tests as outline in BIS and as directed by the Engineer-in-charge.

B. Field Testing Instruments

- i) Steel tapes – 3 m
- ii) Digital Vernier calipers
- iii) Digital Micrometer Screw 25 mm gauge
- iv) A good quality plumb bob
- v) Spirit level minimum 30 cms long with 3 bubbles for horizontal vertical
- vi) Wire gauge (circular type) disc.
- vii) Foot rule
- viii) Long nylon thread
- ix) Rebound hammer for testing concrete
- x) Magnifying glass
- xi) Screw driver 30 cms long
- xii) Ball pin hammer, 100 gms
- xiii) Plastic bags for taking samples
- xiv) Digital Distance meter
- xv) Leveling machine
- xvi) Theodolite
- xvii) Total survey station
- xviii) Ultrasonic Pulse velocity meter

Note: The above list is only indicative and not exhaustive. (If the contractor fails to bring any of the equipment mentioned under A & B of above, necessary recovery shall be made from the contractor)

C. Minimum required T&P

Sl. no.	Detail of T&P	Qty.	Remarks
1	Steel Shuttering	1500 Sq.M.	
2	Steel props of required sizes	1500 Sq.M. space	
3	Excavator cum loader	1 Nos.	
4	Building Hoist	1 No.	
5	Concrete mixer with hopper (For other than RCC work)	1 No.	
6	DG set (Over all capacity 20 KVA)	1 No.	
7	Welding machine	2 Nos.	
8	Plate Vibrator	2 Nos.	
9	Needle Vibrator (Electrically operated)	2 Nos.	
10	Needle Vibrator (Diesel/Petroloperated)	2 Nos.	
11	Bar Cutting & Bending machine	1 Nos.	
12	Water pump	2 Nos.	
13	Cover meter	1 No.	

PROFORMA FOR TESTS CARRIEDOUT

NAME OF THE WORK:
AGREEMENTNO.&DATE:

DIVISION/
SUB-DIVISION

Sl. No.	Item	Quantities as per agreement	Frequency as per specification	No. of tests required	R.A. billNo.	Uptodate quantity	No. of tests required	No. of tests actually done	Remarks
1	2	3	4	5	6	7	8	9	10

CEMENT/PAINT REGISTER

NAME OF WORK:
AGREEMENT NO.:

DIVISION:
SUB-DIVISION:

Particulars of Receipt

Date of Receipt	Source of receipt with details if	Batch	Date of manufacture	Date of expiry	Qty. received	Progressive Total	Date of issued	Qty Issued	Items of work for which Issued	Qty Returned at the end of day's work
1	2	3	4	5	6	7	8	9	10	11
<u>Particulars of Issue</u>										
Net Qty. Issued	Progressive Total	Daily Balance in Hand	Contractor's Initial	JE's Initials	Periodical Check					
12	13	14	15	16	17	18				

LIST OF PREFERRED MAKES OF MATERIALS (FOR CIVIL WORKS)

Note:

1. Unless otherwise specified, the brand/make of the material as specified in the item nomenclature or in the particular specifications or in the list of approved materials attached in the tender shall be used in the work.
2. The Contractor shall obtain prior approval from the Engineer-in-Charge before placing order for any specific Brand/ Make of material.
3. Whenever the specified brand of material is not available then, the Engineer-in-Charge may approve any material equivalent to that specified subject to a definite proof being offered by the Contractor for its equivalence and its non-availability to his satisfaction.

No.	MATERIALS:	PREFERRED BRAND / MAKE
1.	Acrylic Emulsion Paint	Asian (Royale), ICI (Velvet), Berger (Luxol Silk), Nerolac (Allscapes)
2.	Premium Acrylic Smooth Exterior Paint	Apex Ultima of Asian paints, Weather Coat All Guard of Berger Paint.
3.	Aluminium Composite Panel	Alpolic, Aluco Bond, Reynobond, Euro bond, Al-stone, Aludecor.
4.	Aluminium Extrusions	Hindalco, Indalco, Jindal.
5.	Aluminum Sections	Hindalco, Indalco, Jindal.
6.	Board & Plywood	Duro, Green, Century.
7.	Ceramic/Rectified Tiles	Premium double charge tiles of :-Kajaria, RAK, HR Johnsons
8.	CP fittings	Hindware, Johnson, Marc, Cera
9.	CPVC Pipes	Astral, Flowguard, Ashirvad, finolex, supreme
10.	Designer coloured cement concrete floor tiles for external used / Concrete paver blocks.	Ultra, Nitco, or Equivalent (mandatory tests to be performed before execution).
11.	Epoxy Primer & Paints	Berger, Pidilite, SIKO, Asian.
12.	Float Glass	Modi Float, Saint Gobain, Tata.
13.	Flush Doors (ISI Mark only)	Green, Duro, Century or Equivalent (mandatory tests to be performed before execution).
14.	Galvanized/Stainless Steel Anchor Fasteners	Arrow, Hilti, Fischer, Hattich
15.	Gun Metal Gate Valve	Zoloto, Leader, SAINT
16.	Gypsum Board False Ceiling	Boral Gypsum, Gypsum India Limited, USG, St. Gobain (Gyproc)
17.	Hardner	Hard crete of Snowcem India, MC Deritop F.H.
18.	Hydraulic Door Closer	Hardwyn, Godrej, Dorma, Doorset
19.	Hydraulic Floor spring	Hardwyn, Godrej, Dorma, Doorset
20.	Laminate	Greenlam, Decolam, Century, Formica.
21.	Melamine Polish	Melamine Gold of Asian Paint, Wudfin of pidilite, Timbertone of ICI Dulux.
22.	M. S. Pipe	Electro Steel, Apollo (ISI), Jindal, Tata
23.	Marine Plywood / BWP Ply	Century, Green, Duro
24.	Oil Bound Distemper	Asian (Tractor), ICI (Maxi lite), Berger (Bison), Nerolac (NAD)

No.	MATERIALS:	PREFERRED BRAND / MAKE
25.	Sanitary fittings	Hindware, Cera, Jaquar
26.	Plastic Connection Pipe	Jaquar, Kamal Delux.
27.	Ply Wood	Duroply, Green ply, Century ply
28.	Pre-coated GI sheet for roofing	Jindal Saw, Tata Blue Scope.
29.	Polymer Modified Cementitious grout	Bal-Endura, Pidilite, Ceco.
30.	Pre-laminated Particle Board IS : 12823 (Gr-I, Type-II)	Action TESA, Kitlam, Archid Ply, Asis, Green Lam
31.	Primer	Asian, ICI DuLux, Nerolac
32.	PVC Rain Water Pipe & Fitting IS:13592 Type A	Finolax, Supreme, Plasto.
33.	PVC Shutter	Rajshri, Sintex, Akal America.
34.	PVC Tank (ISI Marked)	Sintex, Star, Lotus, Plasto, Supreme.
35.	R. C. C. Pipes (NP-2)	ISI Make
36.	Solid Plastic Seat Cover for EWC	EWC standard seat cover white of Perryware/Hindware/ Neycer, Cera.
37.	Stainless Steel	Jindal Stainless Steel, Salem Steel
38.	Stainless steel Sink with or without Draining board.	Nirali, Hindware
39.	Structural Silicon Sealant	Dow Corning, Wacker, GE.
40.	Structural steel section	TATA, SAIL, RINL, Jindal.
41.	Synthetic Enamel Paints	ICI(Dulux),Asian (Apolite),Berger (Luxol),Nerolac (NST)
42.	Textured Exterior wall paint	Snowcem, ICI (dulux), Asian.
43.	Towel Ring/Towel Rod/Towel Rack.	Marc, Jaquar,
44.	Tubular Section Windows	M/S classic Engineers & Fabricator, Raipur, M/s JK Enterprises, Jaipur.
45.	TMT Bars	As per criteria laid down in Para 4.3 of Part-B
46.	Vitrified Tiles	First quality full body tiles of Kajaria, RAK Ceramics, Johnson, NITCO, RESTILE
47.	Waste Pipe	Kamal with brass checknut,Viking
48.	Water Proofing Compound (Liquid)	Pidiproof Ltd., Sico, Impermo
49.	Wire mesh	Sterling, Trimurty welded mesh.
50.	White Cement	JK, Birla etc
51.	Wall Putty	JK, BIRLA, Asian
52.	Work Stations/ Modular Furniture	Godrej, Wipro
53.	Stoneware pipe and Gully Trap	Perfect or equivalent
54.	PVC flushing System	Johnson, Somany, Hindware, Jaquar
55.	Tactile Tiles	Johnson, Somany, Kajaria
56.	Plastic Emulsion Paint	Asian, ICI, Berger, Nerolac

PART-C:

ELECTRICAL COMPONENT

- 1. Name of Work:- Civil and Electrical repair and Maintenance of IQ Basavanagudi HO Bengaluru South Division - 560004**

INDEX–PART-C(ELECTRICAL)

Name of Work:- Civil and **Electrical** repair and Maintenance of IQ Basavangudi HO, Bengaluru South Division-560004.

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It is certified that this document PART-C(ELECTRICAL) containing page from 01 -92.

Executive Engineer (E)
Postal Electrical Division
Bengaluru

**MINIMUM ELIGIBILITY CRITERIA FOR E&M COMPONENTS AND SPECIALIZED WORKS
WHEREVER APPLICABLE**

Sl. No.	Component of E&M works	Eligibility
1	IEI & Fans	(a) The main contractor having valid Electrical license. Or Main contractor associating with the contractor enlisted in DOP/ BSNL/ CPWD/ Railways/ MES/ Local state PWD in appropriate category and class having valid electrical licence. For Non-DoP enlisted contractors- The main contractor/ associate contractor should have successfully completed the works in Central/state government departments, Central/State Public Sector Undertaking, Central/State Autonomous bodies/City Development Authority/ Municipal Corporation of city formed under any Act by Central/State Government published in any Central/State Gazette during last seven years ending last date of the month previous to the one in which tenders are invited as given below: - Three similar works each for value not less than 40% of the estimated cost put to tender or Two similar works each for value not less than 60% of the estimated cost put to tender or One similar work each for value not less than 80% of the estimated cost put to tender, The bidder's performance for qualifying works completed in the last Seven years should be certified by an officer not below the rank of Executive Engineer or equivalent. Similar work shall mean " EI & Fan Works"
2	D.G Set	The main contractor shall have to associate with agency fulfilling the following eligibility criteria processing valid electrical license issued by competent authority (if he himself does not fulfill the eligibility criteria) having successfully completed in Central/state government departments, Central/State Public Sector Undertaking, Central/State Autonomous bodies/City Development Authority/ Municipal Corporation of city formed under any Act by Central/State Government published in any Central/State Gazette during last seven years ending last date of the month previous to the one in which tenders are invited as given below: - Three similar works each for value not less than 40% of the estimated cost put to tender or Two similar works each for value not less than 60% of the estimated cost put to tender or One similar work each for value not less than 80% of the estimated cost put to tender,

		The bidder's performance for qualifying works completed in the last Seven years should be certified by an officer not below the rank of Executive Engineer or equivalent. Similar work shall mean "SITC of DG Set with capacity of Individual DG of 20 KVA (80% capacity of individual DG Set/Chiller/transformer being 80% of individual capacity Mentioned in schedule of work)" The Main contractor is also be eligible to carry out himself/herself 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 (i) authorized agency/service provider of the manufacturer OR (ii) specialized agency as per criteria mentioned in NIT The L1 Bidder shall ensure that (a) DG set and AMF panel are procured from OEM/ OEA only. (b) Inspection and testing of DG set and AMF panel before dispatch is carried out in the work shop of OEM/OEA only. (c) At the time of approval for make and model of DG set from Engineer –in- charge shall submit the following: - (i) Written commitment from OEM/OEA to supply the DG Sets and delivery schedule as per requirement of department. (ii) Certificate from OEM/OEA or authorized service provider of engine manufacturer for satisfactory installation and commissioning of DG Set after completion of the work. (iii) Required Guarantee of DG Set from OEM/OEA in favour of Engineer-in-Charge to cover defect liabilities. (iv) An undertaking that mandatory free service is carried out during the guarantee period by the authorized service provider of engine manufacturer.
3	~~Fire~~ Fighting System	~~The main contractor shall have to associate with agency fulfilling the following eligibility criteria having successfully completed in Central/state government departments, Central/State Public Sector Undertaking, Central/State Autonomous bodies/City Development Authority/ Municipal Corporation of city formed under any Act by Central/State Government published in any Central/State Gazette during last seven years ending last date of the month previous to the one in which tenders are invited as given below:—~~ Three similar works each for value not less than 40% of the estimated cost put to tender ~~or~~ Two similar works each for value not less than 60% of the estimated cost put to tender ~~or~~ ~~One similar work each for value not less than 80% of the~~

		estimated cost put to tender; ~~The bidder's performance for qualifying works completed in the last Seven years should be certified by an officer not below the rank of Executive Engineer or equivalent.~~ ~~Similar work shall mean "SITC of Fire Fighting (Wet riser (or) down comer) System."~~ ~~The Main contractor is also be eligible to carry out himself/ herself any or all of these works without associating any specialized agency provided:~~ ~~a) He fulfills the prescribed eligibility criteria respectively for these work(s).~~ ~~Note: In addition to the above the main/associate contractor has to be eligible as per the State Fire Bye laws.~~
4	Manual/Automatic Addressable Fire Alarm System	~~The main contractor shall have to associate with agency fulfilling the following eligibility criteria having successfully completed in Central/state government departments, Central/State Public Sector Undertaking, Central/State Autonomous bodies/City Development Authority/ Municipal Corporation of city formed under any Act by Central/State Government published in any Central/State Gazette during last seven years ending last date of the month previous to the one in which tenders are invited as given below:-~~ ~~Three similar works each for value not less than 40% of the estimated cost put to tender~~ ~~or~~ ~~Two similar works each for value not less than 60% of the estimated cost put to tender~~ ~~or~~ ~~One similar work each for value not less than 80% of the estimated cost put to tender,~~ ~~The bidder's performance for qualifying works completed in the last Seven years should be certified by an officer not below the rank of Executive Engineer or equivalent.~~ ~~Similar work shall mean "SITC of Fire Alarm system"~~ ~~The Main contractor is also be eligible to carry out himself/ herself any or all of these works without associating any specialized agency provided:~~ ~~(a) He fulfills the prescribed eligibility criteria respectively for these work(s).~~ ~~Note: In addition to the above the main/associate contractor has to be eligible as per the State Fire Bye laws.~~
5	LAN Networking System	The main contractor shall have to associate with agency fulfilling the following eligibility criteria having successfully completed in Central/state government departments, Central/State Public Sector Undertaking, Central/State Autonomous bodies/City Development Authority/ Municipal Corporation of city formed under any Act by Central/State Government published in any Central/State Gazette during last seven years ending last date of the month previous to the one in which tenders

		are invited as given below: - Three similar works each for value not less than 40% of the estimated cost put to tender or Two similar works each for value not less than 60% of the estimated cost put to tender or One similar work each for value not less than 80% of the estimated cost put to tender, The bidder's performance for qualifying works completed in the last Seven years should be certified by an officer not below the rank of Executive Engineer or equivalent. Similar work shall mean "SITC of LAN Network System" The Main contractor is also be eligible to carry out himself/ herself any or all of these works without associating any specialized agency provided: (a) He fulfills the prescribed eligibility criteria respectively for these work(s).
6	CCTV System	The main contractor shall have to associate with agency fulfilling the following eligibility criteria having successfully completed in Central/state government departments, Central/State Public Sector Undertaking, Central/State Autonomous bodies/City Development Authority/ Municipal Corporation of city formed under any Act by Central/State Government published in any Central/State Gazette during last seven years ending last date of the month previous to the one in which tenders are invited as given below: - Three similar works each for value not less than 40% of the estimated cost put to tender or Two similar works each for value not less than 60% of the estimated cost put to tender or One similar work each for value not less than 80% of the estimated cost put to tender, The bidder's performance for qualifying works completed in the last Seven years should be certified by an officer not below the rank of Executive Engineer or equivalent. Similar work shall mean "SITC of CCTV System" The Main contractor is also be eligible to carry out himself/ herself any or all of these works without associating any specialized agency provided: (a) He fulfills the prescribed eligibility criteria respectively for these work(s).
7	Solar Power Plant	~~The main contractor shall have to associate with agency fulfilling the following eligibility criteria having successfully completed in Central/state government departments, Central/State Public Sector Undertaking, Central/State Autonomous bodies/City Development Authority/ Municipal Corporation of city formed under any Act by Central/State Government published in any~~

		~~Central/State Gazette during last seven years ending last date of the month previous to the one in which tenders are invited as given below:–~~ Three similar works each for value not less than 40% of the estimated cost put to tender ~~or~~ Two similar works each for value not less than 60% of the estimated cost put to tender ~~or~~ One similar work each for value not less than 80% of the estimated cost put to tender, ~~The bidder's performance for qualifying works completed in the last Seven years should be certified by an officer not below the rank of Executive Engineer or equivalent.~~ ~~Similar work shall mean "SITC of ON Grid Solar Power Plant"~~ ~~The Main contractor is also be eligible to carry out himself/ herself any or all of these works without associating any specialized agency provided:~~ ~~(a) He fulfills the prescribed eligibility criteria respectively for these work(s).~~
8.	UPS backup	~~The main contractor shall have to associate with agency fulfilling the following eligibility criteria having successfully completed in Central/state government departments, Central/State Public Sector Undertaking, Central/State Autonomous bodies/City Development Authority/ Municipal Corporation of city formed under any Act by Central/State Government published in any Central/State Gazette during last seven years ending last date of the month previous to the one in which tenders are invited as given below:–~~ Three similar works each for value not less than 40% of the estimated cost put to tender ~~or~~ Two similar works each for value not less than 60% of the estimated cost put to tender ~~or~~ One similar work each for value not less than 80% of the estimated cost put to tender, ~~The bidder's performance for qualifying works completed in the last Seven years should be certified by an officer not below the rank of Executive Engineer or equivalent.~~ ~~Similar work shall mean "SITC of UPS Backup system"~~ ~~The Main contractor is also be eligible to carry out himself/ herself any or all of these works without associating any specialized agency provided:~~ ~~(a) He fulfills the prescribed eligibility criteria respectively for these work(s).~~

Note:

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

- ii) The applicant shall either himself meet the eligibility conditions for the respective E&M packages 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 C of this tender document within **7 days of award of work OR before start of minor component of work whichever is earlier.**
- iii) The applicant/ main contractor has to submit consent letters as per Form “H”, given in Part C of this tender document from at least one eligible associate agency of the respective component of E&M work for each of the component of E& M works by clearly indicating the component of work within **7** days of award of work OR before start of minor component of work whichever is earlier.
- iv) The main contractor will submit Affidavit of MOU signed with eligible associated contractor. The Affidavit of MOU shall be signed by both contractors, Main contractor as 1st party and associated contractor as 2nd party, independently for **Civil and Electrical repair and Maintenance of IQ Basavanagudi HO, Bengaluru South Division - 560004**
- v) If the main contractor fails to associate agency for execution of minor components of work within **7** days of award of work OR before start of minor component of work whichever is earlier or furnishes incomplete details or furnishes details of ineligible agencies even after the tenderer is given due opportunity, the entire scope of such component of work shall be withdrawn from the tender and the same shall be got executed by the Engineer-in-Charge at the risk and cost of the main contractor. (Note:- Association of agency means To get approval of minor component agency eligibility documents from engineer in charge of minor component and to submit MOU as prescribed)
- vi) Verifiable completion certificates of the work, registration/approval documents, Valid Electrical license, self-attested GST registration documents in respect of the associated agencies as the case may be, duly attested by the applicant shall be submitted within **7** days of award of work OR before start of minor component of work whichever is earlier.
- vii) Self-attested GST registration documents in respect of the associated agencies shall be submitted within **7** days of award of work OR before start of Specialized / minor component of work whichever is earlier.

Executive Engineer (E)
Postal Electrical Division
Bengaluru

PROFORMA OF SCHEDULES
(For each minor component work separately)

Name of Work:-**Civil and Electrical repair and Maintenance of IQ Basavanagudi HO Bengaluru**
South Division - 560004

SCHEDULE 'A'

Schedule of Quantities : As per Part D of this document

Schedule 'E'-

Reference to General Conditions of Contract:-GCC for construction works-2023 as amended/modified up to day previous to the last date of submission of bid.

- | | | | |
|------|------------------------|---|---|
| i) | Estimated cost of work | : | ₹2,18,545/- (for Electrical component) |
| ii) | Earnest money | : | As per part-B |
| iii) | Performance Guarantee | : | As per part-B |
| iv) | Security Deposit | : | 2.5% of tendered value |

Schedule 'F'-

General Rules & Directions: As per part-B

Officer Inviting tender:

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

Definitions:

- | | | |
|------|--|---|
| i) | Engineer-in-charge | Executive Engineer (E), Postal Electrical Division, Bengaluru |
| ii) | Accepting Authority | As per part-B |
| iii) | Percentage on cost of materials and labour to cover all over-heads and profits. | 15% |
| iv) | Standard schedule of Rates | DSR- 2025 for electrical work |
| v) | Department | Department of Posts |
| vi) | Standard CPWD contract Form CPWD form 7 as modified & corrected up to date correction slip and General conditions. | |

Clause 1

- | | | |
|----|--|---------------|
| i. | Time allowed for submission of Performance Guarantee, program 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 Part-B |
|----|--|---------------|

(ii) Maximum allowable extension with late fee

@ 0.1% per day of Performance Guarantee amount
beyond the period provided in (i) above in days

As Per Part-B

Clause 2

Authority for fixing compensation under clause 2

As Per Part-B.

Clause 2A

Whether Clause 2A shall be applicable:

No

Clause 5

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

As Per Part-B

Table of milestones

S.No.	Financial progress	Time allowed (From date of start)	Amount to be with-held in case of non-achievement of milestone
1	As Per Part-B	As Per Part-B	As Per Part-B
2.	As Per Part-B	As Per Part-B	
3.	As Per Part-B	As Per Part-B	
4.	As Per Part-B	As Per Part-B	

Time allowed for execution of work

As Per Part-B

Authority to decide:

- Extension of time
- Rescheduling of mile stones
- Shifting of date of start in case of delay in handing over of site
- Authority to give fair and reasonable extension of time for completion of work.

As Per Part-B

As Per Part-B

As Per Part-B

As Per Part-B

PROFORMA OF SCHEDULES Clause 5 Schedule of handing over of site

Part	Portion of Site	Description	Time period for handing over reckoned from date of issue of letter of intent
Part A	Portion without any hindrance		As Per Part-B
Part B	Portions with encumbrances		
Part C	Portions dependent on work of other agencies		

Clause 6

Measure Book (MB) /Computerized Measure Book (CMB) /Electronic

Measurement Book (EMB) Mode of measurement:

MB/CMB

Clause 7

Gross work to be done together with net payment/adjustment
of advances for material collected, if any, since the last such
Payment for being eligible to interim payment.

Rs. ****/-

Clause 7 A

No running account bill shall be paid for the work till the applicable labour licenses, registration with EPFO, ESIC and BOCW Welfare Board, whatever applicable is submitted by the contractor to the Engineer- In- Charge.	Applicable
--	------------

Clause 10 A

List of testing equipment to be provided by the contractor at site lab.	NA
---	----

Clause 10 B(ii)

Whether clause 10 B(ii) shall be applicable	No
---	----

Clause 10C

Component of labour expressed as percentage of value of work:	15 %
---	------

Clause 10 CC

Clause 10 CC to be applicable in contracts with stipulated period of completion exceeding the period shown in next column.	NA.
--	-----

Clause 11

Specification to be followed for execution of work:	CPWD specifications for Electrical work Part-I to part VII as amended up to date and specifications mentioned in this NIT.
---	--

Clause 12

12.2 & 12.3 Deviation limit beyond which clauses 12.2 & 12.3 shall apply for building work.	50%
--	-----

Deviation limit beyond which clauses 12.2 & 12.3 shall apply for foundation work.	NA
---	----

Clause 16

Competent Authority for deciding reduced rates.	SE(E) PEC Bengaluru
---	---------------------

Clause 18

List of mandatory machinery, tools & plants to be deployed by the contractor at site	As per NIT conditions
--	-----------------------

Clause 19C

Authority to decide penalty for each default	As Per Part-B
--	---------------

Clause 19D

Authority to decide penalty for each default	As Per Part-B
--	---------------

Clause 19G

Authority to decide penalty for each default	As Per Part-B
--	---------------

Clause 19K

Authority to decide penalty for each default	As Per Part-B
--	---------------

Clause 25

i. Conciliator:	As Per Part-B
ii. Arbitrator Appointing Authority:	As Per Part-B
iii. Place of Arbitration:	As Per Part-B

Clause 32

Sl No.	Minimum qualification of Technical Representative	Discipline	Designation (Principal Technical/Technical representative)	Minimum experience	Number	Rate at which recovery shall be made from the contractor in the event of not fulfilling provision of clause 36(i)	
						Figures	Words
1.	Graduate Engineer	Elect. Engg	Principal Technical	3 Years	--	₹15000/- per month	₹Fifteen thousand per month
2.	Diploma Holder	Elect. Engg	Technical representative	3 Years	--	₹10000/- per month	₹Ten thousand per month

Assistant Engineers retired from Government services that are holding Diploma will be treated at par with Graduate Engineers

Diploma holder with minimum 10 year relevant experience with a reputed construction co. can be treated at par with Graduate Engineers for the purpose of such deployment subject to the condition that such diploma holders should not exceed 50% of requirement of degree engineers.

SPECIAL CONDITIONS FOR MINOR COMPONENT SPECIALIZED/E & M WORKS

Name of Work:-Civil and Electrical repair and Maintenance of IQ Basavanagudi HO, Bengaluru South Division - 560004

The agency of major component should either himself meet the eligibility conditions for the respective minor components work or otherwise he will have to associate with agencies, fulfilling the eligibility requirements and hence consent letter/ willingness certificate from eligible Associate Agency of the respective Minor component work as per attached Proforma of "consent letter/willingness certificate" and eligibility documents for minor components or eligibility documents for minor component if the major agency himself eligible shall be submitted immediate after award of work to Engineer in charge of minor components of DOP through Engineer in charge of major component and after receiving approval the MOU between major agency and associate agency/ agencies must sign and submit to the engineer in-charge of minor component through Engineer in charge of major component.

In case the main contractor is himself eligible (as per eligibility criteria) for executing 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 minor component.

However, the Composite category contractor shall also be eligible to carry out himself of these works without associating any specialized agency provided:

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

OR

(b) He will have to associate an agency meeting the eligibility requirements as given in this tender document and submit the details as per given in Part C of this tender document within **7 days** of award of work OR before start of minor component of work whichever is earlier.

1. The main tenderer has to submit the following documents for association of contractor within **7 days** of award of work OR before start of minor component of work whichever is earlier.

- (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(C) who will submit these documents to the Engineer in charge of minor component work for deciding the eligibility. Such Associated Contractor will certify that they are not debarred as on the day of application for last day of submission of tender. Proposal for associating agency for minor components of work shall be submitted in **Form- "G"** of this tender document from associate for 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 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.
- (iii) If the main contractor fails to associate agency for execution of minor components of work within 60 days of award of work OR before start of minor component of work whichever is earlier or furnishes incomplete details or furnishes details of ineligible agencies even after the tenderer is given due opportunity, the entire scope of such component of work shall be withdrawn from the tender and the same shall be got executed by the Engineer-in-Charge of minor component at the risk and cost of the main contractor.
- (iv) Verifiable completion certificates of the work, registration/approval documents, Valid Electrical license, self-attested GST registration documents in respect of the associated agencies as the case

may be, duly attested by the applicant shall be submitted within 7 days of award of work OR before start of minor component of work whichever is earlier.

- (v) Self-attested GST registration documents in respect of the associated agencies shall be submitted within 7 days of award of work OR before start of Specialized / minor component of work whichever is earlier.
2. In the event of the concerned minor component agency not performing satisfactorily or failure of associate contractor to complete the minor component work, the main contractor on written directions of the respective Engineer in charge, 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 equipments 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 respective Engineer-in-charge of the work.
 3. Executive Engineer (E) shall be the Engineer-in-charge as far as E & M works are concerned. Separate tender schedule abbreviated CPWD-7 and Special Conditions for E & M 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.
 4. The main contractor gives detailed execution programme of the work which forms part of his agreement with the department. He indicates in the programme, the time/stage of the work when the agencies of specialized components of works will be deployed by him.
 5. The main contractor shall be responsible and liable for proper and complete execution of the E & M work and ensure coordination and completion of both civil and E & M 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 (E) in charge of minor component as well as E.E. in charge of major component.
 7. The associate contractor shall attend the inspection of the work by the Engineer-in-Charge of E&M works as and when required.
 8. In case of LED bulbs/fittings all the LED bulbs/fittings shall be guaranteed for a period of 5 years. Before completion of defect liability period of one years, the main contractor has to submit security deposit of 5% of price quoted by him for SITC of LED fittings, for the remaining 4 years warranty period in acceptable form i.e., FDR/ Bank guarantee to concern Executive Engineer (E). The Security Deposit deducted from the bills of contractor shall be refunded to the main contractor only after submission of above security deposit for LED fittings by main contractor, failing which this LED security deposit @ 5% as above shall be deducted from Security Deposit deducted for total work and balance amount only will be refunded after completion of defect liability period. The LED Security Deposit will be released pro-rata basis each year.

FORM –G

**PROPOSAL FOR ELIGIBLE ASSOCIATING AGENCIES FOR MINOR COMPONENTS OF
WORK**

Name of Associated Contractor	Category and Class of registration	Enlistment copy/completion Certificates attached	Monetary Limit of work	Validity of registration	Consent/willingness letter attached (Yes/No)

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

Signature of contractor

**CONSENT LETTER FROM ELIGIBLE ASSOCIATE AGENCY OF MINOR COMPONENT OF
WORK (On letterhead of the associate agency)**

Name of work: **Civil and Electrical repair and Maintenance of IQ Basavanagudi HO, Bengaluru South Division - 560004**

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

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

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

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

Date:

SIGNATURE OF MAIN CONTRACTOR
CONTRACTOR

Date:
Place:

SIGNATURE OF ASSOCIATED

Date
Place:

1. Witness with address
(From major component contractor side)

2. Witness with address
(From minor component contractor side)

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)
2. Enlistment Status
3. Valid Upto:
(Henceforth called the main Contractor)

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

For the execution of E&M component Works:

Name of work: Civil and **Electrical work for Civil and Electrical repair and Maintenance of IQ Basavanagudi HO, Bengaluru South Division - 560004**

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 (DoP) 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 shall 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 Superintending Engineer (E), PEC, New Delhi. His decisions 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 & 3 of the agreement 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 minor component contractor side)

GENERAL	TERMS AND E&M COMPONENTS	CONDITIONS APPLICABLE FOR ALL
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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 III (Lifts), as amended up to date
- d) CPWD General Specifications for Electrical work Part IV (Substation) as amended Up to date
- e) CPWD General Specifications for Electrical work Part V (Wet Riser & Sprinkler System) as amended up to date.
- f) CPWD General Specifications Part-VI: Fire Alarm System as amended up to date.
- g) CPWD General Specifications Part-VII (D.G Sets) as amended up to date.
- h) CPWD General Specifications -2024 for HVAC Works as amended up to date.
- i) Commercial and Additional conditions for this work.
- j) The Indian Electricity Act, 2003, as amended up to date.
- k) Indian Electricity Rules 1956 amended up to date.
- l) Central Electricity Authority (Measures relating to Safety and Electric Supply) Regulations 2023,
- m) National Electrical Code 2023 as amended up to date
- n) National Building code 2016 as amended up to date and Energy conservation Building code of India 2017 (ECBC 2017) as 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:

- (i) Description of Schedule of quantities.
- (ii) Commercial and Additional conditions for this work.
- (iii) Drawings.
- (iv) CPWD General Specifications of that particular work.
- (v) Relevant IS or any other international code in case IS code is not available.
- (vi) National Electrical Code 2023 as amended up to date
- (vii) National Building code 2016 as amended up to date and Energy conservation Building code of India 2017 (ECBC 2017) as amended up to date.

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, labourcess& other statutory deductions etc. shall be made at source as per the prevalent laws. The deduction 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 rates quoted by the tenderer shall be firm and inclusive of all taxes (including GST, labourcess etc.,) and all charges for packing forwarding, insurance, freight and delivery, installation, testing, commissioning etc. at site including temporary construction of storage, risks, overhead charges, general liabilities/obligations and clearance from CEA. However, the fee for the CEA inspection 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

- a. The contractor has to carry out maintenance as per CPWD General Specifications / manufacturer's standards for a period of **12 months** or as decided by the Engineer –in – Charge from the date of handing over. Nothing extra shall be paid on this account.
- b. In case of Specialized E&M works if Engineer-in-charge desires, the tenderer should submit the following documents from OEM for that particular minor component
 - i. Authorization certificate.
 - ii. The OEM is unconditionally supporting 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
 - iii. OEM is providing all the spares required for the healthy functioning of the equipment for at least seven years from the date of supply of equipment.
- c. In case the same item appears more than once in the schedule of work under the same subhead 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 equipments and components of the work to avoid damage to the building. He shall be responsible for repairing all damages and restoring the same to their original finish at his cost. He shall also remove at his cost all unwanted and waste materials arising out of the installation from the site of work.

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 & equipments, 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

- a. All equipments shall be guaranteed for a period of 12 months (except LED fittings which shall be guaranteed for minimum 5 years), from the date of taking over the installation by the department, against unsatisfactory performance and/or breakdown due to defective design, workmanship or material. The equipments or components, or any part thereof, so found defective during guarantee period shall be repaired or replaced free of cost, to the satisfaction of the Engineer-in Charge. In case it is felt by the department that undue delay is being caused by the contractor in doing this, the same will be got done by the department at the risk and cost of the contractor. The decision of the Engineer-in-charge in this regard shall be final & binding on the contractor.
- b. The tenders shall guarantee among other things, the following:
 - (i) Quality, strength and performance of the materials used as per manufacturers standards.
 - (ii) 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 EQUIPMENTS:

The acceptable makes of various equipments/components/accessories have been indicated in "Product Directory" 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 the award of work

The successful tenderer would be required to submit the following drawings after award of work for approval as per milestones 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, 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 equipments.
- c) Any other drawings necessary for the job.
- d) Reflected Ceiling Plan (RCP) for all floors by incorporating all equipments likely to come in ceiling/false ceiling shall be submitted for approval before casting of slabs by considering all E&M components.
- e) The successful tenderer should furnish well in advance of start of work, three copies of detailed instructions and manufacturer's manuals of all equipments regarding installation, operation and maintenance, preventive maintenance & troubleshooting with all the relevant data sheets, spare parts catalogue, etc.

14 SUBMISSION OF PROGRAMME

- 14.1 The main Contractor shall submit a Programme Chart (Time and Progress) for each mile stone along-with performance guarantee and get it approved from the department. The chart shall be prepared in direct relation to the time stated in the contract documents for completion of the items of the work. It shall indicate the forecast of the dates of commencement and completion of various trades of sections of the work like submission of minor components work layout, various activities of civil and electrical like foundation work, super structure work, date of shuttering for various slab casting, Electrical conduit laying in slab, opening of shuttering of slab, electrical conduit laying and switch board DBs fixing in wall, plastering, Electric wire laying, putty and painting except last coat of painting, fixing fans and fittings, switch board connections, finishing of painting, Generator supply, installation, Fire alarm and firefighting works various activities, earthing and other work,

hand over the installation and may be amended as necessary by agreement between the Engineer-in-charge and the contractor within the limitations of time imposed in the contract documents, and further to ensure good progress during the execution of the work. The contractor shall in all cases in which time allowed for any work exceeds one month (save for special jobs for which a separate program has been agreed upon) complete the work as per milestones given in Schedule 'F'.

1. The work has to be completed in stages as indicated in the **Table of Milestones under Schedule 'F' of Part -A and Part C** and the program should be prepared in such a manner to achieve these Milestones as indicated therein or earlier.
2. The program chart should include the following: -
 - (a) Descriptive note explaining sequence of various activities.
 - (b) Network (PERT / CPM / BAR CHART) prepared on MS project which will indicate resources in financial terms, manpower and specialized equipments for every important stage.
 - (c) Program for procurement of materials by the contractor.
 - (d) Program of procurement of machinery / equipments having adequate capacity, commensurate with the quantum of work to be done within the stipulated period, by the contractor.
3. If at any time, it appears to the Engineer-in-Charge that the actual progress of work does not confirm to the approved program referred above, the contractor shall produce a revised program showing the modifications to the approved program by additional inputs to ensure completion of the work within the stipulated time.
4. The submission of revised program or approval by the Engineer-in-Charge of such program or the furnishing of such particulars shall not relieve the contractor of any of his duties or responsibilities under the contract. This is without prejudice to the right of Engineer-in-Charge to take action against the contractor as per terms and conditions of the agreement.

Notwithstanding the fact that the contractor will have to pay to the labourers and other staff engaged directly or indirectly on the work according to the provisions of the labour regulations and the agreement entered upon and/or extra amounts for any other reason.

5. The approved Programme Chart (Time and Progress) /Revised program will immediately provide to engineer in charge of minor component by Engineer in charge of major component as well as by the agency of major component.

14.2 **PROGRESS AND MONITORING OF WORK:**

1. Apart from the above integrated program chart, the contractor of major component shall be required to submit monthly progress report of the work in a computerized form to Engineer in charge of minor component. The progress report shall contain the following, apart from whatever else may be required as specified:
 - (i) Construction schedule of the various components of the work through a bar chart for the next three quarters (or as may be specified), showing the milestones, targeted tasks and up to date progress.
 - (ii) Progress chart of the various components of the work that are planned and achieved, for the month as well as cumulative up to the month, with reason for deviations, if any in a tabular format.
 - (iii) Plant and machinery statement, indicating those deployed in the work.
 - (iv) Man-power statement, indicating individually the names of all the staff deployed on the work for minor component, along with their designations.
 - (v) Financial statement, indicating the broad details of all the running account payment received up to date, such as gross value of work done, advances taken, recoveries effected, amount withheld, net payments details of cheque payment received etc.
2. For completing the work in time, the Contractor might be required to work in two or more shifts (including night shifts). No claim whatsoever shall be entertained on this account, not withstanding the fact that the Contractor may have to pay extra amounts for any reason, to the labourers and other staff engaged directly or indirectly on the work according to the provisions of

the labour and other statutory bodies regulations and the agreement entered upon by the Contractor with them.

- (a) The work should be planned in a systematic manner so that chase cuttings in the walls, ceilings and floors is minimized. Wherever absolutely essential, the chase shall be cut using chase cutting machines. Chases will not be allowed to be cut using hammer / chisel. The electrical boxes should be fixed in walls simultaneously while raising the brick work. The contractor shall ensure proper coordination of various disciplines viz. building works, sanitary & water supply & electrical installations etc.
- (b) The contractor shall conduct his work, so as not to interfere with or hinder the progress or completion of the work being performed by other contractor(s) or by the Engineer-in-Charge and shall as far as possible arrange his work and shall place and dispose off the materials being used or removed so as not to interfere with the operations of other contractor or he shall arrange his work with that of the others in an acceptable and coordinated manner and shall perform it in proper sequence to the complete satisfaction of Engineer-in-charge.
- (c) The Contractor shall do proper sequencing of the various activities by suitably staggering the activities within various pockets in the plot so as to achieve early completion. The agency may deploy adequate equipment, machinery and labour as required for the completion of the entire work within the stipulated period specified. Also ancillary facilities shall be provided commensurate with requirement to complete the entire work within the stipulated period. Nothing extra shall be payable on this account. Adequate number/sets of equipment in working condition, along with adequate stand-by arrangements, shall be deployed during entire construction period. It shall be ensured by the Contractor that all the equipment, Tools & Plants, machineries etc. provided by him are maintained in proper working conditions at all times during the progress of the work and till the completion of the work. Further, all the constructional tools, plants, equipment and machineries provided by the Contractor, on site of work or his work shop for this work, shall be exclusively intended for use in the construction of this work and they shall not be shifted / removed from site without the permission of the Engineer-in-Charge.
- (d) All material for minor component shall only be brought at site as per program finalized with the Engineer-in-Charge of minor component. Any pre-delivery of the material not required for immediate consumption shall not be accepted and thus not paid for.
- (e) The main contractor shall be responsible for coordinating the activities of all works and will ensure progress of works as per laid down programme.

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 equipments covered by specifications but all incidental sundry components necessary for complete execution and satisfactory performance of installation with all layout charts whether or not 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 to the 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, the 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 equipments, 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 support 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.

17 INSPECTION AND TESTING

- 17.1 All major equipments like Transformers/DG sets/LT panels/HT panels/HVAC Equipments/Lifts etc. (as per the guidelines of [Quality Assurance Policy & Check List of E&M Services](#) of CPWD/specifications) shall be offered for initial inspection. Contractor will intimate the date of testing of equipments at the manufacturer's works before dispatch. The successful tenderer shall give advance notice of minimum two weeks regarding the dates proposed for such test 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. Equipments 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.
- 17.2 Copies of all documents of routine and type test certificates of the equipment, carried out at the Manufacturer'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.
- 17.3 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.

18 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) 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. The 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.

19 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 equipments 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.

20 ERECTION TOOLS:

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

21 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.

22 INSURANCE AND STORAGE:

All consignments are to be duly insured upto 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.

23 VERIFICATION OF CORRECTNESS OF EQUIPMENT AT DESTINATION:

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

24 PAINTING:

This shall include cost of painting of the entire installation. The major equipments 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.

25 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.

26 MAINTENANCE:

Sufficient trained and experienced staff shall be made available to meet any exigency of work during the guarantee period of One year for all installation and 5 year for LED fittings from the handing over of the installation.

The maintenance, routine as well as preventive, for two years from the date of taking over the installation as per manufacturer's recommendation.

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

- 27.1 The agency shall submit drawings and details such as makes and models of the equipments/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.
- 27.2 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.

27.3 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.

28 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.

29 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.

30 ADDITIONAL CONDITIONS AND SPECIFICATIONS

1. The work shall be done as per current CPWD General Specifications for Electrical Works as amended from time to time; and in accordance with the provisions of Electricity Act, 2003; and Central Electricity Authority (Measures Related to Safety and Electric Supply) Regulations as amended up to date.
2. The work shall be supervised by a qualified overseer/supervisor and the contractor will have to submit the credentials of the overseer/supervisor before he will be allowed to work at the site.
3. The layout of the work will be given by the Engineer-in-charge or his authorized representative at site of work.
4. The earthing sets shall be provided in the presence of the Engineer-in-charge or his authorized representative failing which the contractor will have to do that earthing in the presence of the Engineer-in-charge or his authorized representative.
5. The bidder should submit along with the tender, the make of materials to be used in the work whenever not specified in the schedule. Unapproved materials, if used on the work, shall have to be removed immediately at the cost and risk of contractor.

6. The successful contractor should recess the conduit in the walls before they are plastered and will have to take special care so that the conduit do not pass through air-conditioning grills, collar beams etc. Any damage thus done will have to be made good at cost of the contractor.
 7. The runs of various circuits wiring at various places shall be kept minimum by the runs on walls where crossing of columns is not necessary. This has to be decided before the costing of slab so that unnecessary lengths of conduit are not laid there in.
 8. Completion Plan and Completion Certificate: The contractor will have to submit the completion plan drawn to a suitable scale in tracing cloth with ink or computerized drawing, in triplicate along with completion certificate. In case the contractor fails to submit completion plan and completion certificate as aforesaid he shall be liable to pay a sum equivalent to 2.5% of the value of the work subject to a ceiling of ₹ 15000/-.
 9. Inspection of Material and Equipment: Department reserves the right to inspect the material at manufacturer's premises or at authorized dealer's godown.
 10. Underground cable both of 1.1 kV and 11 kV grade should be subjected to insulation test before and after laying the same in the duct and in case of unsatisfactory test results, the cost of all repairs and replacement and all extra work for removal and relaying will have to be made by the contractor at his own cost and risk.
 11. Termination of all connections on main board sub boards/sub distribution boards will be done by contractor and nothing extra will be paid on this account.
-

Additional conditions and specifications of E&M Components

A. IEI & Fans

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 II External-2023, as amended up to date.
- b) CPWD General Specifications for Electrical work Part II Internal-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 as amended up to date.
- f) Central Electricity Authority (Measures relating to Safety and Electric Supply) Regulations 2023,
- g) National Electrical Code 2023 as amended up to date, National Building code 2016 as amended up to date
- h) Energy conservation Building code of India 2017 (ECBC 2017) as amended up to date
- i) Uttar Pradesh Fire Prevention and fire safety act, 2005

and as per the instructions and satisfaction of the Engineer-in-charge

2. Guarantee & Defect Liability Period:

All equipment shall be guaranteed for a period of **12 months** from the date of taking over the installation by the department, against any unsatisfactory performance and/or breakdown due to defective design, workmanship, or materials. However, LED fittings shall carry a minimum guarantee of 5 years, while ceiling fans, pumps, and motors shall be guaranteed for a period of 1 years. The equipments or components, or any part thereof, so found defective during guarantee period shall be forthwith repaired or replaced free of cost, to the satisfaction of the Engineer-in Charge. In case it is felt by the department that undue delay is being caused by the contractor in doing this, the same will be got done by the department at the risk and cost of the contractor. The decision of the Engineer-in-charge in this regard shall be final & binding on the contractor.

3. The tenderers shall guarantee among other things, the following vis-à-vis specifications.

- a) Quality, strength and performance of the materials used.
- b) Satisfactory operation during the maintenance period.
- i) Ceiling fans, Exhaust fans, Pumps, Motors are to be guaranteed for 1(one) Years.
- ii) LED fittings are to be guaranteed for 5 years.
- iii) 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 components.

The Main 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.

4. 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.

5. 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.

6. The work shall be supervised by a qualified license holder supervisor and the contractor will have to submit the credentials of the supervisor before he will be allowed to work at the site.
7. Make/model of all materials to be used on the work shall be got approved from the Engineer-in-charge before execution of work within 7 days from date of acceptance of the bid. Unapproved materials if used on the work shall have to be removed immediately at the cost and risk of contractor.

The following wiring shall be done in separate conduit.

- (a) Power plug wiring
- (b) Light and fan wiring
- (c) Circuit wiring
- (d) Sub main wiring
- (e) Telephone wiring
- (f) LAN wiring
- (g) UPS Wiring

8. Layout of Electrical work shall be submitted by the contractor, 10 days before casting of slab or start of work or award of work whichever is earlier and approval of Engineer-in-charge is required to be obtained before start of slab work at site. Minimum No. of Junctions to be kept, & if required junctions to be kept underneath the fitting locations in corridor/rooms so that junctions are not visible after fittings are fixed in position. Drop of conduit shall be well planned w.r.t. location of fitting/D.B. and crisscrossing to be avoided. All chases in walls shall be cut using wall grooving machine. For this purpose, electricity shall be arranged by contractor.

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 par 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.	35%
B	On drawing of wires i/c terminations, switches, sockets, cover plates etc.	50%
C	On completion of item and after testing and commissioning.	10%
D	At the time of payment of final bill	5%

- b) Items of Rising mains, Distribution Boards, MCBs, RCBOs, LED fittings, fans, Water coolers, MV Panels, Earthing materials, Lightning conductor materials, Split AC's, Illuminated sign boards, pumps, pump panel, street light panel, HDPE pipes and lift cables etc.

S. N.	Stage of work	Percentage of Rate
A	On initial inspection of material and delivery at site in good condition on pro-rata basis.	35%
B	On completion of installation on pro-rata basis.	50%
C	On completion of item and after testing and commissioning.	10%
D	At the time of payment of final bill	5%

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

10. 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.
11. 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.
12. The contractor shall remove all the debris due to the E & M works from the site as soon as the work is completed.
13. 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.
14. The rupturing capacity of the MCBs shall be 10 KA minimum. The MCBs shall have ISI mark. Quantities of MCBs of different rating of 6amp to 32amp shall be brought in consultation with the Engineer-in-Charge or his representative.
15. All the MCCBs shall be rated for Ic only, as specified.
16. The copper wire to be used on this work shall be FRLSH type and ISI marked. The copper conductor cable only shall be used for submain/circuit/point wiring/power wiring. The copper conductor cable shall be ISI Marked IS 694:2010 for insulation of class FRLSH, IS: 17048:2018 insulation of class HFFR and IS:17505 for fire survival cable respectively. Insulation - The conductors shall consist of high conductivity high purity (greater than 99.95%) copper wires complying with class 2 as per IS 8130 and IS:694. PVC insulated of heat resistance grade (type-C), FRLSH fire grade for building up to 24 m height.
17.
 - a) The make of switch boxes shall be the same as that of switches. Only the required knockout 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, MCB DBs 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 to PS. Nothing will be paid extra for blanking plate.
 - e) Power and light MCB distribution boards in office/ non-residential buildings should be of same size irrespective of number of circuits as far as possible in order to get a aesthetic look.
18. The E & M works shall be carried out by the contractor, along with the progress of the civil works.
19. The Contractor shall furnish documentary proof like delivery challans of purchasing Wires, Modular switches & accessories, MCBs, MCB DB, Fittings, accessories and other items from the manufacturers or their authorized dealer to the satisfaction of the Engineer-in-charge.
20. 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.
21. Cutting of brick wall 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.
22. All the sub main and circuit wiring includes loose wire for connections inside switch boxes and MCB DBs. No payment for these loose wires shall be made. However, wires within the cubicle panel will be measured and paid under relevant item of work.

All the circuits / sub-main wiring are to be suitably numbered with stickers / marker pen at LT panel, MCB DBs, switch boards (on backside of cover plate) for ease of maintenance. Nothing shall be paid extra on this account.
23. The contractor shall submit the completion plan separately in triplicate on blueprint/ computer plotted in A0 Size as per Clause-8 of the contract within 30 days of the completion of work. In case the

contractor fails to submit the plan as 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.

24. To facilitate drawing of wires, 18 SWG GI fish wires shall be provided along with laying of recessed conduit for which no extra payment shall be made. Conducts laid for other services, like fire alarm, PA etc., where wiring is not done along with IEI works, fish wire shall be invariably drawn.
25. The connection between incoming switch / isolator and bus bar shall be made with suitable size of thimble and cable at no extra cost.
26. Copper conductor of insulated cables of size 1.5 Sq. mm and above shall be stranded and terminals provided with crimped lugs.
27. 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.
28. All sub-main wirings shall be terminated in the main board with suitable copper lugs and thimbles for which nothing extra will be paid on this account.
29. 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.
30. The rising main shall conform to IS/IEC 61439-1 2011 and 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.
31. Tap-off arrangements shall be provided on the rising mains with tap-off boxes.
32. 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.
33. All hardware items such as nuts/ bolts/ screws/ washers etc. to be used in work shall be zinc/ cadmium plated iron.
34. 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.
35. While laying conduit, suitable size junction boxes shall be provided for pulling the wire as per the decision of the E-in-C.
36. The make of the material has been indicated in the list of acceptable makes. No other makes will be acceptable. The material 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.
37. Where switches/ sockets/ regulator/ telephone/ TV / internet outlets including metal boxes are to be provided, the same shall be of only one make.
38. 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.
39. Wherever light fittings are proposed to be provided on the false ceiling, the respective light/ fan point wiring will have to be brought up to the terminal of the light fittings / fans by the contractor. Flexible metal conduit shall be used for drawing wires from PVC conduit 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 switchboards are to be fixed at heights in all locations in accordance with CPWD specifications/as per the directions given by the Engineer-in-charge.
40. After installation, all accessible surfaces of metallic accessories shall be painted.
41. For circuit/sub-main/point wiring of copper conductor cables shall be terminated on the ends with lugs/thimbles.
42. The firm shall provide necessary barriers, warnings, signals and other safety measures to avoid any accident. The employees of the firm are to be suitably insured against such accidents. The department shall not be responsible for any such accidents.
43. Bad work-man-ship will not be acceptable and defect shall be rectified at contractor's cost to the satisfaction of the Engineer-in-charge.

44. The contractor shall have to furnish the insulation test report, earth report, along with all required details of electrical load on the prescribed Performa for the electric connection from Supply Company. The contractor will have to give the above tests at his cost in the presence of Engineer in charge or his authorized representative before final bill is paid.
45. Three nos ornamental Shikhar of various height is proposed in the building. In consideration of the aesthetic view of the building the spike of the lightning arrester may be designed by agency with consultation to engineer in charge and after getting its approval from DOP and install along with lightning conductor as per with NBC and IE Rules in coordination with Civil Wings/agency.

TECHNICAL SPECIFICATIONS OF MV / LT PANELS

46. 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.

47. 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).

48. M. V. Panel

47.1 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.

47.1.1 All types of panels shall be fabricated from approved firms and strictly as per CPWD specifications.

47.1.2 The Drawings of Panel should be got approved from Engineer-in-charge before fabrication.

47.1.3 The panels shall be got inspected by the Engineer-in-charge before 7 tank process and before dispatch from the manufacturer's workshop.

47.2 Cubicle Type Panels

- 47.2.1 Cubical 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.

47.2.2 Bus Bar and Connections

The bus bars shall be of copper of high conductivity electrolytic quality and of adequate section. Current density shall not exceed 160 amps for copper /sq. cm. or aluminium as specified in schedule .The bus bar should be in full length of oanel as design approved by engineer in charge.The bus bar system may comprise of a system 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 bus bars and connections shall be suitably sleeved / insulated in approved manner and as per CPWD specifications **Busbar should be 100% Neutral**

47.2.3 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.

47.2.4 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

47.2.5 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.

47.2.6 Small Wiring

All small wiring for Controls, Indication etc. shall be of with suitable FRLSH/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) - 2023 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/MV 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:

- 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.
- 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.

49. Rating and Requirements

48.1 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.

48.2 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.

48.3 Bus Bar Marking

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

48.4 TESTS AT MANUFACTURERS WORK

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

50. INSTALLATION, TESTING & COMMISSIONING

49.1 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.

49.2 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:

- a) Operation checks and lubrication of all moving parts.
- b) Interlock function checks.
- c) Continuity checks of wiring, fuses etc. as required.
- d) Insulation test: When measured with 500V Megger the insulation resistance shall not be less than 100 mega ohms.
- e) Trip tests and protection gear test.

51. 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).

50.1 ELECTRODES

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

50.2 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.

50.3 WATERING ARRANGEMENT

Method of watering arrangement shall comply with CPWD General Specifications.

50.4 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.

50.5 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

52. 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 ensure 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.
 - (iv) Earth electrode resistance test.
 - c) 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 equipments/material
- (vi) Drawings showing details of Foundation/Wall supports etc.
- (vii) Any other drawings relevant to the work.

(viii) Data sheets of equipments

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. Warrantee Certificates
- c. O&M Manuals of Equipments
- d. Any other information the Engineer-In-Charge may deem 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 lampholders(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	Guide for safety procedures and practices in electrical work.
(Part-I)	
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.

51.1 REQUIREMENTS

Safety provisions shall be generally in conformity with appendices (A) and (C) of CPWD General specifications of Electric Works (Part 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 equipments 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 equipments. MV danger notice plate shall be 200mm x 150mm made of mild steel at least 2 mm thick vitreous enamelled white on both sides and with the descriptions in signal red colour on front side as required. Notice plates of other suitable materials such as stainless steel, brass or such other permanent nature material shall also be accepted with the description engraved in signal red colour.

d) Fire Extinguishers

Portable CO₂ 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.

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B. FIRE DETECTION AND ALARM SYSTEM

A. SCOPE OF WORK:

The work under this section shall consist of design, drawing approving layout, to fill local fire authority norms, getting approval, NOC, inspections, furnishing all labour, material, equipment and appliances necessary and required to completely install automatic & manual fire detection and alarm system including public address facility (if included in the schedule of work) as required by the drawings and specified hereinafter or given in the schedule of quantities. The work should be executed CPWD General Specifications Part-VI: Fire Alarm System as amended up to date, NBC-16, and other related rules as applicable

B. Specification of Items

A. DETECTORS:

SALIENT FEATURES:

- a) The detector shall be designed to detect one or more characteristics of fire, smoke or heat. The prime function of a detector shall be to detect fire in its early stages by one of its characteristic phenomena both visual and invisible and convert the same into an electrical signal for initiating the local and remote alarm.
- b) The detector shall be suitable for column/ceiling mounting and shall be suitable for plugging-in to mounting bases. Bases shall be from original detector manufacturer. No electronic shall be housed in the base
- c) All type of detectors shall be of same make, compatible to work with each other and shall have interchangeable bases. The detectors shall be UL/FM listed or LPC approved. The detectors shall not be more than one year old at the time of supply. The detector shall be supplied with manufacturer test certificate.
- d) The detectors shall be suitable for connecting a 2-wire 24 V system and shall operate satisfactorily within the supply range of 17-28 V. Protection against reverse polarity and voltage surge shall be built in the detector.
- e) An indicator LED shall be provided on the detector, which illuminates when the detector has reached a pre-set alarm level. A flashing LED to indicate activeness of detector shall be preferred. The detector shall be self hold type capable of maintaining the alarm signal until the system is reset at the control unit. The detector shall have provision for connecting remote indicator.
- f) The construction of the detector and base shall be of self-extinguishing polycarbonate plastic. The detector shall not contain any moving parts. Full circuitry must be protected against moisture and fungus. Smoke entry points must be protected against dust and insect ingress by corrosion resistant gauze.
- g) The detector shall be capable of protecting an area up to 100 sqm at a height of 12m. The installation and siting of detector shall conform to specifications.

DESIGN:

- a) The area to be protected by ionization and photoelectric detectors shall be in accordance with the standards laid down below: (Assumption: Floor height not exceeding 5m and air change 1.0 times per hour.)
 - (i) Each detector shall cover an area not exceeding 25 sqm in case of Air Conditioned equipment room.
 - (ii) Each detector shall cover an area not exceeding 40 sqm in case of non-AC equipment room.
 - (iii) Each detector shall cover an area not exceeding 50 sqm in case of room having no equipments.
 - (iv) Each detector shall cover an area not exceeding 10 sqm when provided above false ceiling or below false flooring or over fully covered cable network.
 - (v) Areas separated by beams having depth of minimum 450mm shall have separate detector

- irrespective of area.
- (vi) Maximum horizontal distance between center to center of smoke detectors shall not exceed 10 meters.
 - b) Ionisation or photoelectric detector shall be installed right above the racks at a distance not exceeding 4.0 m between detectors in case of Electronic Exchanges.
 - c) Ionisation and Photoelectric detectors shall be provided in the areas which are normally free from smoke.
 - d) Heat detector shall be provided for the areas like kitchen, battery room etc which are prone to smoke. Each heat detector shall cover an area not exceeding 40 sqm.
 - e) Each return air opening in weather maker room shall be provided with one duct detector. The detector shall be ionization type smoke detector inside the sampler box.
 - f) Ionisation and photoelectric type smoke detectors shall be provided in the ratio of 1:1 for mixed monitoring purposes.
 - g) Each room including electrical rising main shall necessarily be provided with at least one detector irrespective of its area.
 - h) Each detector shall be numbered zone-wise such as Z09/N-10 indicated detector no. 10 of Zone number nine.
 - i) The specification of different types of detectors shall confirm to the detailed specification issued by the department

Ai) IONISATION SMOKE DETECTORS

- a) The ionization smoke detector shall be suitable for detecting invisible products of combustion as well as visible smoke. It shall be of DUAL CHAMBER SOURCE type consisting of two ionization chambers containing americium-241 foil, an electronic circuitry, connection contacts to base and easy to clean protective housing.
- b) Ionization detector shall not be more than one year old at the time of supply.

Aii) PHOTOELECTRIC (OPTICAL) SMOKE DETECTORS

- a) The Photoelectric (optical) smoke detectors shall be suitable for detecting visible smoke such as is produced by slow smouldering fires including burning PVC. It shall be of the LIGHT SCATTERING TYPE and shall comprise of an emitter, a solid state LED light source which with its associated lens system shall produce a hollow circular beam of light and a silicon photocell, positioned in the central dark area of the hollow beam. In absence of smoke, no light is received on the cell, but when smoke enters the chamber, due to the phenomenon of scattering light from beam impinging on the sensor causing the detector to operate.
- b) The detector shall be factory preset to meet international standards. The optical system shall be contained within a chamber to restrict the access of light from external sources and minimize internal reflection.

Aiii) HEAT DETECTOR

- a) The heat detector shall be electronic in operation and shall be of RATE OF RISE CUM FIXED TEMPERATURE, RESETTABLE type. It shall preferably operate on twin thermistor principle consisting of NTC thermistors. One thermistor is exposed to monitor the ambient temperature and other is thermally insulated from surrounding air.
- b) The detector shall operate at 60 deg C. The sensitivity of detector shall be as per IS: 2175 for grade I detectors. The device shall monitor ambient temperature by means of a NTC thermistors.

A. HOOTERS, MANUAL CALLPOINTS, RESPONSE INDICATORS:

HOOTERS:

- a) The dual tone electronic hooter shall have interrupted tone for Alert. The interrupted tone shall be 'ON' for 3 seconds and 'OFF' one second and shall be distinct from background noise / other sounders in every part of the premises..
- b) The hooter shall be complete with speaker, line matching transformer and connection terminal ready for mounting and conforming to IS 2189. It shall operate on 24 V DC supply and shall be polarity insensitive. The output of hooter shall be approximately 4 watts RMS.
- c) The hooter shall be suitable for wall mounting incorporating hooter card and speaker inside a 16 SWG MS box duly powder coated in fire red shade and shall be mounted 2.4 mtrs. above floor level.
- d) The hooter shall be actuated by the control panel and it shall be possible to use the hooter for raising fire alarms and making public announcements.
- e) Minimum two speakers for audible alarm and/or public announcement shall be provided on each floor and at least one speaker shall be provided on terrace.

MANUAL CALLPOINT (PILLBOX)

- a) The manual call point unit shall comprise of a push button of reputed make enclosed in aluminum die cast box from all sides except the front with provision for cable/conduit entry. The push button shall not be shrouded and shall be projecting out of the surface of the box. Installation of manual call point shall be as per IS 2189. It shall operate on 24 VDC supply along with detectors.
- b) The enclosure shall be completely dust, vermin and damp proof and shall be provided with chain and hammer attached to it. The front side shall be sealed with breakable glass cover using neoprene or equivalent gasket. The glass surface should be minimum 30 sq.cm in area and glass thickness shall not exceed 2 mm.
- c) The unit shall be provided with chain and hammer attached to it. The complete unit i/c chain and hammer shall be powder coated in fire red shade. The glass front cover shall have the words inscribed in clear bold letter "BREAK GLASS IN CASE OF FIRE".
- d) The complete unit shall be suitable for wall/column mounting in surface/concealed position with necessary mounting accessories and shall be mounted at 1.2 meter above floor level.
- e) Manual call point shall be installed in such a way that one should not travel more than 22.5m to reach a call point.

RESPONSE INDICATORS.

- a) Signals from detectors which are normally not visible shall be extended in the shape of response indicators to a suitable location which is visible.
- b) The response indicator for the detector below the false floor shall be installed with top at 300mm above false floor at nearby wall/column or directly on the false floor by making suitable cutout and covered with thick glass. For detectors above false ceiling, the response indicator shall be provided either right below the false ceiling or on the nearby wall/column with bottom 300mm below false ceiling. Alternatively all response indicators shall be located at convenient places as approved. The cover plate of the Response Indicator shall also boldly display the detector no. to which they correspond.

- c) Response Indicators shall be housed in M. S. Box. Indication will be by means of twin LED's in red colour mounted to facilitate viewing from wide angles 60 degree min.
- d) Input will be polarity insensitive.

B. CONTROL PANELS, POWER SUPPLY AND P.A. SYSTEM:

GENERAL DESIGN AND FABRICATION:

- a) The various control and indicating panels shall be totally enclosed, dust and vermin proof and shall be suitable for the environmental condition at the site of their installations.
- b) These shall be fabricated out of sheet steel of 1.6 mm thickness and designed for wall mounting. These shall be front openable types with hinged cover lock. Suitable knockout plates shall be provided for entry of cables and wiring into the panels.
- c) The main control panel shall be designed such that the equipment for power supply, battery charging and P. A. system are housed in independent compartments. Batteries shall however not be accommodated inside the panel to avoid problems due to corrosion.
- d) The panels after fabrication shall be cleaned to remove any dust/dirt/grease/rust and phosphates. After two coats of anti-rust primer, the panel shall be finished with powder coat of approved shade.
- e) Each PCB for different zones shall be mounted on another board with appropriate socket arrangement. No loose wires shall be acceptable for this purpose. In addition to this it should be supported firmly and screwed properly.
- f) All components and their wiring shall be arranged so as to be conveniently attended to from the front of the panels.
- g) All indicating lamps, control switches and buttons and fuses shall be located in the front of the panels. These shall be suitably and unambiguously labeled.
- h) The indicating lamps shall be LED type of the following colours. The conditions shall be indicated by twin lamps.
 - 1) Red to indicate FIRE condition.
 - 2) Amber to indicate FAULT condition.
 - 3) Green to indicate HEALTHY condition.
- i) Test button to test the indicating lamp shall be provided.
- j) All control and indicating panels shall be of solid state type. The panel shall be suitable for all types of fire detectors mentioned in Approved List.
- k) The main control panel shall be installed preferably at the ground floor at the fire control room. The panel shall be suitable for operation on AC Supply with DC as power backup. Standby batteries for power supply to the panels shall be provided near the panel.
- l) The local control panels shall be located at the respective floors in conspicuous and easily accessible areas like corridors close to area under protection.
- m) The panel shall conform to IS 2189 as amended up to date. Also the panel shall be TAC Approved. They shall not be more than one year old. Panels shall be supplied along with manufacturer's test certificate.

MAIN CONTROL PANEL

1. Audio-visual indications shall be provided in this panel for the following,
 - a) Fire conditions in any Local Control Panel/Zone.
 - b) Fault in any Local Control Panel including fault in wiring to the local control panels and removal of any fire detectors / disconnection of leads to detectors.
 - c) Fault in this panel itself.
 - d) Low battery voltage/Battery disconnection.
 - e) A.C. fuse blowout.
 - f) D.C. fuse blowout.
2. Only visual indications shall be provided in this panel for the following
 - a) A.C. power supply ON/ OFF.
 - b) Standby battery supply ON/OFF.
 - c) Battery charger ON /OFF.
 - d) Isolation of a zone for testing purpose as per (3) below.
 - e) Operation of silencing switch, when there is no alarm condition.
 - f) P.A. system ON.
 - g) Isolation of local control panel.
3. The local control panel shall generally derive power from Main Control Panel and shall have facility to test the Local Control Panels individually by simulating fault or fire condition. Each Local Control Panel shall be capable of isolation for maintenance or test purposes, leaving the remaining system in healthy condition so that fire detection in remaining areas is not affected. Visual indication of such isolation shall be available in the panel.
4. This panel shall be provided with the following,
 - a) Necessary test switches for testing of circuits and main control panel lamps.
 - b) Panel's control and silencing switch.
 - c) Switches to operate the fire alarm sounders Zone-wise and also collectively all zones.
 - d) P.A. system equipments and panel microphone.
 - e) Change over switches to P.A. system.
 - f) On clearance of fault or a fire condition, as the case may be the system shall reset automatically.
 - g) Scaled maintenance free batteries of adequate capacity shall be provided to operate system for 48 hrs/1 hr (min) in supervisor / alarm condition respectively.
5. Six potential free NO/NC contacts for the following shall be incorporated in the design of the main panel.
 - a) Provision for automatic connection to fire station through external public Telephone lines.
 - b) Operation of Halon system, pressurization system, air conditioning system and remote alarm etc.

LOCAL CONTROL PANEL

- 1) This panel shall provide indication for the following,
 - a) System ON and healthy - Visual.
 - b) Fault and its type i.e. open/short in any zone connected via this panel - Audiovisual.
 - c) Fire in any zone connected to this panel - Audiovisual.
 - d) Isolation of a zone for testing purposes from main control panel - Visual.
 - e) ACON, ACFAIL, SILENCE - Visual.
 - f) Sounder & Hooter Fault - Audio Visual.
- 2) This panel shall be provided with the following:
 - a) Test switch for testing the lamps on this panel.
 - b) Panel sounder and its silencing switch.
 - c) Zone isolation facility.
 - d) Two independent sounder outputs.
 - e) Common fire annunciator.

- f) Audio output for PA System.
- g) Dry relay contacts for actuators.
- h) Facility for common FAULT relay output.
- i) Self test facility for each zone.

POWER SUPPLY

The entire system shall be suitable to operate on 230V $\pm$ 10, 50 Hz single phase A.C. supply with 24 V D.C. battery as a secondary source. The main features of the power supply units shall be as under.

- a) The power supply unit shall consist of a solid state power rectifier of adequate capacity so as to provide 24 volts stabilized D.C. power as output when receiving 230 volts $\pm$ 10, 50 HZ single phase A.C. supply.
- b) The unit shall also have solid state battery charger circuit for recharging of battery whenever the battery is discharged below a pre-determined level. The charger shall have trickle charging facility.
- c) A secondary battery of sealed maintenance free type continuously trickle / float charged from main A.C. with facility for automatic recharging in eight hours.
- d) Means shall be provided to prevent secondary battery from discharging through the charging equipment in the event of its break down or failure. A fault signal shall be provided as much as possible close to the source for supply.
- e) Suitable over load protection devices like fuses and circuit breakers shall be provided in order to minimize the risk of failure etc. The protective devices shall be provided as much as possible close to the source of supply.
- f) The unit shall have automatic change over facility from A.C. to battery and vice versa in accordance with A.C. supply position.
- g) Main control panel & each Local Control Panel will have its independent power supply.

PUBLIC ADDRESS SYSTEM

- a) The main control panel shall incorporate public address system with microphone and amplifier of adequate capacity with selector switches for ALERT and EVACUATION alarm. The public address system shall have facility to select "*All Floor Addressing*" and "*Individual Floor Addressing*".
- b) The amplifier shall work on A.C. or 24 V. D.C. power supply derived from the main control panel. Automatic change over facility for uninterrupted service shall be provided.
- c) Master control for adjustment of volume shall be provided.
- d) The amplifier unit shall have complete protection against over loads, short circuits and wrong battery polarity etc.
- e) The amplifiers shall have hum and noise level better than 60 db.
- f) Speakers with line impedance transformers (at speaker end) shall be mounted to amplifier.

TALK BACK SYSTEM

The main control panel shall be provided with the electronic circuitry so as to operate the talk back system using telephone handsets between main control panel and local control panels or vice-versa.

C. GENERAL REQUIREMENTS:

- a) All materials shall be of the best quality conforming to specifications and subject to the approval of the Engineer-in-charge.
- b) All the cables and wires shall be tagged or labeled with ferrules for proper identification at the termination end.
- c) All conduit pipes/cables shall be fixed truly vertical, horizontal or in slopes as required in a neat workman like manner.

- d) All conduits, cables, junction boxes etc. shall be securely fixed to brick/RCC walls and ceilings by suitable clamps at regular intervals. Only approved type of anchor fasteners shall be used. CPWD specifications shall be followed for executing this work.
- e) Control panels and junction boxes shall be so located that they are easily accessible for operations, repairs and maintenance.
- f) The exposed conduits shall be painted with one coat of red oxide primer followed by two coats of approved/matching colour synthetic enamel paint with identification of red colour bands at appropriate intervals say 3 metres
- g) The spacing of detectors shall also be in conformity with the drawings and properly co-ordinated with electrical fixtures, air-conditioning ducts/grills, beams and other ceiling services. Contractor shall submit detailed layout drawings to Engineer-in-charge for approval before commencement of work.
- h) Provision of suitable tripod or any other such stand of 300mm height for fixing of detectors in false floor is included in the scope of work. The design of tripod/stand shall be got approved from the Engineer-in-charge.
- i) Any damage or breakage which might be caused during the execution of work shall be made good by the contractor at his own risk and cost.
- j) The contractor shall be responsible for the removal of debris and waste material arising out of work done by him from the site.
- k) Necessary tools and plants shall be arranged by the firm. Modern tools and equipments shall be used for handling of cables, drilling, chiseling, cutting etc so that speed and accuracy is maintained and noise, vibration and disturbance can be minimized.
- l) The firm shall submit all the records such as excise duty gate pass, test certificates, guarantee cards, operation and maintenance manuals and spares and tools of the original supplier to the department.
- m) The concealed items like earthing, cabling and conduiting shall be carried out in the presence of representative of the Engineer-in-charge.
- n) The offer shall include all charges for packing, handling, freight, insurance, loading, unloading, stacking etc. for the material.
- o) All fittings, unit assemblies, accessories, hardware foundation bolts, terminal blocks for connection, cable glands and miscellaneous materials and accessories of item of works which are useful and necessary for efficient assembly and working of the equipment shall be deemed to have been included within the scope of work in the tender and within the overall details for complete item whether they have been specifically mentioned or not.

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SPECIAL CONDITIONS OF CONTRACT FOR FIRE DETECTION AND ALARM SYSTEM

1. GENERAL:

The following conditions shall be read in conjunction with general condition of contract and amendments thereto. If there are any provisions in these special conditions which are in variance with the provisions in other documents, the provision in these special conditions shall take precedence. The work shall generally be carried out as per current CPWD specifications for Electric works as amended from time to time / Indian Electricity Rules as amended up to date / National Building/Electrical Code / Fire Manuals and as per NIT conditions and specification.

2. INSPECTION OF SITE AND CONTRACT DOCUMENTS:

For the purpose of inspection of site and relevant documents the contractor is required to contact E.E. (Elect) concerned and shall give reasonable facilities for inspection of the same. The contractor shall inspect and examine the site and its surroundings and shall satisfy himself, before commencement of work, to the form and nature of the site, the nature of work, and the quantities of materials necessary for completion of the work, the means of access to the site etc. and in general shall obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect his work. No extra charges consequent on any misunderstanding or otherwise will be allowed.

3. SUFFICIENCY OF TENDER:

The contractor shall be deemed to have satisfied himself before entering into the contract as to the correctness and sufficiency of his offer for the work and of the rates and prices quoted in the schedule of works. These rates and prices shall except otherwise provided, cover all his obligations under the contract and all matters and things necessary for proper completion and maintenance of the works.

4. STORES AND MATERIALS AND SAFETY:

All the stores and materials required for the satisfactory completion of work except those specified as departmental supply shall be arranged at work site by the contractor from his own resources. It should be clearly understood that no claim whatsoever shall be entertained by the department on this account. Space for storing of material shall be provided on request from the contractor. Safe custody of materials brought and installed at site shall be contractor's responsibility till the installation is taken over by the department after successful performance and acceptance testing. List of approved materials is furnished. In case the firm desires to offer a material not in the list, prior permission in writing is to be obtained from Engineer in charge.

5. PROGRAMME FOR EXECUTION:

The firm shall submit detailed programme to Engineer in charge for execution of contract within **30 days** from the award of work. The programme shall contain details about submission of drawings, supply of materials, tentative date of installation and commissioning. The programme shall be framed keeping in view the priorities of areas which might be needed to be **covered** in the first instant.

6. APPROVAL OF DRAWINGS:

The contractor shall get the following drawings approved before start of the work:

- a) Floor plans showing the location of detectors indicating the proposed distances between the detectors.
- b) Floor plans indicating the location of main control panel, local control panels, hooters, manual call points, response indicators etc.
- c) Conduit/cable layout diagram clearly indicating details of detectors and other devices connected in a particular zone.
- d) Drawings showing general arrangement of main control panel and local control panels.

The approval of drawing by the department shall not absolve the firm of their responsibility for supplying and installing the system conforming to relevant standards/specifications and schedule

of work.

In case it is mandatory as per local by laws to get CFO's approval, it shall be obtained by the contractor at no extra cost.

7. ~~TEST CERTIFICATES:~~

~~The firm shall submit test certificate on supply of the following items:~~

- ~~a) Detectors.~~
- ~~b) Control Panels.~~

~~NOTE: (Compensation to be levied in case of use of duplicate/spurious material)~~

~~"Department reserves the right to get inspected material in Fire Detection & Fire Alarm Panel, Detectors and all other components of FD & FA system and any component thereof by the manufacturer/their authorized representative, whose report as regards to the genuineness of component shall be final and binding. In case any component upon such inspection is found to be duplicate/spurious, double the cost of such component based on price list (without any discount whatsoever) effective on the date of aforesaid inspection shall be recoverable.~~

~~In case the contractor agrees to replace the component so found spurious/duplicate at his cost within 30 days of the said report, compensation of Rs. 1,000/- per component found spurious/duplicate shall be levied against the contractor.~~

~~Besides the above the Department reserves the right to take disciplinary action against the contractor. Decision of SE(E) in such cases shall be final and out of purview of Clause 25 of arbitration.~~

8. ~~COORDINATION:~~

~~Generally more than one agency are working in the same premises where the fire detection system is being installed. It shall be the aim of different agencies that on their account the work of other agency/agencies is not delayed. Full co-operation and full co-ordination is to be extended during progress of work and at the time of testing of all the agencies.~~

9. ~~COMPLETION DRAWINGS:~~

~~The contractor on completion of the work shall submit three sets of following drawings.~~

- ~~a) Floor plans showing location of detectors indicating the distances between the detectors.~~
- ~~b) Floor plans indicating the location of main control panel, local control panels, hooters, manual call points, response indicators etc.~~
- ~~c) Conduit/cable layout diagram clearly indicating details of detectors and other devices connected in a particular zone.~~
- ~~d) Drawings showing general arrangement of main control panel and local control panels.~~
- ~~e) Control wiring diagram of the main and local control panel.~~
- ~~f) Circuit line diagram of the power supply unit and the power amplifier.~~
- g) One set of floor plan indicating the location of detectors, main/local control panel, hooters, manual call points, response indicators duly sign marked shall be laminated on suitable wooden frame work and installed near each main/local control panel.**
- h) IN CASE OF FIRE instruction shall also be provided near each main/local control panel.**

~~Also three sets of service and troubleshooting manuals in respect of the installation including salient details of the installation shall be supplied by the contractor.~~

~~If the agency fails to provide above completion drawings and information boards Rs. 5,000/- shall be deducted from their final bill after issuing of notice.~~

10. ~~TEST AT SITE:~~

~~(i) After physical completion of the installation functional testing shall be conducted by the firm in the presence of the Engineer in charge or other representative of the department. Functional tests on the following items shall be conducted for this purpose:~~

- ~~a) Smoke detectors both ionization and photoelectric type.~~
- ~~b) Response indicators.~~
- ~~c) Duct detectors.~~
- ~~d) Hooters.~~
- ~~e) Stand by Battery.~~
- ~~f) Heat Detectors.~~
- ~~g) Main and Local Control Panels.~~

~~h) — Public address system.~~

~~(ii) — Functional acceptance testing will be conducted after successful completion of the above test by the Engineer in charge or his authorized representative and representative from T&D circle of the Department. Following procedure shall be followed for this purpose:~~

- ~~a) — Each smoke detector shall be tested by putting smoke generated by four “Agarbatti Sticks” at about 300mm below the bottom of detector and the detector shall operate within 30 to 60 seconds.~~
- ~~b) — The heat detector shall be tested by creating a fire below the detector in a bucket or with hot air blower in order to achieve the requisite temperature rise for the operation of the detector.~~
- ~~c) — All components like detectors, main and local control panels, public address system etc will be tested for their functional performances.~~

~~11. — COMPLETION AND TAKING OVER OF INSTALLATION:~~

~~Date of successful initial testing (Performance testing) shall be taken as the date of completion. After the installation has been completed in all respects and acceptance tested successfully as per the procedure laid down above, the same shall be taken over by the department for the beneficial use. The minor defects and discrepancies which might be noticed during acceptance testing shall be attended by the contractor within one month from the date of acceptance testing.~~

~~12. — GUARANTEE AND DEFECTS LIABILITY:~~

~~The complete installation shall be guaranteed for a period of 12 months after successful acceptance testing. The contractor shall guarantee that all equipments shall be free from any defect due to the defective materials and bad workmanship and that the equipment shall work satisfactorily and that the performance and efficiencies of the equipments shall be not less than the guaranteed values. Any defects discovered or developed during this period shall be rectified by the contractor without any charge whatsoever including replacement of components, if any. The services of the contractor's personnel, if requisitioned during this period for such work, shall be made available free of any cost to the BSNL.~~

~~Following shall not be covered under guarantee:~~

- ~~a) — Part subject to normal wear and tear.~~
- ~~b) — Failure of parts due to corrosive atmosphere.~~

~~13. — MAINTENANCE:~~

- ~~(i) — The contractor shall provide free maintenance of 12 months from the date of successful acceptance testing. This shall include four periodical inspection visits. During this visit the contractor shall inspect the system, adjust necessary controls, if required and shall see that the system is in working condition.~~
- ~~(ii) — The security deposit withheld by the department will be released after four successful visits by the contractor during maintenance and guarantee period of 12 months, 5% of security deposit may be deducted for not performing each such visit.~~

~~14. — TRAINING OF DEPARTMENT PERSONNEL:~~

~~The contractor shall arrange to impart the training to the BSNL Personnel on the following aspects prior to taking over of the plant:~~

- ~~a) — Operation of system.~~
- ~~b) — Diagnosing & attending to minor faults and defects which might develop during the course of system operation.~~
- ~~c) — Adjustment of settings of control and protective devices.~~
- ~~d) — Preventive maintenance.~~

~~15. — REJECTION OF DEFECTIVE INSTALLATION:~~

~~The rejected material will be cleared from site immediately on rejection. If the completed system or any portion thereof, before it is taken over, be found defective or fails to fulfill the intent of the specifications, the contractor shall on receipt of a written notice from the Engineer in Charge, forthwith make good the defects. Should the contractor fail to rectify the defects and or make good the defective system within a stipulated time mentioned in the written notice or replace the equipment/component at no extra cost, BSNL may make good, reject and or replace at the risk and expenses of the contractor, the whole or any portion of the system which is defective or fails~~

to fulfill the requirements of the contract.

16. ~~BYE LAWS:~~

~~The contractor shall comply with all bye laws and regulations of local and statutory authorities having jurisdiction over the works and shall be responsible for payment of all fee and other charges and giving/receiving all necessary notices and keep the Engineer in Charge informed about the notices issued and received. The contractor shall get the system/installation approved from concerned fire authorities, when required. Any statutory fee payable shall be reimbursed on actual. The contractor shall indemnify the BSNL against all claims in respect of patent rights, design, trade mark or name of other protected rights in respect of any components, equipments, work or materials used for or in connections with the works or from and against all claims, demands, proceedings, costs, charges and expenses whatsoever in respect of or in relation thereto. The contractor shall defend all actions arising from such claims and shall he pay all royalties etc.~~

17. ~~TERMS OF PAYMENTS:~~

~~No advance payments shall be made. The payment terms shall be governed as under.~~

- ~~(i) Upto 85% of pro rate of contract value on supply and satisfactory physical inspection of material.~~
- ~~(ii) Upto 95% of pro rate of contract value after successful completion of initial testing (Performance Testing).~~
- ~~(iii) Balance 5% of payments shall be made after successful completion of Acceptance Testing and NOC received from Fire authority.~~

~~All payments shall be subject to adjustments/deductions as under:-~~

- ~~a) Income Tax.~~
- ~~b) Works Contract Tax.~~
- ~~c) Any amount recoverable on account of price variation clause.~~
- ~~d) Any amount recoverable on account of damage of services, pending defects, defects rectified on Risk & Cost, poor workmanship etc.~~
- ~~e) Any amount recoverable on non-compliance of provisions of the contract.~~
- ~~f) Security deposit.~~

18. ~~VARIATION IN EXCISE DUTY:~~

~~In case of any statutory variation in regard to excise duty within the stipulated period of completion, the same shall be paid or recovered as per the actuals against documentary proof. However beyond this period the Dept. will take advantage of any duty reduction but will not pay extra on account of any duty increase.~~

19. ~~TAXES AND DUTIES:~~

~~The firm shall quote the rates for each item on a lumpsum basis including all taxes, duties, levies i/e work contract tax/service tax at the prevailing rate(s) for all the equipments and material used for the work. Also the Department will not issue any C/D form or octroi exemption certificate(s). Nothing extra will be paid on account of octroi. For the purpose of service tax the cost of material shall be taken as 75% of total.~~

20. ~~RATES~~

- ~~(i) Tendered rates are inclusive of taxes and duties payable under respective statute. However pursuant to Constitution (Forty Sixth Amendment) Act 1982, if any further tax or levy is imposed by statute after the date of receipt of tenders and contractor(s) thereupon necessarily and properly payees taxes or levies, the contractor(s) shall be reimbursed the amount so paid provided such payment if any, is not, in the opinion of SE (whose decision shall be final and binding) attributable to delay in execution of work within the control of contractor(s).~~
- ~~(ii) The contractor(s) shall keep necessary books of accounts and other documents for the purpose of this condition as may be necessary and shall allow inspection of the same by a duly authorized representative of the Government and shall furnish such other information/document as the Engineer in charge may require.~~
- ~~(iii) The contractor(s) shall within a period of 30 days of imposition of any further tax or levy pursuant to Constitution (Forty Sixth Amendment) Act 1982, give a notice thereof to the Engineer in charge that the same is given pursuant to this condition together with all necessary information thereto.~~

Note:—~~No additional condition whatsoever will be accepted for the turnover tax/sales tax on works contract. In case of additional condition for the payment of such claims by the contractor, the tender may be liable to be summarily rejected by the accepting authority. (Standing order No. 258).~~

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C. Fire Fighting System (Downcomer System)

1. Scope of works

~~The overall scope under proposal is design, layout getting approval of layout from local fire authority, to provide terrace pump, down comer, fire brigade inlet, necessary valve, piping, cable, panel, necessary wiring, earthing as per CPWD specifications and local fire authority requirements. After completion of work to get NOC from local fire authority.~~

~~The scope of the work of this tender would cover entire equipment including piping and accessories (all sizes) required together with instrumentation and controls as needed, necessary independent suction lines for pumps, necessary Priming tank, necessary control panels, control wiring works etc. Various pipe quantities assumed for size wise for the entire job based on the above data may be furnished by the tenderer, together with suitable layout drawing.~~

~~All the E&M fittings, fixtures, machinery and equipment proposed to be used in the execution shall confirm to highest star rating under star labelling program of Bureau of Energy Efficiency (BEE).~~

~~The above requirement is indicative only not exhaustive, the contractor should plan, design and submit the requirement as NBC 2016, CPWD specifications and statutory provision of local fire authority. along with layout drawings for approval and execution.~~

~~It will be the responsibility of the Contractor to get clearance before commencement of the work and no objection/approval certificate of Uttar Pradesh fire service/local fire authority whichever is mandatory by the local fire authority for safe occupancy /function before commissioning of the firefighting system from the Local Fire Department and any Statutory Authorities if required All expenses on this account shall be borne by the Contractor, however the departmental fee , if any, shall be paid by the DOP.~~

- 2. SYSTEM ENGINEERING:** ~~The capacities and sizes of various components described above will depend upon the type and height of the building. Specifications of various components have been described in succeeding chapters. Following factors shall be taken in to consideration while designing various components.~~

~~Wet Riser cum Down Comer:-~~

~~Pressure at hydraulically remote hydrant and at the highest hydrant shall not be less than 3.5 kgf/cm². The pressure at the hydrants shall however not exceed 7 kgf/cm².~~

~~The pipe line will be designed in such a way that it should be possible to get discharge at any location. Design parameters shall be as under:-~~

- ~~(i) Maximum flow velocity : 2.5 mps (ii) Maximum Friction : 5 m per 100 m run However, the size of wet riser shall be as given in CPWD General specifications for electrical work Part V (wet riser and sprinkler system) 2020 Table 4.1 under Para 4.5.4~~

~~Terrace pump shall be selected for:-~~

- ~~(i) Discharge : 450 lpm/900 lpm (To be selected from Appendix A
(ii) Head : 20m+ 6% of the maximum length of pipe from terrace pump to any hydrant at terrace level.~~

~~No. of Risers:~~ ~~Number of risers will be decided to fulfil the following conditions:-~~

- ~~a. No corner of the building is farther than 30 m from nearest riser.
b. (ii) Horizontal distance between two risers shall not be more than 50 m. (iii) Normally one riser is provided for every 1000 sq.m of plinth area or part thereof. However, the number of risers can be suitably increased to meet the given situation.~~

~~Down Comer:-~~

~~In down comer, underground tank, fire pumps at ground level, ring main and yard hydrant will not be provided. Except these items, all other items described in 2.4.1 shall be provided. Following points are also to be taken in to consideration.~~

~~A minimum of two terrace pumps (electrical) shall be provided. One pump shall act as standby.~~

Down comer Pipes:— Consideration of Para 2.4.1.6 shall apply. 2.4.3.3 All down comer pipes shall be inter connected at the terrace level. In case terraces are not interconnected, all building will be treated as individual buildings. 2.4.3.4 Fire service inlet shall be provided with each Riser/down comer for facilitating pumping of water from fire service tenders.

Control system:— The starting of terrace pump shall be automatic i.e. with the opening of any hydrant valve or hose reel on any floor, the pump will start automatically with fall in line pressure. In addition start/stop push buttons shall be provided at ground floor near internal hydrant for starting the pump manually. Where fire control room has been provided, remote operation of terrace pump may be done from fire control room in place of near internal hydrant. The control panel for terrace pumps shall be provided near the pumps in a suitable enclosure to avoid unauthorized operation.

Air Vessel:— To counteract the water hammer effect, air vessel shall be provided at the top of each riser.

Orifice Plate:— Suitable pressure reducing devices shall be provided for yard as well as internal hydrants to control pressure to desired limit especially at lower level hydrants.

Internal Hydrant— Internal hydrants are provided to fight fire from within the building. Following factors are considered for deciding location of internal hydrant:

- (i) Internal hydrants are provided at every floor at the same location and connected with risers. (ii) Hydrant for firefighting shall be located in the lobby in firefighting shaft. Those hydrants planned to be provided near fire exit staircase on the floor shall be within 5 m from exit door in exit access.
- (iii) Numbers and location of risers shall be decided as per Para 2.4.1.6. Every wing of the building shall preferably be provided with independent hydrants. Hydrant shall be located in the center of the building so that one hydrant can cover area on both sides.
- (iv) A masonry enclosure on three sides of size minimum 1200 mm wide and 800 mm deep and 2100 mm height shall be provided. Cut out of size 200 mm x 200 mm be provided in one corner in the slab for down comer/wet riser pipe. If sprinkler installations are to be provided, additional cut out of similar size for sprinkler pipe and drain pipe as the case may be, shall be provided. Steel shutter with 1250 mm glazing on top with locking arrangement shall be provided in front of the hydrant. The shutter shall be painted red as per para 1.13. Typical arrangement has been shown in Figure 8 in CPWD Specifications part V.
- (v) Internal hydrant shall be easily accessible. A clear space of at least 1.5 m should be available in front of the internal hydrant for operation. Internal hydrant shall not be provided in a lockable room.
- (vi) Internal hydrant shall be clearly marked with the inscription of “FIRE HOSE CABINET” of letter size 75 mm in height and 12 mm in width by luminous sign. Suitable lighting arrangement shall be provided in front of the internal hydrant. The location of such cabinets shall be shown on floor plan and duly displayed in the landing of the respective fire exit staircase.
- (iii) — Down comer pipe size shall be of 100 mm dia.
- (iv) — Fire service inlet and fire service connection shall be with pipe size not less than 150 mm diameter.
- (v) — All Tee off connections for landing valves from vertical risers and for external hydrants from ring main shall be with pipe size not less than 80 mm diameter.

Selection of Material:— Components like landing valve, hose coupling branch pipes etc. are available in three material i.e. Aluminum Alloy, Gun metal and Stainless steel. Aluminum Alloy is prone to wear and tear under weather conditions faster than other two materials. However being cheaper, Aluminum Alloy may be used in location where chances of pilferage are more. Stainless steel may be considered at location not very safe from theft. Gunmetal may be used in installations which are well protected.

Hose Pipes/ Branch pipes:— A minimum of two number of 63 mm diameter, 15 m long hose pipe with instantaneous coupling at both ends and one number branch pipe with nozzle shall be kept with every internal and external hydrant.

Orifice Plate:— The pressure in a firefighting system varies from point to point. The pressure will be maximum in the pump house and minimum at the farthest hydrant at terrace level. To reduce pressure to safe operating pressure at every internal/external hydrant, orifice plates are provided before connection of landing valve between the flanges of landing valve and pipe flange. The size of orifice shall be calculated as per details given in Table 4.2. of CPWD General specifications part-

~~V Other suitable means may also be used for reducing the pressure apart from orifice plates.~~

Fire Service inlet : In order to facilitate feeding of water in the system by fire service, a 2/3 way 63 mm diameter collecting head shall be provided and connected with each riser/down comer and the ring main with non return valve and butterfly/slucice valve. This should be located at a place where fire brigade tender can reach.

Fire Brigade draw out collecting head: Each of the static water storage tanks shall also be provided with a fire brigade draw out collecting head with 63 mm diameter instantaneous male draw out arranged in a valve box at a suitable point at street level. This draw out shall be connected to galvanized iron pipe of 100 mm diameter with foot valve arrangement in the tank.

3. FIRE SERVICE INLET AND FIRE SERVICE CONNECTION

(i) These are provided for connection of fire service hose pipes for either directly pressurizing the system with their pumps or filling water in the tank from a distance. In the first case non return valve with butterfly valve shall be provided for holding water pressure. Fire service inlet shall be provided with each wet riser/down comer and the ring main. The arrangement has been shown in Fig.5. These are fixed to 150 mm diameter pipe and located in MS Box made of 2 mm thick mild steel sheet with openable glass cover.

(ii) These shall be as per IS: 904.

4. GENERAL REQUIREMENTS FOR INSTALLATION

- i. The installation work shall be carried out in accordance with the detailed drawings prepared by the contractor and approved by the Engineer in charge.
- ii. In pipe above ground level, expansion loops or joints shall be provided to take care of expansion or contraction of pipes due to temperature changes
- iii. Tee off connections shall be through equal or reducing tees, otherwise ferrules welded to the main pipe shall be used. Drilling and tapping of the walls of the main pipe shall not be done.
- iv. Open ends of piping shall be blocked as soon as the pipe is installed to avoid entrance of foreign matter.
- v. Piping installation shall be supported on or suspended from structure adequately. The contractor shall provide, clamps, hangers etc. Proper lines and levels shall be maintained while installing exposed pipes.
- vi. Pipe supports in pump house shall be floor mounted and of mild steel/G.I. Spacing of pipe supports shall not be more than that specified below

Nominal Pipe Size (mm)	Spacing (m.)
20 and 25	2.00
32 to 125	2.50
150 and above	3.00

- vii. Extra supports shall be provided at the bends and at heavy fittings like valves to avoid undue stress on the pipes.
- viii. Anti vibration pads, springs or liners of resilient and non deteriorating material shall be provided at each support, so as to prevent transmission of vibration through the supports.
- ix. Pipe sleeves of diameter larger than the pipe by least 50 mm shall be provided wherever pipes pass through walls and the annular spaces shall be filled with felt and finished with retaining rings.
- x. Vertical risers shall be parallel to walls and column lines and shall be straight and in plumb. Risers passing from floor to floor shall be supported at each floor by clamps

- ~~xi. The space in the floor cut-outs around the pipe work shall be closed using cement concrete (1:2:4 mix) or steel sheet, from the fire safety considerations, taking care to see that a small annular space is left around the pipes to prevent transmission of vibration to the structure.~~
- ~~xii. Riser shall have suitable supports at the lowest point.~~
- ~~xiii. Where mild steel pipes are to be buried under ground the same shall be treated in accordance with specifications above before laying. The top of the pipes shall be not less than 100 cms. below the ground level. Where this is not practicable, permission of the Engineer in charge shall be obtained for burying the pipes at lesser depth. Masonry or C.C.blocks shall be provided for supporting the pipes at interval in accordance with specifications. After the pipes have been laid, the trench shall be refilled with the excavated soil in layers of 20 cm. and rammed and any extra soil shall be removed from the site of work by the contractor.~~
- ~~xiv. Underground pipe shall be laid at least 2 m. away from the face of the building preferably along the roads and foot paths. As far as possible laying of pipes under road, pavement and large open spaces shall be avoided. Pipes shall not be laid under building and where unavoidable, these shall be laid in masonry trenches with removable covers.~~
- ~~xv. To facilitate detection of leak and isolation of defective portion of pipe, valves shall be provided in underground pipe at suitable locations. As far as possible such valves shall be provided over ground. If the valves are to be provided below ground, suitable masonry chamber with cover plate shall be provided. Locations where vehicles can pass shall be avoided for provision of valve below ground.~~
- ~~xvi. Pipe over ground shall be painted in red colour shade No. 536 of IS: 5. Suitable identification shall be provided to indicate the run of underground pipe wherever the route of underground pipe cannot be ascertained from the location of yard hydrant/isolating valves.~~
- ~~xvii. It shall be made sure that proper noiseless circulation is achieved in the system. If proper circulation is not achieved due to air bound connections, the contractor shall rectify the defective connections. He shall bear all the expenses for carrying out the above rectification, including the tearing up and refinishing of floors, walls, etc. as required.~~
- ~~xviii. All piping shall be tested to hydrostatic test pressure of at least one and a half times the maximum operating pressure, but not less than 10 kg/sq.cm. for a period not less than 24 hours. All leaks and defects in joints revealed during the testing shall be rectified to the satisfaction of the Engineer in Charge.~~
- ~~xix. Piping repaired subsequent to the above pressure test shall be re-tested in the same manner.~~
- ~~xx. System may be tested in sections and such sections shall be securely capped.~~
- ~~xxi. Pressure gauges may be capped off during pressure testing of the installation.~~
- ~~xxii. As far as possible, underground pipe are not to be laid under road, pavement, building and long open spaces. The locations along road, foot path in earth may be preferred.~~
- ~~xxiii. The location of pumps and terrace pipe may be decided keeping in view location of terrace tanks for firefighting and other services. The pipe line should not cause undue hindrance for movement of maintenance personnel at the terrace.~~
- ~~xxiv. All valves shall be installed at a height and in a position that their operation by right hand is conveniently possible.~~
- ~~xxv. All pressure gauges should be installed so that the dial is vertical and is visible while entering the pump house.~~
- ~~xxvi. Electrical panels should not be installed at floor level. The panels shall be sufficiently raised above ground level. If panels are to be mounted on wall, an angle iron frame shall be provided so that at least 75 mm space is left behind the panels. The panels shall be easily approachable.~~
- ~~xxvii. Cable trays are to be used for laying of power and control cable inside pump house. No cable is to be laid at floor level/in trench. Cable tray layout should give neat appearance. All cable tray shall be adequately supported from the ceiling /floor.~~
- ~~xxviii. In no case any structural member i.e. RCC wall, column, beam and floor are to be damaged during installation. Mechanical fasteners are to be used for grouting support. U.G. tank wall is not to be used for any support. No pipe/cable is to cross the pump house below ground level. Openings above ground level are only to be used for this purpose~~

- xxix. ~~The engine installation work shall be carried out in accordance with the requirement of engine manufacturer and be got approved by the manufacturer or their authorised service centre. The exhaust pipe should be suitably extended outside the pump house so that smoke does not effect nearby structure. Fuel tank shall be properly supported and located in away that the same does not cause hindrance in movement in the pump house.~~
- xxx. ~~While excavating for laying of external pipes, suitable sign board! barricading shall be provided to ensure that no person falls in the trench. The earth filling is to be done in layers of 20 cm each and properly rammed so as to avoid possibility of settlement. Surplus earth, debris, malba shall be removed from the site by the contractor.~~

5. ~~Testing:~~

- i. ~~All piping in the system shall be tested to hydro static pressure of 3.5Kg/Sq.cm without drop in pressure for at least 2 hours.~~
- ii. ~~Rectify all leakages, make adjustments and retest as required and directed.~~

6. ~~COMMISSIONING~~

~~As soon as the work is complete, the system shall be commissioned and made available for use in accordance with Para below.~~

~~Testing of the system: Testing shall be done as per CPWD specifications.~~

7. ~~APPROVAL BY LOCAL BODIES~~

~~It shall be the responsibility of the contractor to obtain the approval of drawings and to get the installation inspected and obtain NOC (No Objection Certificate) from the local fire authorities as may be necessary. Any License fee, if required, shall be paid by the department as per actual.~~

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D.SOLARPOWERSYSTEM

1.—DEFINITION

A grid tied solar rooftop photovoltaic (SPV) power plant consists of SPV array, module mounting structure, power conditioning unit (PCU) consisting of maximum power point tracker (MPPT), inverter, and controls & protections, interconnect cables and switches. PV array is mounted on a suitable structure. Grid tied SPV system is without battery and should be designed with necessary features to supplement the grid power during daytime. Components and parts used in the SPV power plants including the PV modules, metallic structures, cables, junction box, switches, PCUs etc., should conform to the BIS or IEC or international specifications, wherever such specifications are available and applicable.

Solar PV system shall consist of following equipment/components.

- i. — Solar PV modules consisting of required number of **Crystalline** PV modules.
- ii. — Grid interactive power conditioning unit with remote monitoring system
- iii. — Mounting structures
- iv. — Junction boxes.
- v. — Earthing and lightning protections.
- vi. — IR/UV protected PVC Cables from grid to main panel, pipes and accessories.
- vii. — Net meter of suitable capacity.

2.—SOLARPHOTOVOLTAICMODULES:

2.1. — The PV modules used should be made in India.

2.2. — The PV modules used must qualify to the latest edition of IEC PV module qualification test or equivalent BIS standards — Crystalline — Silicon — Solar — Cell Modules — IEC — 61215/IS 14286. In addition, the modules must conform to IEC 61730 Part 1 and Part 2 requirements for construction & Part 2 requirements for testing, for safety qualification or equivalent IS.

- a. For the PV module to be used in a highly corrosive atmosphere throughout their lifetime, they must qualify to IEC 61701/IS 61701
- b. The total solar PV array capacity should not be less than allocated capacity and should comprise of solar crystalline modules of peak power of minimum **330 Wp** and above wattage. Module capacity less than minimum 330 Wp will not be accepted
- c. Protective devices against surges at the PV modules shall be provided. Low voltage drop bypass diodes shall be provided.
- d. PV modules must be tested and approved by one of the IEC authorized test centres.
- e. The module frame shall be made of corrosion resistant materials, preferably having anodized aluminum.
- f. The bidder shall carefully design & accommodate requisite numbers of the modules to achieve the rated power in his bid. Departments shall allow only minor changes at the time of execution.
- g. Other general requirement for the PV modules and subsystems shall be the Following:
 - i. — The rated output power of any supplied modules shall have tolerance of $\pm 3\%$.

- ii. ~~The peak power point voltage and the peak power point current of any supplied module and/or any module string (series connected modules) shall not vary by more than 2 (two) per cent from the respective arithmetic means for all modules and/or for all module strings, as the case may be.~~
- iii. ~~The modules shall be provided with a junction box with either provision of external screw terminal connection or sealed type and with arrangement for provision of by pass diode. The box shall have hinged, weather proof lid with captive screws and cable gland entry points or may be of sealed type and IP-65 rated.~~
- iv. ~~I-V Curves at STC should be provided by bidder.~~

2.3. ~~Modules deployed must use an RFID identification tag. The following information must be mentioned in the RFID used on each module (This can be inside or outside the laminate, but must be able to withstand harsh environmental conditions).~~

- a. ~~Name of the manufacturer of the PV module~~
- b. ~~Name of the manufacturer of Solar Cells.~~
- c. ~~Month & year of the manufacture (separate for solar cells and modules)~~
- d. ~~Country of origin (separately for solar cells and module)~~
- e. ~~I-V curve for the module Wattage, I_m , V_m and FF for the module~~
- f. ~~Unique Serial No and Model No of the module~~
- g. ~~Date and year of obtaining IEC PV module qualification certificate.~~
- h. ~~Name of the test lab issuing IEC certificate.~~
- i. ~~Other relevant information on traceability of solar cells and module as per ISO 9001 and ISO 14001~~

2.4. Warranties:

a. Material Warranty:

- i. ~~Material warranty is defined as: The manufacturer should warrant the solar module(s) to be free from the defects and/or failures specified below for a period not less than five years from the date of completion.~~
- ii. ~~Defects and/or failures due to manufacturing~~
- iii. ~~Defects and/or failures due to quality of materials~~
- iv. ~~Non conformity to specifications due to faulty manufacturing and/or inspection processes. If the solar Module(s) fail to conform to this warranty, the manufacturer will repair or replace the solar module(s), at the Owners sole option~~

b. Performance Warranty:

- i. ~~The predicted electrical degradation of power generated not exceeding 20% of the minimum rated power over the 25 year period and not more than 10% after ten years period of the full rated original output.~~

Note: ~~The firm should submit Necessary test certificate from the approved test lab along with supply of material.~~

3. ARRAY STRUCTURE

- a. ~~Hot dip galvanized MS mounting structures may be used for mounting the modules/panels/arrays. Each structure should have an angle of inclination as per the site condition to take maximum insolation. However, to accommodate more capacity the angle inclination may be reduced until the plant meets the specified performance ratio requirements.~~
- b. ~~The Mounting structures shall be so designed to withstand the speed of the wind zone of the location where a PV system is proposed to be installed (like Delhi/Uttar Pradesh wind speed of 150 km/hr). It may be ensured that the design has been certified by a recognized laboratory/institution in this regard and submit wind loading calculation sheet to department. Suitable fastening arrangement such as grouting and capping should be provided to secure the installation against the specific wind speed.~~
- c. ~~The mounting structure steel shall be as per latest IS 2062:1992 and galvanization of the mounting structures shall be in compliance of latest IS 4759.~~
- d. ~~Structural material shall be corrosion resistant and electrolytically compatible with the materials used in the module frame, its fasteners, nuts and bolts. Aluminium structures also can be used which can withstand the wind speed of respective wind zone. Necessary protection towards rusting need to be provided either by coating or anodization.~~
- e. ~~The fasteners used should be made up of stainless steel. The structures shall be designed to allow easy replacement of any module. The array structure shall be so designed that it will occupy minimum space without sacrificing the output from the SPV panels~~
- f. ~~Regarding civil structures the bidder needs to take care of the load bearing capacity of the roof and need arrange suitable structures based on the quality of roof. It must assure by the agency that there not be any possibilities of leakage in roof due to installation of SPP~~
- g. ~~The total load of the structure (when installed with PV modules) on the terrace should be less than 60 kg/m².~~
- h. ~~The minimum clearance of the structure from the roof level should be 300 mm.~~

NOTE: ~~The structural design of the complete system should be compatible with the structural strength and load bearing capacity of the roof. Design calculations and certificate to this effect shall be provided by a qualified chartered structural engineer. Latest IS code shall be followed for structural design. Contractor shall submit the structural analysis and design (STAAD) calculations along with the structural design. It is the contractor responsibilities to produce it to engineer in charge before start of work and nothing extra will be pay on account of it.~~

4. JUNCTION BOXES (JBs)

- a. ~~The junction boxes are to be provided in the PV array for termination of connecting cables. The J.Boxes (JBs) shall be made of GRP/FRP/Powder Coated Aluminium /cast aluminium alloy with full dust, water & vermin proof arrangement. All wires/cables must be terminated through cable lugs. The JB's shall be such that input & output termination can be made through suitable cable glands.~~
- b. ~~Copper bus bars/terminal blocks housed in the junction box with suitable termination threads conforming to IP65 standard and IEC 62208 Hinged door with EPDM rubber gasket to prevent water entry. Single / double compression cable glands. Provision of earthing. It should be placed at 5 feet height or above for ease of accessibility.~~
- c. ~~Each Junction Box shall have High quality Suitable capacity Metal Oxide Varistors (MOVs)/SPDs, suitable Reverse Blocking Diodes. The Junction Boxes shall have suitable arrangement monitoring and disconnection for each of the groups.~~
- d. ~~Suitable markings shall be provided on the busbar for easy identification and the cable ferrules must be fitted at the cable termination points for identification~~

5. ~~DC DISTRIBUTION BOARD:~~

- ~~a. DC Distribution panel to receive the DC output from the array field.~~
- ~~b. DC DPBs shall have sheet from enclosure of dust & vermin proof conform to IP 65 protection. The bus bars are made of copper of desired size. Suitable capacity MCBs/MCCBs shall be provided for controlling the DC power output to the PCU along with necessary surge arrestors.~~

6. ~~AC DISTRIBUTION PANEL BOARD:~~

- ~~a. AC Distribution Panel Board (DPB) shall control the AC power from PCU/inverter, and should have necessary surge arrestors. Interconnection from AC DB to mains at LT Bus bar while in grid tied mode.~~
- ~~b. All switches and the circuit breakers, connectors should conform to IEC 60947, part I, II and III/ IS 60947 part I, II and III.~~
- ~~c. The change over switches, cabling work should be undertaken by the bidder as part of the project.~~
- ~~d. All the Panel's shall be metal clad, totally enclosed, rigid, floor mounted, air insulated, cubical type suitable for operation on three phase/single phase, 415 or 230 volts, 50 Hz~~
- ~~e. The panels shall be designed for minimum expected ambient temperature of 45 degree Celsius, 80 percent humidity and dusty weather.~~
- ~~f. All indoor panels will have protection of IP54 or better. All outdoor panels will have protection of IP65 or better.~~
- ~~g. Should conform to Indian Electricity Act and rules (till last amendment).~~
- ~~h. All the 415 AC or 230 volts devices / equipment like bus support insulators, circuit breakers, SPDs, VT etc., mounted inside the switch gear shall be suitable for continuous operation and satisfactory performance under the following supply conditions~~

Variation in supply voltage	+/- 10%
Variation in supply frequency	+/- 3Hz

7. ~~PCU/ARRAY SIZERATIO:~~

- ~~a. The combined wattage of all inverters should not be less than rated capacity of power plant under STC.~~
- ~~b. Maximum power point tracker shall be integrated in the PCU/inverter to maximize energy drawn from the array.~~

8. ~~PCU/Inverter:~~

~~As SPV array produce direct current electricity, it is necessary to convert this direct current into alternating current and adjust the voltage levels to match the grid voltage. Conversion shall be achieved using an electronic Inverter and the associated control and protection devices. All these components of the system are termed the "Power Conditioning Unit (PCU)". In addition, the PCU shall also house MPPT (Maximum Power Point Tracker), an interface between Solar PV array & the Inverter, to the power conditioning unit/inverters should also be DG set interactive, if necessary. Inverter output should be compatible with the grid frequency. Typical technical features of the inverters shall be~~

as follows:

- Switching devices : IGBT/MOSFET
 - Control: Microprocessor/DSP
 - Nominal AC output voltage and frequency: 415V, 3 Phase, 50Hz (In case single phase inverters are offered, suitable arrangement for balancing the phases must be made.)
 - Output frequency: 50Hz
 - Grid Frequency Synchronization range: ± 3 Hz or more
 - Ambient temperature considered: 20°C to 50°C
 - Humidity: 95% Non-condensing
 - Protection of Enclosure : IP-20 (Minimum) for indoor.
: IP-65 (minimum) for outdoor.
 - Grid Frequency Tolerance range: ± 3 or more
 - Grid Voltage tolerance: $20\% \& \pm 15\%$
 - No load losses: Less than 1% of rated power
 - Inverter efficiency (minimum): $> 97\%$
 - THD: $< 3\%$
 - PF: > 0.9
- a. ~~Three phase PCU/inverters shall be used with each power plant system (5 kW and/or above) but in case of less than 5 kW single phase inverter can be used.~~
- b. ~~PCU/inverters shall be capable of complete automatic operation including wake-up, synchronization & shutdown.~~
- c. ~~The output of power factor of PCU inverter is suitable for all voltage ranges or sink of reactive power, inverter should have internal protection arrangement against any sustainable fault in feeder line and against the lightning on feeder.~~
- d. ~~Built in meter and data logger to monitor plant performance through external computer shall be provided.~~
- e. ~~The power conditioning units/inverters should comply with applicable IEC/equivalent BIS standard for efficiency measurements and environmental tests as per standard codes IEC 61683/IS 61683 and IEC 60068-2(1,2,14,30)/Equivalent BIS Std.~~
- f. ~~The charge controller (if any) / MPPT units environmental testing should qualify IEC 60068-2(1, 2, 14,30)/equivalent BIS std. The junction boxes/enclosures should be IP-65 (for outdoor)/ IP-54 (indoor) and as per IEC 529 specifications.~~
9. ~~The PCU/ inverters should be tested from the MNRE approved test centres /NABL /BIS /IEC accredited testing calibration laboratories. In case of imported power conditioning units, these should be approved by international test houses.~~

10. INTEGRATION OF PV POWER WITH GRID:

The output power from SPV would be fed to the inverters which convert DC produced by SPV

array to AC and feeds it into the main electricity grid after synchronization. In case of grid failure, or low or high voltage, solar PV system shall be out of synchronization and shall be disconnected from the grid. Once the DG set comes into service PV system shall again be synchronized with DG supply and load requirement would be met to the extent of availability of power. 4 pole isolation of inverter output with respect to the grid/ DG power connection need to be provided.

11. DATA ACQUISITION SYSTEM/PLANT MONITORING

- i. ~~Data Acquisition System shall be provided for each of the solar PV plant.~~
- ii. ~~**Data logging systems (Hardware and software): for Solar PV Plant, for plant control and monitoring shall be provided.**~~
- iii. ~~Solar Irradiance: An integrating Pyranometer / Solar cell based irradiation sensor (along with calibration certificate) provided, with the sensor mounted in the plane of the array. Readout integrated with data logging system.~~
- iv. ~~Temperature: Temperature probes for recording the Solar panel temperature and/or ambient temperature to be provided complete with readouts integrated with the data logging system~~
- v. ~~The following parameters are accessible via the operating interface display in real time separately for solar power plant:~~
 - a. ~~AC Voltage.~~
 - b. ~~AC Output current.~~
 - c. ~~Output Power~~
 - d. ~~Power factor.~~
 - e. ~~DC Input Voltage.~~
 - f. ~~DC Input Current.~~
 - g. ~~Time Active.~~
 - h. ~~Time Disabled.~~
 - i. ~~Time Idle.~~
 - j. ~~Power produced~~
 - k. ~~Protective function limits (viz. AC Overvoltage, AC Undervoltage, Over frequency, Under frequency ground fault, PV starting voltage, PV stopping voltage.~~
- vi. ~~All major parameters available on the digital bus and logging facility for energy auditing through the internal microprocessor and read on the digital front panel at anytime) and logging facility (the current values, previous values for up to a month and the average values) should be made available for energy auditing through the internal microprocessor and should be read on the digital front panel.~~
- vii. ~~PV array energy production: Digital Energy Meters to log the actual value of AC/ DC voltage, Current & Energy generated by the PV system provided. Energy meter along with CT/PT should be of 0.5 accuracy class.~~
- viii. ~~Computerized DC String/Array monitoring and AC output monitoring shall be provided as part of the inverter and/or string/array combiner box or separately.~~
- ix. ~~String and array DC Voltage, Current and Power, Inverter AC output voltage and current (All 3 phases and lines), AC power (Active, Reactive and Apparent), Power Factor and AC energy (All 3 phases and cumulative) and frequency shall be monitored.~~
- x. ~~Computerized AC energy monitoring shall be in addition to the digital AC energy meter.~~
- xi. ~~The data shall be recorded in a common _____ worksheet chronologically date wise. The data file shall be MS Excel compatible. The data shall be represented in both tabular and graphical form.~~

- xii. ~~All instantaneous data shall be shown on the computer screen.~~
- xiii. ~~Software shall be provided for USB download and analysis of DC and AC parametric data for individual plant.~~
- xiv. ~~Provision for Internet monitoring and download of data shall be also incorporated.~~
- xv. ~~Remote Server and Software for centralized Internet monitoring system shall be also provided for download and analysis of cumulative data of all the plants and the data of the solar radiation and temperature monitoring system.~~
- xvi. ~~Ambient/Solar PV module back surface temperatures shall be also monitored on continuous basis.~~
- xvii. ~~Simultaneous monitoring of DC and AC electrical voltage, current, power, energy and other data of the plant for correlation with solar and environment data shall be provided.~~

12. Remote Monitoring and data acquisition through Remote Monitoring System software at the project location with latest software/hardware configuration and service connectivity for online/realtime data monitoring/control complete to be supplied and operation and maintenance/control to be ensured by the supplier.

Note: Department will arrange mobile SIM for remote monitoring. The usage bill of mobile shall be paid by the department.

13. METERING:

- a. ~~The bidirectional electronic energy meter (0.5S class) shall be installed for the measurement of import/Export of energy before commissioning of SPV plant.~~
- b. ~~The bidder must take approval/NOC from the concerned DISCOM for the connectivity, technical feasibility and synchronization of SPV plant with distribution network and submit the same to the department~~
- c. ~~Reverse power relay shall be provided by bidder~~

14. POWER CONSUMPTION:

- a. ~~Regarding the generated power consumption, priority need to give for internal consumption first and thereafter any excess power can be exported to grid.~~

15. PROTECTIONS

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

15.1. LIGHTNING PROTECTION

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

15.2. SURGE PROTECTION

Internal surge protection shall consist of three MOV type surge arrestors connected from +ve and -ve terminals to earth (via Y arrangement)

15.3. EARTHING PROTECTION

- i. Each array structure of the PV yard should be grounded/earthed properly as per IS:3043-1987. In addition, the lightning arrester/masts should also be earthed inside the array field. Earth Resistance shall be tested in presence of the representative of Department as and when required after earthing by calibrated earth tester. PCU, ACDB and DCDB should also be earthed properly.
- ii. Earth resistance shall not be more than 5 ohms. It shall be ensured that all the earthing points are bonded together to make them at the same potential.

15.4. GRID ISLANDING:

- i. In the event of a power failure on the electric grid, it is required that any independent power-producing inverters attached to the grid turn off in a short period of time. This prevents the DC to AC inverters from continuing to feed power into small sections of the grid, known as "islands." Powered islands present a risk to workers who may expect the area to be unpowered, and they may also damage grid-tied equipment. The Rooftop PV system shall be equipped with islanding protection. In addition to disconnection from the grid (due to islanding protection) disconnection due to under and over voltage conditions shall also be provided.
- ii. A manual disconnect / pole isolation switch beside automatic disconnection to grid would have to be provided at utility end to isolate the grid connection by the utility personnel to carry out any maintenance. This switch shall be locked by the utility personnel.

16. CABLES

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

- i. Shall meet IEC 60227/IS 694, IEC 60502/IS 1554 standards
- ii. Temp. Range: -10°C to +80°C.
- iii. Voltage rating 660/1000V
- iv. Excellent resistance to heat, cold, water, oil, abrasion, UV radiation
- v. Flexible
- vi. Sizes of cables between array interconnections, array to junction boxes, junction boxes to Inverter etc. shall be so selected to keep the voltage drop (power loss) of the entire solar system to the minimum. The cables (as per IS) should be insulated with a special grade PVC compound formulated for outdoor use.
- vii. Cable routing/ marking: All cable/wires are to be routed in a GI cable tray and suitably tagged and marked with proper manner by good quality ferule or by other means so that the cable easily identified.
- viii. The cable should be so selected that it should be compatible up to the life of the solar PV panels i.e. 25 years.
- ix. The ratings given are approximate. Bidder to indicate size and length as per system design requirement. All the cables required for the plant provided by the bidder. Any change in cabling sizes if desired by the bidder/approved after citing appropriate reasons. All cable schedules/layout drawings approved prior to installation.
- x. Multi-strand, Annealed high conductivity copper conductor PVC type „A“ pressure extruded insulation or XLPE insulation. Overall PVC/XLPE insulation for UV protection armoured cable for underground laying. All cable trays including covers to be provided. All cables conform to latest edition of IEC/ equivalent BIS Standards as specified below: BoS item / component Standard description Standard Number Cables General Test and Measuring Methods, PVC/XLPE insulated cables for working Voltage

up to and including 1100 V, UV resistant for outdoor installation IS /IEC 69947.

- xi. ~~The size of each type of DC cable selected shall be based on minimum voltage drop however; the maximum drop shall be limited to 1%.~~
- xii. ~~The size of each type of AC cable selected shall be based on minimum voltage drop however; the maximum drop shall be limited to 2 %.~~

17. CIVIL WORKS

17.1 Concreting

- a. ~~Concrete mix shall be of M 20/M 25 grade for pedestal and earth pit chambers.~~
- b. ~~Pedestal bases shall be provided with tapered edge using waterproofing compound of IS - 2649.~~
- c. ~~Curing of all concrete work shall be carried out continuously for minimum of 7 days.~~
- d. ~~The solar panels are very much prone to uprooting at very high wind speed during the storms, therefore, they have to be anchored properly on the roof top by suitably designing the fixtures and its support system considering the design wind speed for the area as per relevant IS code.~~
- e. ~~During fixing the solar panels on the roof top the damage to the structural slabs/ water proofing treatment should be carefully avoided.~~
- f. ~~The solar panels should be fixed on the roof surface in such a way that the rain water flow to the rain water pipe should not be obstructed and maintenance of other items such as water supply pipelines should not be disturbed and there should be no hindrance for maintaining it.~~
- g. ~~For the upkeep and cleaning, a lightweight folding ladder of height about 8 feet should be provided.~~

17.2 Array layout: Contractor shall design the array layout by incorporating following dimensions:

- a. ~~Approx. 750 mm space around the periphery wall of rooftop.~~
- b. ~~Minimum 900 mm spaces near the rain water exhaust pipe, water tank and rooftop entrance.~~

17.3 Structural design: Latest IS code shall be followed for structural design. Contractor shall submit the structural analysis and design (STAAD) calculations along with the structural design.

18. CONNECTIVITY

~~The maximum capacity for interconnection with the grid at a specific voltage level shall be as specified in the Distribution Code/Supply Code of the State and amended from time to time. Following criteria have been suggested for selection of voltage level in the distribution system for ready reference of the solar suppliers.~~

Plant Capacity	Connecting voltage
Upto 10 kW	240V single phase or 415V three phase at the option of the consumer
Above 10 kW and Upto 100 kW	415V Three phase

- I. ~~The maximum permissible capacity for rooftop shall be 100 kW for a single net metering point.~~
- II. ~~Utilities may have voltage levels other than above, DISCOMS may be consulted before finalization of the voltage level and specification be made accordingly.~~

19. TOOLS & TACKLES AND SPARES:

- i. ~~After completion of installation & commissioning of the power plant, necessary tools & tackles are to be provided free of cost by the bidder for maintenance purpose. List of tools and tackles to be supplied by the bidder for approval of specifications and make from department.~~
- ii. ~~A list of requisite spares in case of PCU/inverter comprising of a set of control logic cards, IGBT driver card set, Junction Boxes, Fuses, MOVs/arrestors, MCCBs etc. along with spare set of PV modules be indicated, which shall be supplied along with the equipment. A minimum set of spares shall be maintained in the plant itself for the entire period of warranty and Operation & Maintenance which upon its use shall be replenished.~~
- iii. **DANGER BOARDS AND SIGNAGES:**

~~Danger boards should be provided as and where necessary as per IE Act./IE rules as amended up to date. Signage at three locations one each at battery cum control room, solar array area and main entry from administrative block shall be provided. Text of the signage may be finalized in consultation with the department~~

20. FIRE EXTINGUISHERS:

The fire fighting system for the proposed power plant for fire protection shall be consisting of:

- a. ~~Portable fire extinguishers in the control room for fire caused by electrical short circuits~~
- b. ~~Sand buckets in the control room~~
- c. ~~The installation of Fire Extinguishers should confirm to TAC regulations and BIS standards. The fire extinguishers shall be provided in the control room housing PCU as well as on the Roof for site where the PV arrays have been installed.~~

21. DRAWINGS & MANUALS:

- i. ~~Two sets of Engineering, electrical drawings and Installation and O&M manuals are to be supplied. Bidders shall provide complete technical data sheets for each equipment giving details of the specifications along with make/makes in their bid along with basic design of the power plant and power evacuation, synchronization along with protection equipment.~~
- ii. ~~Approved ISI and reputed makes for equipment to be used.~~
- iii. ~~For complete electro-mechanical works, bidders shall supply complete design, details and drawings for approval to engineer in charge before progressing with the installation work.~~

22. PLANNING AND DESIGNING:

- i. ~~The bidders should carry out Shadow Analysis at the site and accordingly design strings & array layout considering optimal usage of space, material and labor. The bidders should submit the array layout drawings along with Shadow Analysis Report to the Engineer in Charge for approval.~~
- ii. ~~Department reserves the right to modify the landscaping design, Layout and specification of sub-systems and components at any stage as per local site conditions/requirements.~~
- iii. ~~The bidder shall submit preliminary drawing for approval & based on any modification or recommendation, if any. The bidder submits three sets and soft copy in CD of final drawing for formal approval to proceed with the construction work.~~

23. DRAWINGS TO BE FURNISHED BY BIDDER AFTER AWARD OF CONTRACT

- i. ~~The Contractor shall furnish the following drawings Award/Intent and obtain approval~~
- ii. ~~General arrangement and dimensioned layout~~

- iii. ~~Schematic drawing showing the requirement of SV panel, Power conditioning Unit(s)/ inverter, Junction Boxes, AC and DC Distribution Boards, meters etc.~~
- iv. ~~Structural drawing along with foundation details for the structure.~~
- v. ~~Itemized bill of material for complete SV plant covering all the components and associated accessories.~~
- vi. ~~Layout of solar Power Array~~
- vii. ~~Shadow analysis of the roof~~

24. SOLAR PV SYSTEM ON THE ROOFTOP FOR MEETING THE ANNUAL ENERGY REQUIREMENT

The Solar PV system on the rooftop of these selected buildings will be installed for meeting up to 90% of the annual energy requirements depending upon the area of rooftop available and the remaining energy requirement of the office buildings will be met by drawing power from grid at commercial tariff of DISCOMs.

25. SAFETY MEASURES

The bidder shall take entire responsibility for electrical safety of the installation(s) including connectivity with the grid and follow all the safety rules & regulations applicable as per Electricity Act, 2003 as amended up to date and CEA guidelines etc.

26. SCOPE OF MAINTENANCE OF SPV POWER PLANT FOR A COMPREHENSIVE WARRANTY PERIOD OF 5 YEARS FROM DATE OF SATISFACTORY COMMISSIONING OF SYSTEM

- i. ~~maintenance of the SPV Power Plant after satisfactory commissioning of system includes routine and on call maintenance of the system including supply all spare parts required for reliable operation of the system under five years comprehensive warranty period from the date of successful commissioning of the system.~~
- ii. ~~The SPV power plants shall be warranted for five years comprehensive maintenance from the date of successful commissioning. The complete system including all equipment/components/accessories/mechanical structures/ electrical works such as PCU/inverter, MPPT units, distribution boards, digital meters, switchgears, cabling, earthing, lightning arrestors etc. along with supply of consumable items~~
- iii. ~~Complete maintenance of the plants has to be carried out by the contractor and cannot be sublet to any third party.~~
- iv. ~~The security of the power plants will rest with the contractor till such time the power plant is not handed over to the department.~~
- v. ~~The Contractor shall be responsible for all required activities for maintenance of the SPV Power Plant during the five year comprehensive warranty period.~~
- vi. ~~The deputed personnel during his routine visits / breakdown visits shall check and test all the equipment, so that, preventive actions, if any, could be taken well in advance to save any equipment from damage. Any abnormal behaviour of any equipment shall be brought to notice of engineer in charge immediately for appropriate action.~~
- vii. ~~Normal and preventive maintenance of the power plant and checking of all the equipment and accessories as a part of routine and breakdown maintenance on regular interval, tightening of all electrical connections, changing of tilt angle of module mounting structure, cleaning & greasing of terminals etc. shall be under the scope of the contract.~~
- viii. ~~During maintenance period of five years of the power plants, if there is any loss or damage of any component of the power plants due to mismanagement/mishandling or any other reasons, what so ever, the contractor shall be responsible for immediate replacement/rectification. The damaged component may be repaired, if it is understood after examination that after repairing performance of the component shall not be degraded, otherwise the defective component shall have to be replaced by new one without any extra cost.~~
- ix. ~~The contractor shall keep sufficient inventories to assure ready stock supply of all spares, consumables and fixtures as required. Stock should be maintained all associated equipment and materials as per manufacturer/supplier recommendations.~~
- x. ~~The spares and measuring instruments which are supplied along with the systems are the property of the department and the contractor will use these spares sparingly with express permission of the department in case of emergency breakdowns, however, the contractor will have to refill the used spares within one~~

~~month of drawn down.~~

- ~~xi. All the spares inventory of the department has to be fully refilled with new and unused spares at the time of handing over of the plant after completion of the five years of maintenance of the plants by the contractor. In case of non-compliance, the department will refill these spares with new ones at the cost of the contractor.~~

27. MAINTENANCE INSTRUCTIONS

- ~~i. Maintenance of the plants shall be carried out by the contractor during comprehensive maintenance warranty period of five years, a maintenance schedule shall be prepared in consultation with the engineer in charge for quarterly / half yearly / annual review check up of plant and equipment.~~
- ~~ii. The contractor shall depute qualified and experienced engineers/technician well versed in maintenance of SPV plants and having knowledge of computers. The details of the Engineer/technician i.e. name, address, mobile number etc. should be submitted to the department~~
- ~~iii. Proper re-painting, re-coating of exposed surfaces to prevent rusting & replacement of worn out parts shall be carried out along with the maintenance of the PCU/inverter.~~

iv. PLANT PERFORMANCE EVALUATION

~~Performance Ratio (PR) mean ratio of plant output versus installed plant capacity at any instance with respect to the radiation measured. The successful bidder shall be required to meet minimum guaranteed generation with Performance Ratio (PR) at the time of commissioning and related Capacity Utilization Factor (CUF) as per the GHI levels of the location during the maintenance period. PR should be shown minimum of 75% at the time of inspection for initial commissioning acceptance to qualify for release of payment. Minimum CUF of 19% should be maintained for a period of 5 years. The bidder should send the periodic plant output details to the department for ensuring the CUF. The PR will be measured at Inverter output level during peak radiation conditions.~~

- ~~v. The routine maintenance work to be carried out when plant is not in operation.~~
- ~~vi. All breakdown maintenance/major break down should be attended in real time and to be completed within 24 hour (including arranging spares). Any additional time (more than 24 hour) taken for making the plant generation worthy, will invite the adequate compensation commensurate to the loss of generation due to non-availability of power.~~
- ~~vii. Replacement & repair of damaged parts shall be carried out immediately during the maintenance period so as to ensure at least 95% uptime.~~
- ~~viii. The contractor shall maintain a maintenance record register for proper data logs and records at the plant office to record the daily generation, efficiency, and solar radiation, regular maintenance, preventive and breakdown maintenance along with the date of maintenance, reason for breakdown, duration of the breakdown, steps taken to attend the breakdown etc. which shall be supplied on demand to the department/engineer in charge.~~
- ~~ix. The contractor shall ensure replacement of worn out parts and components during the operation and maintenance period for which purpose the contractor shall carry and maintain minimum inventory levels of spares at the plant and its works.~~
- ~~x. In case of delay in repair & maintenance and non-observance of engineer in charge "operation and maintenance schedule, the department shall have the right to impose any penalties including forfeiture of security.~~
- ~~xi. The Five year comprehensive maintenance warranty period covers routine, preventive, breakdown and capital maintenance of complete plant and equipment including SPV array, inverter, SCADA system with dedicated telephone lines shall be carried out by the supplier in accordance with manufacturer's instructions,~~

~~manufacturer's procedures, relevant safety codes, Indian Electricity Act, 2003, Indian Electricity Rules, 1956, engineer in charge instructions, prudent utility practices, etc.~~

~~xii. ROUTINE AND PREVENTIVE MAINTENANCE~~

~~This shall include such checks and maintenance activities as and when required to be carried out on all the components of the power plant to minimize breakdowns and to ensure smooth and trouble free running of the power plant. The contractor shall be responsible to carry out routine and preventive maintenance and replacement of each and every component/equipment of the power plant and shall provide all labour, material, consumables etc. for routine and preventive maintenance at their own cost.~~

~~xiii. BREAKDOWN MAINTENANCE~~

~~This shall mean the maintenance activity including repairs and replacement of any component or equipment of the power plant which is not covered by routine and preventive maintenance and which is required to be carried out as a result of sudden failure/breakdown of that particular component or equipment while the plant is running. The contractor shall be responsible to carry out breakdown maintenance of each and every component of the power plant and he shall provide the required manpower, materials, consumables, components or equipment etc. for breakdown maintenance at his own cost irrespective of the reasons of the breakdown/failure.~~

~~xiv. CAPITAL MAINTENANCE~~

~~(a) This shall mean the major overhaul of any component or equipment of the power plant which is not covered by routine, preventive and breakdown maintenance which may become necessary on account of excessive wear & tear, aging, which needs repair/replacement. The capital maintenance of power plant and all civil structures shall normally be planned to be carried out on an annual basis. For this purpose a joint inspection by the contractor and the engineer in charge or his authorised representative shall be carried out on all the major components of the power plant, about two months in advance of the annual maintenance period, in order to ascertain as to which components of the power plant require capital maintenance. In this regard the decision of the department will be final and binding.~~

~~(b) However, if the condition of any plant and component warrants its capital maintenance at any other time, a joint inspection of the engineer in charge or his authorised representative and contractor shall be carried out immediately on occurrence of such situation and capital maintenance shall be carried out by arranging the shutdown of the plant/part of the plant, if required, in consultation with concerned authorities. The decision of the department shall be final and binding.~~

Executive Engineer (E)
Postal Electrical Division
Bengaluru

SPECIAL CONDITIONS OF CONTRACT FOR SOLAR POWER SYSTEM

DEFINITIONS

~~In the deed of contract unless the context otherwise requires-~~

- 1.1 — “DoP” shall mean The Executive Engineer (E), Postal Electrical Division, Bengaluru
- 1.2 — The “contractor” shall mean the firm/ person (whose tender has been accepted by DoP) and shall include his legal representatives, successor in interest and assignees.
- 1.3 — The “contract” shall mean carrying out the works as mentioned in the NIT on **turnkey basis**.

28. — GENERAL

~~These special conditions are intended to amplify the General Conditions of Contract, and shall be read in conjunction with the same. For any discrepancy between the General Conditions and these Special Conditions, the provision of these Special Conditions will apply.~~

2.1 — SCOPE OF WORK

~~The general character and the scope of work to be carried out under this contract is illustrated in Schedule of Work & Specifications. The contractor shall as a system integrator for providing an end to end solution for the above, including but not limited to design, supply, erection, testing, commissioning of the required solar photo voltaic power plant with accessories, peripherals like power conditioning units, cables, cable tray, junction boxes, conduits for wiring, all necessary wiring/cables for DC supply system (from solar array box, intermediate junction box to main junction box and main junction box to power conditioning units, cable for AC supply system from PCU to main solar panel, cable termination & connections sockets & other suitable accessories, earthing, data acquisition & storing, net metering, DC system & bus etc. and installation, performance testing, commissioning, warranty, annual maintenance, etc. The bidders have to ensure the planning and smooth execution of the project.~~

~~The Contractor shall carry out and complete the said work under this contract in every respect in conformity with the contract documents and with the direction of and to the satisfaction of the engineer in charge. The contractor shall furnish all labour, materials and equipment as listed and specified otherwise, transportation and incidental necessary for supply, installation, testing and commissioning of the complete system through as described in the Specifications. The work shall also include interfacing the PV Plant with the grid equipment and obtaining necessary approval from Electrical Supply Company for net metering etc.~~

29. — COMPLETION OF WORK

- 3.1 — ~~The work shall be deemed to be completed after satisfactory installation, testing and commissioning net metering of the complete system. The work shall have to be completed within time and shall be binding on the contractor~~
- 3.2 — ~~In case the contractor fails to execute the said work or related obligations within stipulated time, DoP will be at liberty to get the work executed from the open market at the risk and cost of the contractor. Any additional cost incurred by DoP during such execution of the work shall be recovered from the contractor.~~

30. — QUALITY, WARRANTY/ GUARANTEE

- 4.1 — ~~The SPV panel shall carry a performance warranty of minimum 25 years.~~
- 4.2 — ~~The SPV panel must be warranted for their peak power output which shall not be less than 90% at the end of 10 years and 80% at the end of 25 years.~~

- 4.3 — ~~The PCU/solar grid tie inverters shall carry a warranty of minimum five years.~~
- 4.4 — ~~The complete system shall be under comprehensive maintenance warranty of five years which includes supply of all spare parts as required for reliable operation of the system for five years warranty/guarantee period from the date of satisfactory completion of work~~
- 4.5 — ~~The complete SPV rooftop systems installed and commissioned shall be under a warranty against any manufacturing or usage defect including mechanical structures, electrical works including power conditioners units /inverters /maximum power point tracker units /data logger & plant monitoring unit /distribution boards /digital meters /switchgear etc. and overall workmanship of the SPV rooftop systems for a minimum period of five year.~~
- 4.6 — ~~The warranty will be against breakages, malfunctions, non fulfilment of guaranteed performance and breakdowns due to manufacturing defects or defects that may arise due to improper operation of electrical /electronic components of the system but do not include physical damages by the end users.~~
- 4.7 — ~~The above warranty shall take effect from the date on which the system is taken over by the Department of Posts after satisfactory commissioning.~~
- 4.8 — ~~The successful bidder shall be liable to make good the loss by replacing the defective product during the warranty period for the entire system free of cost.~~
- 4.9 — ~~The warranty will cover all the materials and goods involved in the installation and commissioning of SPV rooftop systems.~~
- 4.10 — ~~The contractor shall warrant the solar PV power plant as per applicable standards of quality. Anything to be furnished shall be new, free from all defects and faults in material and workmanship. The manufacture shall be in accordance with the specified technical parameters and should be of the highest grade and consistent with established and generally accepted standards for material. It shall be in full conformity with the drawing or samples if any and shall operate properly.~~
- 4.11 — ~~After installation of the solar PV power system at site, the contractor shall ensure satisfactory performance of the equipment for a period of time as specified in the scope of work. Contractor shall submit the performance report of the system on quarterly basis in addition to routine check up of the system including cleaning of the solar panels, checking of battery and inverter etc. duly signed from user regarding functioning of the system.~~
- 4.12 — ~~The contractor shall rectify defects developed in the systems within warranty period promptly. In case the contractor does not rectify the defects within seven days of the receipt of complaint, DoP may restore the system in working condition on contractor's expenses.~~
- 4.13 — ~~Frequent and unjustified delays in rectifying defects may lead to recovery of losses and imposing of additional penalty. In such circumstance DoP shall have the full liberty to recover the losses/penalty from the contractor's pending claims, security deposit or in other law full manner. The amount of losses/penalty shall be decided by DoP and will be binding on the contractor.~~

31. — SERVICE CENTRES

~~The successful bidder shall have minimum of one service centre in Lucknow or nearby 100 km. The installer or his authorised qualified representative (Engineer) shall visit the site at least once in a quarter, to attend routine maintenance, during the five years warranty period. However, in case of malfunctioning of the system, the tenderer/bidder shall attend the site for rectification of defects within 48 hours from the time of lodging complaint.~~

32. — STANDARDS

~~The goods supplied and works executed under this contract shall conform to the standards mentioned in the technical specification and where no applicable standard is mentioned, the latest version of Indian Standard or Bureau of Indian Standards shall be applicable.~~

~~33. — INSPECTION AND TESTS~~

- ~~7.1 — Do or its duly authorized representatives shall have the right to inspect and /or to test the goods to confirm their quality according to the contract and shall have access to the contractor's works premises and the power to inspect and examine the materials and workmanship of the solar PV power plant at all reasonable times during their period of manufacture/ before despatch of material at site.~~
- ~~7.2 — The contractor shall inform DoP through a written notice regarding any material being ready for testing at least seven days in advance. All the arrangements of necessary equipment and expenses for such tests shall be on the contractor's account excluding the expenses of the inspector (fee, if any) if deputed from outside of DoP.~~
- ~~7.3 — DoP's Engineer in charge, will inspect and attend such test within seven days from the date on which the equipment are notified as being ready for test /inspection, if required.~~
- ~~7.4 — DoP shall within seven days, give written notice to the contractor, about any objection regarding the quality of the system. The contractor shall either make the necessary modifications to remove the cause of such objection or shall clarify the objections in writing if modifications are not necessary to comply with the contract.~~
- ~~7.5 — After satisfactory testing of the systems during inspection, DoP's engineer in charge shall issue dispatch clearance for the supply.~~

~~34. — FEES AND PERMITS~~

~~The contractor shall obtain all permits/ licenses approvals and pay for any and all fees required for the inspection, approval and commissioning of the installation from concerned statutory/ local bodies/ authorities. The all inputs & material as required & all necessary liaisoning with all concerned authorities/officers for obtaining them the required permits/ permission/ NOC shall be provided by the contractor & included in the scope of the work. However, all statutory fees/ amount deposited by contractor shall be reimbursed on production of proof of payment to the satisfaction of engineer in charge.~~

~~35. — SPARE PARTS~~

~~The contractor shall make arrangement to maintain a sufficient stock of essential spares and consumable spare parts to ensure proper maintenance of the system promptly.~~

~~36. — PACKING AND FORWARDING~~

- ~~10.1 — Contractor, wherever applicable shall properly pack and crate all materials in such a manner as to protect them from deterioration and damage during transportation. The contractor shall be responsible for all damage due to improper packing.~~
- ~~10.2 — The contractor shall inform the Executive Engineer (E)/engineer in charge, DoP regarding the probable date of each shipment of materials from his works.~~

~~37. — TRANSPORTATION~~

~~The contractor is required to deliver the goods at locations as defined in the scope of work.~~

~~38. — DEMURRAGE, WHARFAGE, ETC~~

~~All demurrage, wharfage and other expenses incurred due to delayed clearance of the material or any other reason shall be on the account of the contractor.~~

~~39. — INSURANCE~~

- ~~13.1 — The goods supplied under the contract shall be fully insured against loss or damage incidental to manufacture or acquisition; transportation and the expenses shall be borne by the contractor.~~

~~13.2 The contractor shall arrange security & storage of their materials to avoid any theft or losses during execution of work. DoP will, in no case, shall be responsible for providing any security/storage for the materials & equipment lying at site during execution of work. Under the contract contractor shall be responsible for any loss or damage until the systems/ supplies are taken over.~~

~~40. LIABILITY FOR ACCIDENTS AND DAMAGES~~

~~14.1 During the warrantee period, the contractor shall assume all responsibilities for direct damages covering all type of accident, injury or property damage caused by manufacturing defects or faulty installation on the systems.~~

~~14.2 Any damage to the installation (s)/building due to carelessness on the part of contractor's staff shall be the responsibility of the contractor and he shall rectify the damages without any extra cost.~~

~~14.3 Any accident or damage will be the responsibility of agency and the department will not entertain any claim, compensation, penalty etc. on this account or on account of non observance of any other requirement of law relevant to his work.~~

~~41. DUTIES AND TAXES~~

~~The rates/ prices mentioned in the price schedule including all applicable taxes & duties and applicable taxes will be deducted at source against which necessary tax deductions certificates will be issued as and when required. No additional payments shall be made by DoP on this account.~~

~~42. PATENT RIGHT AND ROYALTIES~~

~~The contractor shall indemnify DoP against all third party claims of infringement of patent, royalties, trademark or industrial design rights arising from use of the goods supplied/ installed by the contractor or any part thereof.~~

~~43. RIGHT TO VARY QUANTITIES~~

~~DoP reserves all the rights to increase or decrease the quantity of goods mentioned in the contract, at the time of placement of orders without any change in price or other terms and conditions.~~

~~44. LOCAL CONDITIONS~~

~~18.1 It will be imperative on contractor to have full information of all local conditions and factors which may have any effect on the execution of the works. The contractor shall be deemed to have collected all the relevant information regarding the proposed place of works/ site, its local environment, approach road and connectivity etc. and be well acquainted with actual working and other prevailing conditions.~~

~~18.2 The contractor is advised to visit the site before quoting for as well as starting the work. DoP shall not entertain any request of contractor for clarifications related to such local conditions and shall bear no responsibility in this regard.~~

~~45. TOOLS & TACKLES~~

~~The contractor shall provide all necessary tools & tackles for proper execution of work and operation/ maintenance of systems after installation. DoP shall in no way, responsible for supply of any tools & tackles.~~

~~46. TERMINATION FOR DEFAULT~~

~~DoP without prejudice to any other remedy for violate of contract, by written notice of default sent to the contractor, may terminate the contract in whole or in part-~~

~~20.1 If the contractor fail to deliver the Services within the allocated time period(s):~~

~~20.2 If the contractor fails to perform any other obligation(s) under the contract. However in the event of termination of the contract in part, the contractor shall continue performance of the contract to the extent not terminated.~~

~~47. TERMINATION FOR INSOLVENCY~~

~~DoP may at any time terminate the contract by giving written notice to the contractor without compensation to the contractor if he becomes bankrupt or otherwise insolvent, provided that such termination will not prejudice or affect any right of action or remedy, which has accrued or will accrue thereafter to DoP.~~

~~48. COMPLETION DRAWINGS~~

~~Contractor shall submit five sets of completion drawings as and when work in all respects is completed in a particular area i/c photographs. These drawings shall clearly indicate following:~~

~~22.1 Location and rating of PV arrays/PCU's~~

~~22.2 Location and details of panels, and other particulars including approved fabrication drawings of panel.~~

~~22.3 Complete wiring diagram, as installed and scheduled showing all connections in the complete electrical system.~~

~~22.4 Routing and particulars of all LT cables and trays.~~

~~22.5 Single line diagram, power schematic, control schematic with detailed bill of materials, showing makes, types and description of all components and accessories.~~

~~49. COMPLETION CERTIFICATE~~

~~On completion of the installation, a certificate shall be furnished by the contractor countersigned by the licensed electrical supervisor under whose direct supervision the installation was carried out. This certificate shall be in the prescribed form as required by the local supply authority/ electrical inspector.~~

~~50. DRAWINGS~~

~~All drawing shall be prepared on computer aided drawings and site measurement Contractor shall furnish for the approval of the Engineer in charge, detailed drawings of all equipment and material giving following information:~~

~~i. Certified foundation details~~

~~ii. Layout of PV arrays and associated equipment, panels.~~

~~iii. Cable & cable tray layout.~~

~~iv. Earthing layout/ location system~~

~~v. Single line diagram, control schematic showing make type and description of all components and accessories.~~

~~vi. The detailed design, calculations, energy simulation for arriving at the system capacity & the energy generation capacity. The details of all losses starting from solar incident level to up to L.T. metering level shall also be provided along with detail calculations. The design shall be based on data for the location of site of work~~

~~51. BYE LAWS AND REGULATIONS~~

~~The installation shall be in conformity with the bye-laws, regulations and standards of the local authorities/ Govt of India/ State Govt/ any statutory body concerned, in so far as these become applicable to the installation.~~

~~52. OTHERS CONDITIONS~~

~~26.1 The contractor shall not transfer, assign or sublet the work under this contract or any substantial part thereof to any other party.~~

~~26.2 — Work carried out without DoP approval shall not be accepted and DoP shall have rights to get it removed and to recover the cost so incurred from the contractor.~~

~~26.3 — The contractor shall not display the photographs of the work and not take advantage through publicity of the work without written permission of DoP.~~

~~53. — PAYMENT TERMS~~

~~27.1 — No advance payments shall be made.~~

~~27.2 — 60% of the tendered amount after the supply of material in good condition of the complete system at site (The contractor shall supply the necessary test certificates of the equipment /system, tax invoice, gate pass etc. in support of materials supplied)~~

~~27.3 — 30% of the tendered amount after installation, Net Metering, and successful commissioning of the system.~~

~~27.4 — 10% payment shall be retained for comprehensive warranty period of 5 years which shall be released @2% at the end of each year for 5 years, on satisfactory performance of the complete system. However, this amount may be released against the bank guarantee for a period of 5 years of equal amount.~~

Note

1. — No price escalation due to any reason (including any change in the applicable taxes, duties etc.) shall be considered by DoP during the validity/ extended validity of the contract agreement

2. — All the bank guarantees should be made from scheduled bank for the entire warranty period of 5 year from the date of satisfactory commissioning of system.

~~54. — APPROVAL & CLEARANCE~~

~~All associated activities required for necessary clearances / permissions / approvals / licenses from concerned Electrical authorities so their Govt. / strategy / local bodies are in the scope of supplier.~~

~~55. — ACCEPTANCE TEST~~

- ~~i. — The user acceptance test shall be carried out as per mutually agreed~~
- ~~ii. — Acceptance test plan against the system requirements specified in the tender.~~
- ~~iii. — Type and routine test certificates of major items.~~

~~56. — Operating Instruction & Maintenance Manual~~

~~Upon completion and commissioning of entire system the contractor shall submit a copy of comprehensive operating instructions, maintenance schedule and log sheets for all systems and equipment included in this contract. This shall be supplementary to manufacturer's operating and maintenance manuals. Upon approval of the draft, the contractor shall submit four complete bound sets of typewritten operating instructions and maintenance manuals. These manuals shall also include basis of design, detailed technical data for each piece of equipment as installed, spare parts manual and recommended spares for 15 year period of maintenance of each equipment. These manuals shall include:~~

- ~~i. Description of the work carried out/ installed.~~
- ~~ii. Operating instructions.~~
- ~~iii. Maintenance instructions including procedures for preventive maintenance.~~
- ~~iv. Manufacturer's catalogues.~~
- ~~v. Spare parts list.~~
- ~~vi. Troubleshooting charts.~~
- ~~vii. Drawings~~
- ~~viii. Type and routine test certificates of major items.~~

57. ~~TRAINING OF ENGINEER IN CHARGE'S PERSONNEL FOR OPERATION AND MAINTENANCE~~

~~Upon completion of all work and all tests, the contractor will conduct on-site training of the engineer in charge's/user's personnel regarding the assembly, start-up, operation, adjustment, maintenance & repair of all equipment of solar PV plant installed.~~

*Executive Engineer (E)
Postal Electrical Division
Bengaluru*

E.DG SETWORK

1. SCOPE:

The offer should cover complete supply, installation, testing, and commissioning of ready to use diesel engine alternator sets in acoustic enclosure. All minor civil works, electrical and other works associated with installation and commissioning of these sets shall be carried out by the contractor. The contractor would quote for complete lot to be executed under works contract.

2. REQUIREMENT:

The engine alternator supplied should be of ready-to-use (RTU) type, the BHP of engine may be suitably enhanced as per site conditions in order to deliver the minimum required kVA at site. In case of water-cooled engine, it should be supplied with first filling of coolant and water mixture as per the manufacturer recommendation. The engine shall be equipped with Electronic governor and all standard fittings, flexible pipe, suitable low maintenance lead acid automotive duty battery fixed between base frame, suitable capacity fuel tank of minimum capacity as per schedule with G.I. wire braided fuel pipe, silencer, M.S. exhaust pipe of suitable size and length as per site requirement covered with two layers of 6 mm thick asbestos rope, instrument panel equipped with necessary instruments, directly coupled with alternator of suitable capacity on a suitable length of common base frame channel, fixed on necessary AVM pads including required length of suitable sized copper conductor cable with lugs for inter connection between alternator and control panel, providing tools for normal maintenance and all other accessories complete as required and as per detailed specifications attached.

VI- The engine and the enclosure shall conform to the latest Environment (Protection) Act, 1986 (29 of 1986) amended up to date. The emission limits of DG Sets shall be as per Gazetted Notification G.S.R. 804(E) dated 03d November 2022 of Ministry of Environment. Forest and Climate Change (The Environment (Protection) Third Amendment Rules 2022). No set shall be accepted without the latest CPCB certificate of authorized agency such as ARAI of Pune, NPL New Delhi, NSTL Vishakapatnam, FCRI Palghat and NAL Bangalore. The make and model of engine and alternator shall be as per list of approved makes.

1. OPERATING CONDITIONS

The engine alternator shall be capable of working at any ambient temperature between 0°C to 50°C and relative humidity up to 95% condition.

2. PERFORMANCE REQUIREMENT

- i) The working KVA rating at NTP conditions shall be obtained at 0.8 power factor.
- ii) When there is an electrical mains supply failure it will be required to work continuously for a period which may even exceed 24 hours at a time.
- iii) The set shall be capable of taking 10% overload for a period of one hour during every 12 hours period while operating continuously at full load.

3. OUTPUT VOLTAGE FREQUENCY AND WAVEFORM

Normal output voltage shall be 3 phase, 415V with $\pm 5\%$ manual adjustment at all conditions of the load. Frequency shall be 50 Hz ± 1.5 Hz.

4. DIESEL ENGINE

Engines shall be multi-cylinder, reciprocating compression ignition diesel engine as per manufacturer's standard design and conforming to IS 10001- 1981 & BS-5514 amended up to date..

5. LUBRICATION

Lubrication shall be positive pressure type lubricating all moving parts. No moving parts shall require lubrication by hand either prior to the starting of the engine or while it is in operation. Lubrication oil shall conform to relevant IS amended up to date. Necessary oil filters shall be provided for operation at normal conditions for a period of 250 hour. Temperature and pressure gauge shall be fitted to the lubricating system.

6. FUEL TANK

Fuel tank shall be removable/ draw out type for easy maintenance provided between base frames or separately installed in case of installation in a canopy. The fuel tank shall be made of 3 mm thick M.S. sheet and of not less than 100 litres capacity. The tank shall have fuel level indicator marked in litres, filling inlet with removable fuel screen, fuel outlet located at minimum of 25 mm above from the bottom of the drain plug, air vent and necessary pipings shall be provided. Hand pump for pumping the fuel into the service tank with necessary pipe or tubes shall be provided. The outlet of the pump shall be provided with 3 meters long reinforced flexible pipe. Extra fuel sufficient for the operation of the set on full load for 2 hours shall be left in the fuel tank after the successful completion of the acceptance testing.

7. FUEL PIPING

GI wire braided pipe with hydraulically compressed benzoo of superior quality shall be provided for fuel piping.

8. SPEED AND GOVERNING 'A1'

The engine shall operate on 1500 RPM, and be able to meet site conditions with regard to Voltage, Speed, Frequency and regulation equipped with Electronic governor

ENGINE START

Engines shall be cold and self-starting type. The starter battery shall have suitable copper connecting lead, sufficient to meet engine starting and control gear requirement as per manufacturer's specification.

9. BATTERY CHARGING

The battery charging shall be done through alternator and solid state battery charger.

10. HOSPITAL TYPE EXHAUST SILENCER

Dry exhaust manifold with hospital type exhaust silencer and catalytic convertor.

11. THE ENGINE SHALL HAVE FOLLOWING ACCESSORIES:-

- (i) Heavy duty flywheel
- (ii) Coupling with guard
- (iii) Fuel Pump suitable for lifting the fuel from fuel tank
- (iv) Governor
- (v) Pre filter
- (vi) Fuel Filter
- (vii) Per-filter in lift pump/button filter
- (viii) Lubricating oil filter
- (ix) Dry exhaust manifold with hospital type exhaust silencer and catalytic convertor.
- (x) Starter
- (xi) Radiator fan
- (xii) Battery charging Alternator
- (xiii) Mechanical type hour meter cum RPM indicator

12. ENGINE INSTRUMENT PANEL:-

It shall comprise of the following:-

- (i) Starting switch with key

- (ii) Lubricating oil temperature gauge
- (iii) Lubricating oil pressure gauge
- (iv) Battery charging ammeter
- (v) Stop lever switch
- (vi) water temperature gauge for water cooled engine

13. ALTERNATOR

- (i) The alternator shall be 3 phases, 415 V copper wound, brushless type and totally enclosed for screen protected class-F/H insulation, designed and constructed to withstand tropical conditions. Manual adjustment at all conditions of load with coarse and fine controls to obtain voltage adjustment of $\pm 5\%$ shall be available and shall be conforming to IS 13364 (Part 2)/IS: 4722/BS 2613 suitable for tropical conditions and with class-H insulation.
- (ii) The winding shall be star connected and neutral shall be brought out to the terminal box for earth with two independent earths. The terminal of the alternator output shall be enclosed in the terminal box. The AC/DC wiring shall be separated from each other.

14. AMF Control Panel

17.1 General Features: The control panel shall be fabricated out of 1.6mm thick sheet steel, totally enclosed, dust, damp and vermin proof free standing floor mounted type & front operated. It shall be made into sections such that, as far as feasible, there is no mixing of control, power, DC & AC functions in the same section and they are sufficiently segregated except where their bunching is necessary. Hinged doors shall be provided preferably double leaf for access for routine inspection from the rear. There is no objection to have single leaf hinged door in the front, all indication lamps, instruments meter etc. shall be flushed in the front. The degree of protection required will be IP-42 conforming to IS:2147.

17.2 Terminal blocks and wiring: Terminal blocks of robust type and generally not less than 15 A capacity, 250 V/500 V grade for dc upto 100V and 660 V/1100 V grade for ac and rest of the junction shall be employed in such a manner so that they are freely accessible for maintenance. All control and small wiring from unit to unit inside the panel shall also be done with not less than 2.5 sq. mm copper conductor PVC insulated and 660 V/1100 V grade. Suitable colour coding can be adopted. Wiring system shall be neatly formed and run preferably, function wise and as far as feasible segregated voltage wise. All ends shall be identified with ferrules at the ends.

17.3 Labeling: All internal components shall be provided with suitable identification labels suitably engraved. Labels shall be fixed on buttons, indication lamp set etc.

17.4 Painting: The entire panel shall be given primer coat after proper treatment and powder coating with 7 tanks process before assembly of various items.

17.5 Equipment requirements: The control cubical shall incorporate into assembly general equipment and systems as under:

- (a) Control system equipment and components such as relays, contactors, timers, etc. both for automatic operation on main failure and as well as for manual operation.

- (b) Equipment and components necessary for testing generating set's healthiness with test mode and with load on mains.
- (c) Necessary instruments and accessories such as voltmeter, power factor meter, KW meter, KWH meter, Ammeter, Frequency meter etc. in one energy analyzer unit with selector switch to obtain the reading of desired parameters.
- (d) Necessary indication lamps, fuses, terminal blocks, push buttons, control switches etc. as required.
- (e) Necessary engine/generating set shutdown devices due to faults/ abnormalities.
- (f) Necessary visual audio alarm indication and annunciation facility as specified.
- (g) Necessary battery charger.
- (h) Necessary excitation control and voltage regulating equipment. (Alternatively provided on the Alternator itself).
- (i) Necessary overhead bus trunking terminations all internal wiring, connection etc. as required.
- (j) Breakers as specified in the schedule of work.

17.6 System Operation: The above mentioned facilities provided shall afford the following operational requirements.

17.6.1 Auto Mode:

- (a) A line voltage monitor shall monitor supply voltage on each phase. When the mains supply voltage fails completely or falls below set value (variable between 80 to 95% of the normal value) on any phase, the monitor module shall initiate start-up of diesel engine. To avoid initiation due to momentary disturbance, a time delay adjustment between 0 to 5 second shall be incorporated in start-up initiation.
- (b) A three attempt starting facility shall be provided 6 seconds ON, 5 seconds OFF, 6 seconds ON, 5 seconds OFF, 6 seconds ON, if at the end of the third attempt, the engine does not start, it shall be locked out of start, a master timer shall be provided for this function. Suitable adjustment timers be incorporated which will make it feasible to vary independently
- (c) ON-OFF setting periods from 1-10 seconds. If alternator does not build up voltage after the first or second start as may be, further starting attempt will not be made until the starting facility is reset.
- (d) Once the alternator has built up voltage, the alternator circuit breakers shall close connecting the load to the alternator. The load is now supplied by the alternator.
- (e) When the main supply is restored and is healthy as sensed by the line voltage monitor setting, both for under voltage and unbalance, the system shall be monitored by a suitable timer which can be set between 1 minute to 10 minutes for the load to be transferred automatically to main supply.
- (f) The diesel alternator set revert to standby for next operation as per (a), (b) and (c) above.

17.6.2 Manual mode:

- (a) In a manual mode, it shall be feasible to start-up the generator set by the operator on pressing the start push button.
- (b) Three attempt starting facility shall be operative for the start-up function.
- (c) Alternator circuit breakers close and trip operations shall also be through operator only by pressing the

appropriate button on the panel and closure shall be feasible only after alternator has built up full voltage. If the load is already on 'mains', pressure on 'close' button shall be ineffective.

- (d) Engineshutdown,otherwiseduetofaults,shallbemanualbypressinga'stop'button.

17.6.3 Testmode:

- (a) When under 'test' mode pressing of 'test' button shall complete the start up sequence simulation and start the engine. The simulation will be that of mains failure. Sequence I 2.4.2.2.6.1(a) and (b) shall be completed.
- (b) Engine shall build up voltage but the set shall not take load by closing of alternator circuit breaker. When the load is on the mains, monitoring of performance for voltage/ frequency etc. shall be feasible without supply to load.
- (c) Ifduringtestmode,thepowersupplyhasfailed,theloadshallautomaticallygettransferredtoalternator.
- (d) Bringing the mode selector to auto position shall shut down the set as per sequence of 2.4.2.2.6.1 (d) provided main supply is ON. If the mains supply is not available at that time, the alternator shall take load as in (c) above.

17.7Engineshutdownandalternatorprotectionequipment:Followingshutdown andprotectionsystemshallbeintegratedinthecontrolpanel.

(a) Engine:

- (i) Lowlubricatingoilpressureshutdown.Thisshallbeinoperativeduringstartupandacceleration period.
- (ii) Highcoolant(water)temp.shutdown.
- (iii) Engineoverspeedshutdown.

(b) AlternatorProtection:Followingprotectionarrangementsshallbemade:

- (i) Overload
- (ii) Shortcircuit
- (iii) Earthfault
- (iv) Overvoltage

17.8Monitoringandmeteringfacilities:

- (a) Necessaryenergyanalyzerunitforvisualmonitoringofmains,alternatorandloadvoltage, current, frequency, KWH, power factor, etc.
- (b) Asetofvisualmonitoringlampindicationfor:
 - (i) Load onset
 - (ii) Load onmains
 - (iii) Setontest(Alternatoronoperationduty,Alternatoronstandby duty).
- (iv) Set of lamp for engine shut down for over speed, low lub. Oil pressure and high coolant water temperature, overload trip of alternator, earth fault trip of alternator, engine lock out and failure to

start etc. All these indications shall have an audio and visual alarm. When operator accepts the alarm, the hooter will be silenced and the fault indication will become steady until reset by operating a reset button.

17.9 Operating devices: A set of operation devices shall be incorporated in the front of panel as under:

- (a) Master Engine Control Switch: This shall cut off in 'OFF' position DC control to the entire panel, thus preventing start-up of engine due to any cause. However, battery charger, lamp test button for testing the healthiness of indication lamps, DC volt meter/ammeter etc. shall be operative. It shall be feasible to lock the switch in OFF position for maintenance and shut down purposes.
- (b) Operation selector switch OFF/AUTO/MANUAL/TEST position.
- (c) Energy analyzer unit for display of various electrical parameters like voltage, current, frequency, KW, power factor, etc.
- (d) A set of push button as specified.
- (e) Relays, contactors, timers, circuit breakers as required.
- (f) Necessary battery charger with boost/trickle selector, DC volt meter and DC ammeter.

15. SAFETY CONTROL TRIP

- (i) Low lubricating oil pressure
- (ii) High cylinder/water temp
- (iii) Lack of fuel
- (iv) Overspeed

16. SOUND PROOF ENCLOSURE

- (i) The canopy should be sound proof, weather proof and environment friendly conforming to the latest environment (protection) Act. The emission limits of DG Sets shall be as per Gazetted Notification G.S.R. 804(E) dated 03d November 2022 of Ministry of Environment. Forest and Climate Change (The Environment (Protection) Third Amendment Rules 2022). No set shall be accepted without the CPCB certificate of authorized agencies such as ARAI of Pune, NPL New Delhi, NSTL Vishakapattanam, FCRI Palghat and NAL Bangalore.
- (ii) The canopy shall be in modular construction with the provision of assembly at site. The acoustic panels shall be fabricated in 2mm thick CRCA sheet. The finished sheet metal components shall undergo seven tank treatment process for degreasing, derusting, phosphatising etc. for longer life and should be Poly polyester based coated inside & outside. The nuts, bolts and other hardware shall be Zinc coated. The door shall be provided with high quality EPDM gaskets to avoid leakage of sound. The door handles and hinges shall be Zinc plated & lockable type.
- (iii) The Radiator fan of the water cooled Engine shall be used for ventilation. A pusher fan (for air cooled Engines) or in addition to Radiator fan, if required shall also be provided.
- (iv) Adequate ventilation shall be provided to meet the air requirement for combustion and also to expel heat to maintain temperature inside the enclosure within 5 degree Celsius above ambient at 10% overload with tripping arrangement between (50 – 60) degree Celsius. as per recommendation of latest CPCB norms.
- (v) An arrangement for adequate illumination inside the enclosure shall be provided.
- (vi) Separated door with locking arrangement for easy access to D.G. set during operation & maintenance should

be provided.

- (vii) The enclosure shall be guaranteed for a period of 12 months from the date of completion of work against defective materials & rust, welding, painting, smooth functioning of doors, inspection window etc. Minor civil work is to be carried out without any extra cost.
- (viii) Small see through window for reading meters etc. made of transparent polymer sheet of thickness not less than 10 mm shall be provided.
- (ix) Radiator bellow to be provided in case of Water Cooled Engines.
- (x) Fuel Tank and Control Panel shall be incorporated inside the canopy.
- (xi) Two point lifting arrangement.
- (xii) Main base frame will be of size 100mm X 50mm X 5mm MS channel welded with 5mm thick MS sheet for bolting arrangement complete as required.
- (xiii) Framework will be provided for floor made out of 3 mm thick chequered plate
i/c welding, painting
etc complete around foundation as required.
- (xiv) Sound proof enclosure in modular construction will be supplied and erected, made out of 35mm X 35mm X 5mm angle at every corner inside plane & support of angle 45mm X 45mm X 5mm at every door structure, and hinged at two points with refrigeration lock arrangement, fitted over the MS plate of 50mm X 5mm with nut & bolt i/c cutting, welding, painting complete as required.
- (xv) Insulation on enclosure will be provided and fixed of mineral rock wool Slabs of density not less than 96 kg/M³ of 75 mm thickness, covered with 22 gauge GI sheet having 3 mm perforation fitted with strips of aluminum by hydraulic riveting to support the whole insulation rigidly complete as required. Specially designed sound attenuators shall be provided to control sound at air entry & exit points i/c louvers.
- (xvi) The canopy shall be provided with emergency stop button easily approachable from outside.
- (xvii) The canopy shall be provided with following meters (visible from outside):
 - Lube oil pressure gauge
 - Water temperature gauge (for water cooled engines only)
 - Dial type fuel gauge with sensing arrangement

17. GENERAL REQUIREMENT

- (i) The set shall have minimum vibration and noise under all conditions of load. The set shall be properly statically and dynamically balanced. Anti vibration mountings shall be provided for supporting the set.
- (ii) The size of E.A. set base frame channels shall be of 100 mm X 50 mm. and not less than 5 mm thick. Each channel shall be provided with 3 ribs in between the ends and also holes for earth connections.
- (iii) Control wirings shall be done with 1.5 Sqmm multi strand PVC insulated copper conductor cable.
- (iv) Earthing provision should be made for earthing all current carrying metal parts of the equipment. Earth lugs of suitable size shall be provided.

- (v) All the exposed moving parts like fan belt, coupling etc. shall be provided with suitable guards/ covering to avoid the chances of accidents.
- (vi) All exposed metal parts shall be suitably finished to prohibit corrosion under climatic conditions prevailing at site.
- (vii) A name plate showing rating connection diagram should be provided on engine and alternator. All the important and major parts should bear their catalogue number, make of the parts etc. All the control wiring shall be provided with letter number ferules at both ends. Three sets of manual giving the details about design, specifications, special features of the equipment, schematic and wiring diagram, instructions regarding installation and maintenance etc. should be supplied. A laminated control wiring diagram and operation & maintenance instructions shall be framed and displayed.

18. TESTING AND A/T

The EA set shall be tested as per following format in the presence Engineer-in-charge or its authorized representative.

SCOPE:

This section lays down the procedure for conducting test on the installation. In general the procedure laid down here shall be followed, which is at variance, the same may be adopted. The artificial load, fuel manpower for testing will arrange for testing by the agency for which nothing will pay extra.

PHYSICAL CHECKS:

Particulars such as name plate detail of all major components/equipment shall be recorded and compared with what has been offered by the contractor as per the concluded agreement.

Physical visual inspection of the installations, especially on the following aspects shall be conducted.

1. Firmness of mounting.
2. Verticality of installed set
3. Tightness of nuts & bolts.
4. Proper installation of exhaust pipe.
5. Insulation of exhaust pipe.
6. Provision of guard on EA set coupling joint.
7. Proper location of fuel tank.
8. Size of electrical cables as per the approved plan.
9. Termination of cables.
10. Rating of various fuses.
11. Termination of earth lead on neutral & body.

EARTH RESISTANCE:

Measurements shall be taken in respect of earth resistance or earth stations provided for grounded neutral and body. The resistance shall be measured by isolating the connecting earth lead in respect of all earth stations individually. The results shall be recorded as under:-

Sl.No.	Identification of earth station	Used for	Earth stations (ohms)
(1)	(2)	(3)	(4)

RUN TEST:

The engine shall be given a test run continuously for at least six hours with alternators supplying full rated load. During this run following observation shall be recorded.

Sl.No.	ITEM	Time (After start of run test)
		1 Hr. 2 Hr. 3 Hr. 4 Hr. 5 Hr. 6 Hr. 7 Hr.

1. Lubricating oil pressure.
2. Exhaust gas colour
3. Speed of Engine
4. Output voltage
5. Load current

FUEL CONSUMPTION TEST:

- i) Fuel consumption for half an hour shall be measured after the full load operating conditions have stabilized.
- ii) During the measurement the load shall be maintained unchanged.
- iii) The fuel consumption shall be compared with values given in technical particulars.

OVERLOAD TEST:

Over load test to the extent of 10% over the rated load for one Hr. shall be conducted immediately after the full load run test.

The various parameters as in the case of run test shall regularly be monitored and recorded. After the overload test the load shall be normalized to rated value and all Parameters recorded accordingly in addition to recording stator body temp.

ENGINE GOVERNOR:

Suit able to meet requirement as given under Speed Governing of A/T Test

SPEED GOVERNING:

The Engines shall run steadily and load up to its maximum rated load to the standard given below:

Maximum change of speed as a LOAD VARIATION percentage of rated speed

- | | |
|---|----------------------|
| * Load variation on suddenly taking off or throwing on the rated load | Temporary change 10% |
| | Permanent Change 4% |
| * On change of load by any step of 20 percent of the rated load | Temporary change 3% |
| | Permanent change 2% |

INSULATION TEST:

- i) Insulation test shall be conducted after testing the EA set at overload.
- ii) The insulation resistance between the stator coil and frames shall be measured with 500 volts megger.
- iii) Insulation resistance of control wiring with 500V meggers shall be measured which shall not be less than one mega ohm.

FUNCTIONAL TEST:

- i) Functional tests in respect of various components like controls, interlocks, measuring devices, battery charger and annunciation devices shall be considered.

BATTERY TEST:

- ii) The battery shall be tested for six successive attempts for starting of engine in order to establish healthy condition of battery.

19. GUARANTEE ETC.:

- (i) The entire installation system shall be guaranteed against any inherent defect or faulty workmanship and for its perfect functioning for a period of one year from the date of successful AT of entire system.
- (ii) Free services as per manufacturer's standard practice and norms will be provided free of cost.
- (iii) The contractor shall impart training to the operator deputed by the department for operation and attending the minor faults free of cost.
- (iv) All work will be executed as per CPWD (Internal/External) specifications, relevant IE rules.

*Executive Engineer (E)
Postal Electrical Division
Bengaluru*

F. LAN NETWORKING SYSTEM

1. The LAN Networking with switches will be installed at Civil and **Electrical repair and Maintenance of IQ Basavanagudi HO, Bengaluru South Division - 560004**
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 familiarize 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 LAN Networking items with switches 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 equipment's 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 equipment's 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. Conferencing products should be with minimum two years warranty / as per OEM standards & OEM must have service centre for prompt repairing and replacement at Any damage done to the building/false ceiling/Exhibits is to be made good by the contractor with no extra cost by department.
9. 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.
10. 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).
11. 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-II Internal 2023 shall be complied with.

15. PAYMENTTERMS

Thefollowingpercentageofcontractratesshallbepayableagainstthestagesofwork shown here in:

S.No	Stageofwork	Payment
1	Aftersupplyofequipmentatsiteingoodconditiononpro-rata Basis	70%
2	Oncompletionofpro-ratainstallation	20%
3	Oncommissioningandcompletioninallrespects	5%
4.	Handingoverofthetotalinstallationstothedepartment.	5%

Forotheritems,the termsofpayment willbedecidedbytheEngineer-In-Chargeandshall be binding on the contractor.

*Executive Engineer (E)
Postal Electrical Division
Bengaluru*

G. CCTV

1. The CCTV system will be installed at Civil and **Electrical repair and Maintenance of IQ Basavanagudi HO, Bengaluru South Division -560004**

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, so as to satisfy themselves with all site working conditions, cable routes etc.

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

a) All the CCTV Equipments like Dome/ Bullet Cameras, NVR, Display, Hard disk, Display, UPS, etc should be of compatible approved make. 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 CCTV equipments including accessories quoted by them is in continuous process of manufacturing and acceptance 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. All software & hardware should be in upgrade version.

7. CCTV equipments and items should be with minimum two years warranty / as per OEM standards.

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

8. 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.

9. 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, same should be made operational within 24 hrs. A penalty as deemed reasonable by

Engineer-in-charge shall be recovered from the firm (which will be minimum Rs 1000/- per day).

10. 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 equipments and accessories.

c) Operation and maintenance manual of all major equipments detailing all adjustment, operation and maintenance procedure. – 3 Sets

11. 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.

12. PAYMENT TERMS

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

Sl. No	Stage of work	Payment
1	After supply of equipment at site in good condition on pro-rata basis	75%
2	On completion of pro-rata installation	10 %
3	On commissioning and completion	10 %
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)
Postal Electrical Division
Bengaluru*

ANNEXURE-A

UNDERTAKING FROM MANUFACTURERS OF LED FITTINGS

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

Name of Work: Civil and **Electrical repair and Maintenance of IQ Basavanagudi HO, Bengaluru South Division - 560004**

We hereby agree that

1. All the LED fittings, including drivers, supplied by us for the above work are guaranteed for five years from the date of handing over.
2. In case of discontinuation of model and non-availability of spares, we will replace the fittings with equivalent/ high end model in case of manufacturing defect during the five (5) year warranty period.

For M/s :

.....

(Authorized signatory of manufacturer of LED luminaries)

With company seal

Counter Signature,

Major contractor (with Seal)

Product Directory		
S. no.	Details of material/equipment	Manufacturer's name/make
1	MCB, Isolator, Industrial Plug Socket, RCCB, ELCB	Schneider Electric / Legrand / LK (FORMERLY L&T)/ ABB / Seimens / Havells / C&S / Indoasian / CG
2	DB / Loose wire Box	Schneider Electric / Legrand / LK (FORMERLY L&T)/ ABB / Seimens / Havells / C&S / Indoasian / CG/ Crompton/ HPL
3	MCCB / ACB	Schneider Electric / Legrand / LK (FORMERLY L&T)/ ABB / Seimens / Havells / C&S / Indoasian / CG/ Crompton/ HPL
4	Change Over Switch	LK (FORMERLY L&T)/ Havells/ ABB / C&S / CG / HPL Socomec / Schneider Electric / Seimens
5	Contactora	LK (FORMERLY L&T) / ABB / C&S / CG / Havells / Legrand / Schneider Electric / Siemens
6	MS Conduit (ISI marked)	BEC/ NIC/ AKG/ M-Kay / Steel Craft / Vikas
7	PVC Conduit (ISI marked)	AKG/ Astral/ Finolex / M-Kay / Press Fit/ Precision / Supreme / Polycab
8	Modular Switch, Socket/Telephone socket/ cable TV Socket/ Data outlet socket/ Fan Regulator	ABB / Anchor / Schneider Electric /Legrand / MK /Havells (Crabtree)
9	FRLSH PVC ins. Copper cond. Single core cable for wiring (ISI marked)	Finolex / Havells / KEI / Polycab / Rallison / RR Cabel/Plaza/Anchore/ HPL/ GM/ Standard /RPG/CCI/L&T/Walna/ Svam/ Gloster/ MESCAB
10	Armoured/ Unarmoured telephone cable, coaxial cable	Finolex / Havells / KEI / Polycab / Rallison / RR Cabel/Plaza
11	LAN/CAT-6 / IO / Patch Cord	Legrand / D Link / Digilink / Havells / Finolex
12	Phenolic laminated sheet/ Bakelite sheet	Hylem / Formica / Mylam/ Greenlam
13	Call bell/Buzzer	Legrand / Siemens / LK (FORMERLY L&T) / MK / Anchor / Havells / Philips
14	PVC Trunking	MK / Schneider Electric / Legrand / AKG
15	LED Fittings	Wipro/ Phillips/ Crompton / Havells / Jaquar / Regent / Trilux / Lighting Technology / Bajaj/OSRAM/Luker/Surya/ GM/ Panasonic
16	Exhaust Fan/Wall Fan/Fresh Air fan	Havells / Crompton / Usha / Orient/ALMONARD/ATOM BERG/luker
17	BLDC Ceiling Fan	Atom Berg / Crompton / Havells / Orient / Usha/Luker/KHAITAN/ Bajaj
18	Wall Bracket fitting	Wipro/ Phillips/ Crompton / Havells/ Trilux/ Lighting Technology/ Panasonic / Bajaj / Jaquar/OSRAM/Luker/GM/ Panasonic
19	LED Lamp	Wipro / Phillips / Crompton / Havells / Osram / Jaquar/OSRAM/Luker/Surya
20	LED Post Top fitting/Street Light Fittings	Wipro/ Phillips/ Crompton / Havells / Jaquar / Lighting Technology / Panasonic/ Bajaj/Luker/Surya
21	XLPE insulated PVC Sheathed Alum. / Copper conductor Armored / Unarmored cable of 1.1 KV grade	Finolex / RR Kabel / KEI / Havells / Polycab / Rallison/PLAZA

22	Cable Jointing Kit	Densons / M-Seal / Raychem.
23	Polycarbonate Junction box/ Enclosure	Hensel/ Sintex / Tyco
24	D.W. Corrugated HDPE pipe (ISI marked)	Rex / Duraplast/ Triputi/ Duraline/ CPE
25	MS / GI Cable Tray	MEM/BEC/Legrand/OBO/Milestone/Neptune/MK
26	Submersible Pump/ Mono Block Pump	Kirloskar / KSB / Crompton Greaves / CRI / Havells
27	Geysers	Racold/CG/Havells/ Usha/Venus/ Jaquar/Bajaj.
28	Window/Split AC	Mitsubishi/ O General/ Carrier/Daikin/Hitachi/Blue Star/Voltas/ LG/ Samsung/Lloyds/Panasonic/Toshiba/Godrej
29	Cassette AC	Mitsubishi/ O General/ Carrier/Daikin/Hitachi/Blue Star/Voltas/ LG/ Samsung/Lloyds/Panasonic/Toshiba/Godrej
30	VRV / VRF AC	Voltas/ Hitachi/ Carrier / Daikin / Mitshubishi Electric / O- General / Toshiba/ Bluestar
31	CT/PT	AE/ Havells/ Indocoil/ Kappa/ Kaycee/ LK (FORMERLY L&T) / Marshal/ Meco/ Rishabh/ Siemens/ Universal
32	LED type indicating lamp/ Push Button	Havells / Indocoil / Kaycee / Meco / Siemens / Universal / Vaishno / Schneider Electric / LK (FORMERLY L&T)/ Seimens / ABB
33	Selector Switch & Toggle switch	AE / Kaycee/ Meco / Rishabh/ Universal / Vaishno / ABB / LK (FORMERLY L&T) / Siemens
34	Conventional/ Electronic Digital Meters (A/V/PF/Hz/KW/KWH/Multi Function Meter)	AE / Havells / Kaycee / Meco / Rishabh / Siemens / Universal / LK (FORMERLY L&T)/ Secure/ HPL
35	Terminal Block & Connectors	Elmex/ Wago/ Hensel/ Connectwell /Dowels
36	Timer	ABB/ AE/ Havells/ LK (FORMERLY L&T) / Legrand/ Minilec/ Schneider Electric/ Siemens
37	Single Phase Preventer	Minilec/ LK (FORMERLY L&T) /Siemens/ Zerotrip
38	Capacitor	Appeco/ Asian/ CG/ Khiatan/LK (FORMERLY L&T) / Usha/ Universal.
39	FASD Starter/ DOL starter / Star delta starter	L&T/ABB/Cutler Hammer/ Schneider/Neptune
40	Rubber Matting	ISI Mark
41	GI pipe	Tata / Jindal / Sail / Swastik / Zenith
42	GI Sheet	HSL/ Jindal/ National/ Nippon Denro/ SAIL/ Tata
43	Battery	Amar Raja/ Amaron/ Amco/ Exide/ Furukawa/ Hitachi/ CG/ Kirloskar
44	Rising Main	C&S/ LK (FORMERLY L&T)/Schneider/Legrand/ Seimens.
45	Package / Unitised Substation	ABB/ CG/ Kirloskar/ Legrand/ Schneider Electric
	DG Set	
46	Engine	Ashok Leyland / Caterpillar / Cummins / Greaves / Kirloskar
47	Alternator	Greaves / ELGI / Kirloskar / Stamford / Leroy-Somer

	CCTV	
48	Dome/Bullet/PTZ Cameras	Bosch / Sony / Honeywell / Siemens / CP Plus / Hikvision
49	Network Video Recorder (NVR)	TP Link/ Samsung/ Panasonic/ Honeywell/ CP Plus / Hikvision
50	Switches	CISCO / HP / Netgear/Hikvision/DLink
51	Hard Disc (Surveillance Grade)	Seagate / Western Digital / Toshiba
52	Rack	Valrack / DLink
	Fire Fighting	
53	Main Fire / Terrace / Sprinkler / Jockey / Priming pump sets	Grundfos / Kirloskar /Wilo Mather & Platt/ KSB / Armstrong / Crompton
54	Motors	Siemen / ABB / Kirloskar / CG / Bharat Bijlee /Lubi
55	Diesel Engine	CNP / KOEL/ Cummins / Greaves / Mahindra / Lubi
56	Fire Brigade connection	GeTech/Newage/Agni/Ceasefire
57	Branch Pipe	GeTech/Newage/Agni/Ceasefire
58	Hydrant valves	Newage/Ceasefire/Safex/Kalpana/L&T valves/Life-Guard
59	CIDF Butterfly valve / Sluice valve/ Non-return valve / Foot valve/strainer. (Valves to be ISI marked only)	Advance / Audco (L&T) / Leader / Sant /Kirloskar /ZOLOTO
60	First Aid Hose Reel, ISI mark with hose reel drum, Double/Single Hydrant valve/branch pipe all with ISI mark	Newage / Minimax / Ceasefire / Omex / GETECH
61	RRL hose pipe, hose coupling (To be ISI marked only)	DUNLOP/JYOTI/MARUTI/NEW AGE/GE TECH/ Minimax / Cease fire / Omex
62	PRESSURE SWITCH	INDOFOSS/ FEIBIG/ Honeywell / Siemens
63	Flow Switch	Siemens / Anergy / Honeywell/Rapidcool / Jonson Control
64	Pressure Gauge	Fiebig / H-Guru/ Emerald
65	Fire extinguishers (ISI marked)	Ceasefire/ Minimax /Safex / Kanex
66	COATING /WRAPPING	INTEGRATED WATER PROOFING (PYPKOTE)
	Fire Detection & Alarm	
67	Heat Detector / Smoke Detector	Apollo/ System Sensor / Honeywell / Siemens / Edwards / Agni Instruments
68	Intelligent Addressable fire alarm control panels	Apollo / System Sensor / Honeywell / Siemens / Edwards
69	Manual (Conventional) Fire Alarm Control Panel	Agni Instruments / Ravel Electronics/ System Sensor / Honeywell / Siemens / Edwards / GST
70	PA System	Ahuja / Philips / Motwani / Yamaha / Ahuja /Bosch
71	Hooters / Sounders	Should be same make as the FACP
	Solar	
72	Crystalline PV modules (Poly/Mono/TOPCon)	Indigenous makes – Emmvee/ HHV/ Tata Solar/ Vikram/ Waaree/ Websol Energy/ Premier Energies / Mundra Solar

		Energy (Adani Solar)
73	PCU/Inverter	FIMER (ABB) / Delta / SMA /Solar / Tata Solar / Growatt / K Solare / Luminous / Waaree / Havells / Sungrow
74	DC Cable	Finolex / Havells / KEI / Polycab / RR Cabel
75	Other accessories	As approved by the engineer-in-charge

Note:-

1. Engineer in charge (minor component) is Approving authority reserve the right to add or delete any materials and makes/brands in the list of preferred makes of materials/brands.
2. In case of non-availability of the Make & Model given above the NIT the Engineer in charge of minor component shall decide the equivalent Make & Model which should be used and the decision will be conveyed in writing.

Executive Engineer (E)
Postal Electrical Division
Bengaluru

Financial Bid: - Part D

(Work Schedule)

	NIT No : 04/BPCD/2026-2027.				
	SCHEDULE OF QUANTITIES				
N/W	Civil works for repair and maintenance works to Basuvangudi IQ under Bengaluru South Division - 560004				
SLNo	Description	Qty	Unit	Rate	Amount
1	Carriage of Materials				
1.1	By Mechanical Transport including loading,unloading and stacking				
1.1.1	Disposal of moorum/building rubbish/ malba/ similar unserviceable, dismantled or waste material by mechanical transport including loading, transporting, unloading to approved municipal dumping ground for lead upto 10 km for all lifts, complete as per directions of Engineer-in-charge. Note - Item to be applicable in urban areas having directions for restricted hours for movement/plying of load carrying motor vehicle of 3.5 cum or more.	15	cum	576.91	8654.00
2	CEMENT CONCRETE (CAST IN SITU)				
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)	1	cum	7611.12	7611.00
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	1:5:10 (1 cement : 5 coarse sand (zone-III) derived from natural sources : 10 graded stone aggregate 40 mm nominal size derived from natural sources).	1.88	cum	9947.02	18700.00
3	REINFORCED CEMENT CONCRETE				
3.1	Reinforced cement concrete work in beams, suspended floors, roofs having slope up to 15 degree 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).	0.13	cum	13433.82	1746.00
3.2	Centering and shuttering including strutting, propping etc. and removal of form for				
3.2.1	Lintels, beams, plinth beams, girders, bressumers and cantilevers	1.8	sqm	859.82	1548.00
3.3	Steel reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete above plinth level.				
3.3.1	Thermo-Mechanically Treated bars of grade Fe-500D or more.	20	kg	125.93	2519.00
4	MASONRY WORK				

4.1	Brick work with common burnt clay F.P.S. (non modular) bricks of class designation 5.0 in superstructure above plinth level up to floor V level in all shapes and sizes in :a) Cement Mortar 1:6	1	Cum	10297.30	10297.00
4.2	Half brick masonry with common burnt clay F .P .S. (non modular) bricks of class designation 5.0 in superstructure above plinth level up to floor V level. Cement mortar 1:4 (1 cement :4 coarse sand)	7.05	Sqm	1273.85	8981.00
5	CLADDING WORK				
5.1	Providing and fixing 18 mm thick gang saw cut, mirror polished, premoulded and prepolished, machine cut for kitchen platforms, vanity counters, window sills, facias and similar locations of required size, approved shade, colour and texture laid over 20 mm thick base cement mortar 1:4 (1 cement : 4 coarse sand), joints treated with white cement, mixed with matching pigment, epoxy touch ups, including rubbing, curing, moulding and polishing of edges to give high gloss finish etc. complete at all levels.				
5.1.1	Granite stone slab of colour black, Cherry/Ruby red				
5.1.1.1	Area of slab upto 0.50 sqnn	1.08	sqm	6320.80	6826.00
5.2	Providing edge moulding to 18 mm thick marble stone counters, Vanities etc., including machine polishing to edge to give high gloss finish etc. complete as per design approved by Engineer-in-Charge.				
5.2.1	Granite work	3	metre	596.59	1790.00

5.3	Providing and fixing 1st quality ceramic glazed wall tiles conforming to IS: 15622 (thickness to be specified by the manufacturer), of approved make, in all colours, shades except burgundy, bottle green, black of any size as approved by Engineer-in-Charge, in skirting, risers of steps and dados, over 12 mm thick bed of cement mortar 1:3(1 cement : 3 coarse sand) and jointing with grey cement slurry @ 3.3kg per sqm, including pointing in white cement mixed with pigment of matching shade complete.	37.82	sqm	1480.46	55991.00
6	WOOD AND P. V. C. WORK				
6.1	Extra for providing frosted glass panes 4 mm thick (weight not less than 10 kg per sqm) instead of ordinary float glass panes 4 mm thick (weight not less than 10 kg per sqm) in doors, windows and clerestory window shutters. (Area of opening for glass panes excluding portion inside rebate shall be measured).	5.9	sqm	205.96	1215.00
6.2	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.				
6.2.1	Fixed to steel windows by welding	30	kg	255.82	7675.00
6.3	Providing and fixing IS: 12817 marked stainless steel butt hinges (heavy weight) with stainless steel screws etc. complete :				
6.3.1	100x60x2.50 mm	24	each	124.17	2980.00
6.4	Providing and fixing aluminium extruded section body tubular type universal hydraulic door closer (having brand logo with ISI, IS : 3564, embossed on the body, door weight upto 36 kg to 80 kg and door width from 701 mm to 1000 mm), with double speed adjustment with necessary accessories and screws etc. complete.	2	each	1147.93	2296.00

6.5	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 :				
6.5.1	250x16 mm	3	each	304.28	913.00
6.6	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 :				
6.6.1	200x10 mm	6	each	116.41	698.00
6.6.2	150x10 mm	12	each	96.39	1157.00
6.7	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 :				
6.7.1	100 mm	12	each	69.53	834.00
6.8	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.				
6.8.1	Twin rubber stopper	3	each	84.48	253.00
6.9	Providing and fixing bright /matt finished Stainless Steel handles of approved quality & make with necessary screws etc all complete.				
6.9.1	100mm	6	each	105.61	634.00
6.1	Providing and fixing 19 mm thick both side balancing lamination factory pressed BWP grade marine ply as per IS : 710 of approved brand boxes,shelves,racks,almirah,cupboard and drawer etc. including necessary nails,screws etc. complete as per direction of Engineer-in- charge.	9	sqm	3027.76	27250.00

6.11	Providing and fixing stainless steel self closing spring hinges at 0 degree hinges (hydraulic type) of approved make/brand to cupboard shutters with full threaded steel screws including making necessary recess in board and finished etc. complete as per direction of Engineer-in-charge.	16	each	317.59	5081.00
6.12	Providing and fixing 2 mm thick 16 to 19 mm wide PVC edge binding tape of approved quality for cupboard/wardrobe shutters including necessary synthetic resin hot pressed to edges on binding machine etc. complete as per direction of Engineer-in-charge.	30	metre	51.14	1534.00
7	STEEL WORK				
7.1	Steel work in built up tubular (round, square or rectangular hollow tubes etc.) trusses etc., including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer, including welding and bolted with special shaped washers etc. complete.				
7.1.1	Hot finished welded type tubes	150.44	kg	226.98	34147.00
7.2	Steel work welded in built up sections/ framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required.				
7.2.1	In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works	20	kg	201.53	4031.00
8	FLOORING				

8.1	Providing and laying Ceramic glazed floor tiles of size 300x300 mm (thickness to be specified by the manufacturer), of 1st quality conforming to IS : 15622, of approved make, in all colours, shades, except White, Ivory, Grey, Fume Red Brown, laid on 20 mm thick bed of cement mortar 1:4 (1 Cement : 4 Coarse sand), jointing with grey cement slurry @ 3.3 kg/ sq.m including pointing the joints with white cement and matching pigments etc., complete.	6.95	sqm	1535.74	10673.00
8.2	Providing and laying Vitrified tiles in floor in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS:15622, of approved brand & manufacturer, in all colours and shade, laid on 20 mm thick cement mortar 1:4 (1 cement: 4 coarse sand) jointing with grey cement slurry @3.3 kg/sqm including grouting the joints with white cement and matching pigments etc. The tiles must be cut with the zero chipping diamond cutter only . Laying of tiles will be done with the notch trowel, plier, wedge, clips of required thickness, leveling system and rubber mallet for placing the tiles gently and easily.				
8.2.1	Double charge vitrified tile polished finish of size				
8.2.1.1	Size of Tile 600 x 600 mm	33.88	sqm	1697.28	57504.00
8.3	Providing and laying Vitrified tiles in different sizes (thickness to be specified by manufacturer), with water absorption less than 0.08 % and conforming to I.S. 15622, of approved make, in all colours & shade, in skirting, riser of steps, over 12 mm thick bed of cement mortar 1:3 (1 cement: 3 coarse sand), jointing with grey cement slurry @ 3.3 kg/ sqm including grouting the joint with white cement & matching pigments etc. complete.				
8.3.1	Size of Tile 600x600 mm	3.68	sqm	1895.07	6974.00

9	ROOFING				
9.1	Providing and fixing on wall face unplasticised - PVC moulded fittings/ accessories for unplasticised Rigid PVC rain water pipes conforming to IS : 13592 Type A, including jointing with seal ring conforming to IS :5382, leaving 10 mm gap for thermal expansion.				
9.1.1	Single tee with door				
9.1.1.1	75x75x75 mm	2	each	191.72	383.00
9.1.1.2	110x110x110 mm	2	each	273.39	547.00
9.1.2	Bend 87.5°				
9.1.2.1	75 mm bend	2	each	123.65	247.00
9.1.2.2	110 mm bend	2	each	175.55	351.00
9.1.3	Shoe (Plain)				
9.1.3.1	75 mm Shoe	2	each	108.70	217.00
9.1.3.2	110 mm Shoe	2	each	153.95	308.00
10	FINISHING				
10.1	12 mm cement plaster of mix:				
10.1.1	1:6(1 cement: 6 fine sand)	22	sqm	389.22	8563.00
10.2	15 mm cement plaster on the rough side of single or half brick wall of mix:				
10.2.1	1:6 (1 cement: 6 fine sand)	15.66	sqm	447.19	7003.00
10.3	Finishing walls with Premium Acrylic Smooth exterior paint with Silicone additives of required shade:				
10.3.1	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)	104	sqm	199.78	20777.00
10.4	Painting with synthetic enamel paint of approved brand and manufacture to give an even shade :				
10.4.1	Two or more coats on new work	82.76	sqm	182.03	15065.00
10.5	Providing and applying white cement based putty of average thickness 1 mm, of approved brand and manufacturer, over the plastered wall surface to prepare the surface even and smooth complete.	159.3	sqm	182.20	29025.00

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	198.3	sqm	166.73	33063.00
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	198.3	sqm	86.34	17122.00
10.8	Removing dry or oil bound distemper, water proofing cement paint and the like by scrapping, sand papering and preparing the surface smooth including necessary repairs to scratches etc. complete.	302.3	sqm	29.37	8877.00
11	REPAIRS TO BUILDING				
11.1	Repairs to plaster of thickness 12 mm to 20 mm in patches of area 2.5 sq.meters and under, including cutting the patch in proper shape, raking out joints and preparing and plastering the surface of the walls complete, including disposal of rubbish to the dumping ground, all complete as per direction of Engineer-in-Charge.				
11.1.1	With cement mortar 1:4 (1 cement : 4 fine sand)	10	sqm	639.14	6391.00
11.2	Providing and fixing double scaffolding system (cup lock type) on the exterior side, up to seven story height made with 40 mm dia M.S. tube 1.5 m centre to centre, horizontal & vertical tubes joining with cup & lock system with M.S. tubes, M.S. tube challies, M.S. clamps and M.S. staircase system in the scaffolding for working platform etc. and maintaining it in a serviceable condition for the required duration as approved and removing it there after.	67.5	sqm	394.94	26658.00

	The scaffolding system shall be stiffened with bracings, runners, connection with the building etc wherever required for inspection of work at required locations with essential safety features for the workmen etc. complete as per directions and approval of Engineer-in-charge. The elevational area of the scaffolding shall be measured for payment purpose. The payment will be made once irrespective of duration of scaffolding. Note: - This item to be used for maintenance work judicially, necessary deduction for scaffolding in the existing item to be done.				
11.3	Dismantling W.C. Pan of all sizes including disposal of dismantled materials including malba all complete as per directions of Engineer-in-Charge.	2	each	156.58	313.00
12	Dismantling and Demolishing				
12.1	Demolishing lime concrete manually/ by mechanical means and disposal of material within 50 metres lead as per direction of Engineer- in-charge.	1.38	cum	994.21	1372.00
12.2	Demolishing cement concrete manually/ by mechanical means including disposal of material within 50 metres lead as per direction of Engineer - in - charge.				
12.2.1	Nominal concrete 1:4:8 or leaner mix (including equivalent design mix)	2	cum	1755.60	3511.00
12.3	Demolishing R.C.C. work manually/ by mechanical means including stacking of steel bars and disposal of unserviceable material within 50 metres lead as per direction of Engineer - in- charge.	2	cum	4146.44	8293.00
12.4	Demolishing brick work manually/ by mechanical means including stacking of serviceable material and disposal of unserviceable material within 50 metres lead as per direction of Engineer-in-charge.				

12.4.1	In cement mortar	2	cum	2405.49	4811.00
12.5	Dismantling doors, windows and clerestory windows (steel or wood) shutter including chowkhats, architrave, holdfasts etc. complete and stacking within 50 metres lead :				
12.5.1	Of area 3 sq. metres and below	14	each	428.74	6002.00
12.6	Dismantling tile work in floors and roofs laid in cement mortar including stacking material within 50 metres lead.				
12.6.1	For thickness of tiles 10 mm to 25 mm	66.93	sqm	85.70	5736.00
12.7	Dismantling C.I. or asbestos rain water pipe with fittings and clamps including stacking the material within 50 metres lead :				
12.7.1	100 mm dia pipe	20	metre	91.07	1821.00
12.8	Dismantling old plaster or skirting raking out joints and cleaning the surface for plaster including disposal of rubbish to the dumping ground within 50 metres lead.	25	sqm	63.81	1595.00
13	ROAD WORK				
13.1	Providing and laying matt finished vitrified tile of size 300x300x9.8 mm having with water absorption less than 0.5% and conforming to IS: 15622 of approved make in all colours and shades in for outdoor floors such as footpath, court yard, multi modals location etc., laid on 20 mm thick base of cement mortar 1:4 (1 cement : 4 coarse sand) in all shapes & patterns including grouting the joints with white cement mixed with matching pigments etc. complete as per direction of Engineer-in-Charge.	19.5	sqm	1699.62	33143.00
14	SANITARY INSTALLATIONS				

14.1	Providing and fixing water closet squatting pan (Indian type W.C. pan) with 100 mm sand cast Iron P or S trap, 10 litre low level white P.V.C. flushing cistern, including flush pipe, with manually controlled device (handle lever) conforming to IS : 7231, with all fittings and fixtures complete, including cutting and making good the walls and floors wherever required:				
14.1.1	White Vitreous china Orissa pattern W.C. pan of size 580x440 mm with integral type foot rests	1	each	7901.62	7902.00
14.2	Providing and fixing wash basin with C.I. brackets, 15 mm C.P. brass pillar taps, 32 mm C.P. brass waste of standard pattern, including painting of fittings and brackets, cutting and making good the walls wherever require:				
14.2.1	White Vitreous China Flat back wash basin size 550x 400 mm with single 15 mm C.P. brass pillar tap	2	each	2194.15	4388.00
14.3	Providing and fixing CP Brass 32 mm size Bottle Trap of approved quality & make and as per the direction of Engineer-in-charge.	2	each	1208.23	2416.00
14.4	Providing and fixing 600x450 mm beveled edge mirror of superior glass (of approved quality) complete with 6 mm thick hard board ground fixed to wooden cleats with C.P. brass screws and washers complete.	2	each	1877.44	3755.00
14.5	Providing and fixing PTMT towel rail complete with brackets fixed to wooden cleats with CP brass screws with concealed fittings arrangement of approved quality and colour.				
14.5.1	600 mm long towel rail with total length of 645 mm, width 78 mm and effective height of 88 mm, weighing not less than 190 gms.	2	each	827.77	1656.00

14.6	Providing and fixing white vitreous china extended wall mounting water closet of size 780x370x690 mm of approved shape including providing & fixing white vitreous china cistern with dual flush fitting, of flushing capacity 3 litre/ 6 litre (adjustable to 4 litre/ 8 litres), including seat cover, and cistern fittings, nuts, bolts and gasket etc complete.	1	each	17513.01	17513.00
15	WATER SUPPLY				
15.1	Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold water supply and all CPVC plain & brass threaded fittings, including fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step CPVC solvent cement and testing of joints complete as per direction of Engineer in Charge. Internal work - Exposed on wall				
15.1.1	25 mm nominal dia Pipes	30	metre	468.85	14065.00
15.2	Providing and fixing Chlorinated Polyvinyl Chloride (CPVC) pipes, having thermal stability for hot & cold water supply, including all CPVC plain & brass threaded fittings and fixing the pipe with clamps at 1.00 m spacing. This includes jointing of pipes & fittings with one step CPVC solvent cement and the cost of cutting chases and making good the same including testing of joints complete as per direction of Engineer in Charge. Concealed work, including cutting chases and making good the walls etc.				
15.2.1	25 mm nominal dia Pipes	30	metre	732.38	21971.00
15.3	Providing and fixing unplasticised PVC connection pipe with brass unions :				
15.3.1	45 cm length				
15.3.1.1	15 mm nominal bore	2	each	114.13	228.00
15.4	Providing and fixing C.P. brass shower rose with 15 or 20 mm inlet :				
15.4.1	100 mm diameter	2	each	226.46	453.00
16	ALUMINIUM WORK				

16.1	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 / panelling, 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) :				
16.1.1	For fixed portion				
16.1.1.1	Powder coated aluminium (minimum thickness of powder coating 50 micron)	28.92	kg	619.88	17927.00
16.1.2	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)				
16.1.2.1	Powder coated aluminium (minimum thickness of powder coating 50 micron)	17.9	kg	740.78	13260.00
16.2	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):				

16.2.1	With float glass panes of 4.0 mm thickness (weight not less than 10kg/sqm)	5.9	sqm	1374.03	8107.00
16.3	Filling the gap in between aluminium frame & adjacent RCC/ Brick/ Stone work by providing weather silicon sealant over backer rod of approved quality as per architectural drawings and direction of Engineer-in-charge complete.				
16.3.1	Upto 5 mm depth and 5 mm width	31.2	metre	112.97	3525.00
16.4	Providing and fixing aluminium casement windows fastener of required length for aluminium windows with necessary screws etc. complete.				
16.4.1	Powder coated minimum thickness 50 micron aluminium	5	each	114.37	572.00
17	WATER PROOFING				
17.1	Providing and laying water proofing treatment to vertical and horizontal surfaces of depressed portions of W.C., kitchen and the like consisting of: (i) Ist course of applying cement slurry @ 4.4 kg/sqm mixed with water proofing compound conforming to IS : 2645 in recommended proportions including rounding off junction of vertical and horizontal surface. (ii) IInd course of 20 mm cement plaster 1:3 (1 cement : 3 coarse sand) mixed with water proofing compound in recommended proportion including rounding off junction of vertical and horizontal surface. (iii) IIIrd course of applying blown or residual bitumen applied hot at 1.7 kg. per sqm of area. (iv) IVth course of 400 micron thick PVC sheet. (Overlaps at joints of PVC sheet should be 100 mm wide and pasted to each other with bitumen @ 1.7 kg/sqm).	10.76	sqm	898.58	9669.00
18	NEW TECHNOLOGIES AND MATERIALS				

18.1	Providing and fixing factory made single extruded WPC (Wood Polymer Composite) solid door/window/Clerestory windows & other Frames/ Chowkhat comprising of virgin PVC polymer of K value 58-60 (Suspension Grade), calcium carbonate and natural fibers (wood powder/ rice husk/ wheat husk) and non toxic additives (maximum toxicity index of 12 for 100 gms) fabricated with miter joints after applying PVC solvent cement and screwed with full body threaded star headed SS screws having minimum frame density of 750 kg/cum, screw withdrawal strength of 2200 N (Face) & 1100 N (Edge), minimum compressive strength of 58 N/mm², modulus of elasticity 900 N/mm² and resistance to spread of flame of Class A category with property of being termite/borer proof, water/moisture proof and fire retardant and fixed in position with M.S hold fast/lugs/SS dash fasteners of required dia and length complete as per direction of Engineer-In- Charge. (M.S hold fast/lugs or SS dash fasteners shall be paid for separately). Note: For WPC solid door/window frames, minus 5 mm tolerance in dimensions i.e depth and width of profile shall be acceptable. Variation in profile dimensions on plus side shall be acceptable but no extra payment on this account shall be made.				
18.1.1	Frame size 50 x 100 mm	29.4	metre	1106.53	32532.00

18.2	Providing and fixing factory made single extruded WPC (Wood Polymer Composite) solid plain flush door shutter of required size comprising of virgin polymer of K value 58-60 (Suspension Grade), calcium carbonate and natural fibers (wood powder/ rice husk/wheat husk) and non toxic additives (maximum toxicity index of 12 for 100 gms) having minimum density of 650 kg/cum and screw withdrawal strength of 1800 N (Face) & 900 N (Edge), minimum compressive strength 50 N/mm ² , modulus of elasticity 850 N/mm ² and resistance to spread of flame of Class A category with property of being termite/borer proof, water/moisture proof and fire retardant and fixing with stainless steel butt hinges of required size with necessary full body threaded star headed counter sunk S.S screws, all as per direction of Engineer-In- Charge. (Note: stainless steel butt hinges and necessary S.S screws shall be paid separately)				
18.2.1	30 mm thick	9.6	sqm	5075.21	48722.00
19	MISCELLANEOUS (LMR)				
19.1	Providing and fixing 25mm nominal bore CPVC gate valve with both end brass thread of of supreme make or equivalent approved design and manufacutre complete as per directions of Engineer in Charge.	2	Each	865.14	1730.00
19.2	Providing and fixing 2 in one CP brass bib cock of approved quality approved makeof jaguar or equivalent complete as per directions of E-in-C.	2	Each	1411.92	2824.00
19.3	Providing and fixing GI clamps upto 300mm length of approved design to unplasticized rain water pipes/CPVC pipes with MS screws of required length including making good the wall etc., all complete as per directions of E-I-C.	10	Each	238.34	2383.00

19.4	Providing and fixing PVC floor trap 100x75mm of standard make and design as per IS standards with PVC solvent cement.complete as per directions of E-in-C.	4	Each	218.05	872.00
19.5	P/F Lexan multiwall polycarbonate sheet of 6mm thickness clear colour in required pattern with all fittings etc., for wall cladding/ roofing purpose all complete as per the direction of Engineer-in-charge.	18	Sqm	853.13	15356.00
19.6	Providing and fixing on wall face unplasticised Rigid PVC sewage water pipes conforming to IS : 13592 Type B, including jointing with seal ring conforming to IS : 5382, leaving 10 mm gap for thermal expansion, (i) Single socketed pipes. 75 mm diameter	10	meter	335.34	3353.00
19.7	Providing and fixing on wall face unplasticised Rigid PVC sewage water pipes conforming to IS : 13592 Type B, including jointing with seal ring conforming to IS : 5382, leaving 10 mm gap for thermal expansion, (i) Single socketed pipes. 110 mm diameter	10	meter	459.79	4598.00
19.8	P/F 50mm PVC pipe including all fittings etc complete as per the direction of Engineer-in-charge	10	Metre	191.39	1914.00
19.9	Providing and fixing PVC beading for ceramic wall tiles at corner of tiles by using cement/adhesives all complete as per direction of Engineer-In-Charge.	20	metre	94.14	1883.00
	Civil Total				775280.00

NIT No : 04/BPCD/2026-2027.**Schedule of Quantities**

Name of work: Providing EI and fresh wiring for Basavanagudi IQ, Bg South Division, Bg HQ Region.

Sl. No.	Description of Items	Quantity			Unit	Amount
Wiring						
1.00	Wiring for light point / fan point / exhaust fan point/ call bell point with 1.5 sq.mm FRLS/ HFFR PVC insulated copper conductor single core cable in surface / recessed medium class PVC conduit, with modular switch, modular plate, suitable GI box and earthing the point with 1.5 sq.mm FRLS/ HFFR PVC insulated copper conductor single core cable etc. as required.					
1.01	Group B	15	Point	1362	Point	20430
2.00	Wiring for twin control light point with 1.5 sq.mm FRLS/ HFFR PVC insulated copper conductor single core cable in surface / recessed medium class PVC conduit, 2 way modular switch, modular plate, suitable GI box and earthing the point with 1.5 sq.mm FRLS/ HFFR PVC insulated copper conductor single core cable etc. as required.	10	Point	1803	Point	18030
3.00	Wiring for circuit/ submain wiring alongwith earth wire with the following sizes of FRLS/ HFFR PVC insulated copper conductor, single core cable in surface / recessed medium class PVC conduit as required.					
3.01	2 X 1.5 sq.mm + 1 X 1.5 Sq.mm earth wire	50.00	Metre	267	Metre	13350.00
3.02	2 X 4 sq.mm + 1 X 4 Sq.mm earth wire	40.00	Metre	373	Metre	14920.00
3.03	4 X 4 sq.mm + 2 X 4 Sq.mm earth wire	10.00	Metre	587	Metre	5870.00
4.00	Supplying and drawing following sizes of FRLS/ HFFR PVC insulated copper conductor, single core cable in the existing surface / recessed steel / PVC conduit as required					
4.01	3 x 1.5 sq.mm	20.00	Metre	104	Metre	2080.00
4.02	3 x 4 sq.mm	10.00	Metre	222	Metre	2220.00
5.00	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.					
5.01	20 mm	60.00	Metre	151	Metre	9060.00
5.02	25 mm	30.00	Metre	168	Metre	5040.00
6.00	Supplying and fixing following modular switch / socket on the existing modular plate & switch box including connections but excluding modular plate etc. as required					
6.01	5/6 amps switch	3	Each	121	Each	363
6.02	3 pin 5/6 A socket outlet	3	Each	136	Each	408
6.03	Two module stepped type fan regulator	3	Each	402	Each	1206.00
6.04	25A Starter for AC units (2 Module)	2	Each	510	Each	1020.00
6.05	25A 3 pin socket	2	Each	249	Each	498.00
7.00	Supplying and fixing following size / modules, GI box along with modular base & cover plate for modular switches in recess etc. as required					
7.01	1 or 2 Module (75mm x 75 mm)	4	Each	354	Each	1416.00

8.00	Supplying and fixing suitable size GI box with modular plate and cover in front on surface or in recess, including providing and fixing 3 pin 5/6 A modular socket outlet and 5/6 A modular switch, connections etc. as required	3	Each	545	Each	1635
9.00	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	1	Each	659	Each	659
10.00	Supplying and fixing suitable size GI box with modular plate and cover in front on surface or in recess, including providing and fixing 2 Nos. 3 pin 5/6 A modular socket outlets and 2 Nos. 5/6 A modular switches, connection etc. as required.	1	Each	757	Each	757.00
11.00	Supplying and fixing suitable size GI box with modular plate and cover in front on surface or in recess, including providing and fixing 25A modular socket outlet and 25A modular SP MCB, "C" curve i/c connections, painting etc. as required.	2	Each	807	Each	1614.00
12.00	S/Fixing 5 star rated single phase, 15 Ltr storage water heater with titanium enamel tank coating including fixing, connecting to water inlet and outlet pipe, testing etc as reqd. (M/s. V Guard Victo/ Racold/ Havells make)	1	Nos	10423	Each	10423.00
13.00	Dismantling of existing light/fan/ 5A/15A plug point /switch board, circuit/sub main wiring/ cable in the IQ portion, dismantling the old DB's, SFU's etc, making good the walls/ceiling with cement and sand painting with matching colour paint etc as reqd.	1	Job	2245	Job	2245.00

Fittings

14.00	Supplying and fixing PVC batten/ angle holder including connections etc. as required.	3	Each	132	Each	396.00
15.00	Supplying and fixing following accessories i/c connection etc as required					
15.01	7/9 W LED lamp (M/s Crompton/ Havells/ philips/ Bajaj/ Luker make)	3	Nos	202	Each	606.00
15.02	9 W LED mirror light fitting of 2 feet length complete with LED tubular lamp & Electronic driver etc (M/s Philips Astra line/ crompton Laser ray/ similar model of Bajaj/Luker make)	2	Nos	616	Each	1232.00
15.03	Decorative wall bracket fitting alongwith 9W LED lamp complete as reqd. (M/s Philips comet/ Crompton/ similar model of Bajaj/Luker make)	5	Nos	1100	Each	5500.00
15.04	10W LED panel type Bulk head fitting complete with all accessories and electronic driver (M/s Jaquar ILO-BLK-LBLK/ M/s Crompton CIS-306-10-57-SL-DP-NBK/ Similar model of Philips/Havells/ Luker)	1	Nos	1403	Each	1403.00
15.05	2 modular skirting light with white LED (M/s Legrand/ Indoasian/ GM/ MK makes)	2	Nos	554	Each	1108.00
16.00	LED Batten light (System lumen efficacy $\geq 105 < 120$ lm/Watt)					

	Supplying, installation, Testing & Commissioning of LED surface mounted Batten light of following body material and construction as per IS : 10322 with driver (Replaceable) as per the requirement with Driver efficiency >85% ,Operating voltage AC 140-270 Volt, freq 50/60 hz, Operating temp range -15 deg to 40 deg centigrade, internal surge protection of 2.5 KV with Short & Open circuit protection ,THD < 10% , P. F.≥0.95, IP20, CRI >80, Flicker free, (flicker should be below 5 %), life time (LED,Driver & electrical circuitary), of minimum 50000 Burning Hours with , 70% of initial Lumen maintained till life ends, CCT 3000°K / 4000°K / 5700°K /6000°K/6500°K (As per ANSI Bin), SDCM(Standard Deviation Color Matching) <3, Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard and trade mark certificate (T.C.). Manufactures Word Mark/ Name Engraved/ Embossing/ Screen printing on housing. complete in all respect i/c external connections with 1.5 sq mm FRLS/ HFFR, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty. System lumen efficacy ≥105 <120 lm/Watt output . LM79 & LM80 Test report from NABL lab for all testing required for LED fixtures as per BIS shall be submitted. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminum housing such that LED junction temperature shall not rise above 90°C).					
	Powder coated CRCA sheet Body (Thickness ≥ 0.50 mm)					
16.01	18-22 W	3	Nos	629	Each	1887
17.00	S/F of 300mm medium duty Metal blade exhaust fan with all accessories etc., complete as reqd.(M/s Havells -Ventil Air DS/ Crompton-Trans Air/ Almonard Make)	2	Each	3179	Each	6358.00
DBs & MCBs						
18.00	Supplying and fixing following way sheet steel, MCB distribution board, 240/415 volts, on surface/recess, complete with tinned copper bus bar, neutral link, earth bar, din bar, interconnections, powder painted i/c earthing etc as reqd (but without MCB/RCCB/Isolator)					
18.01	4 way, Double door TP&N	1	Each	4377	Each	4377.00
19.00	Supplying and fixing following amps rating, 240/415 volts, "C" curve, MCB for inductive loads of following poles in the existing MCB DB complete with connections, testing and commissioning, etc. as required.					
19.01	5-32A SP MCB	8	Each	285	Each	2280.00
19.02	40A TP&N MCB	1	Each	2163	Each	2163.00
19.03	Blanking plates	4	Each	14	Each	56.00
20.00	Supplying and fixing following rating, four pole, (three phase and neutral), 415 volts, residual current circuit breaker (RCCB), having a sensitivity current 30 milliamperes in the existing MCB DB complete with connections, testing and commissioning etc. as required.					

20.01	40A	1	Nos	3452	Each	3452.00
Earthing						
21.00	Earthing with G.I. earth plate 600 mm x 600 mm x 6 mm thick including accessories and providing masonry enclosure with cover plate having locking arrangement and watering pipe of 2.7 metre long etc. with charcoal / coke and salt as required.	2	Set	8351	Set	16702.00
22.00	Providing and fixing 25 mm X 5 mm G.I. strip in 40 mm dia G.I. pipe from earth electrode including connection with G.I. nut, bolt, spring, washer excavation and re-filling etc. as required.	10	Metre	755	Metre	7550.00
23.00	Providing and fixing 25 mm x 5 mm G.I. strip on surface or in recess for connections etc. as required.	5	Metre	287	Metre	1435.00
24.00	Providing and fixing 6 SWG dia G.I. wire on surface or in recess for loop earthing alongwith existing surface/ recessed conduit/ submain wiring/ cable as required.	130	Mtrs	50	Metre	6500.00
25.00	P/F earth bus bar of 30cm long 25mmx 5mm GI strip on surface 2 Nos porcelain insulators on surface including making holes, connections etc as required.	1	Set	261	Set	261.00
Compound Lights & cabling						
26.00	Supplying and laying of 1.1KV grade, 4x16 sqmm PVC Insulated and PVC sheathed /XLPE Armoured Aluminium Conductor UG Cable in the following manner as required.					
26.01	In the existing RCC/ HUME/ METAL Pipe as reqd.	30	Mtrs	465	Mtr	13950.00
26.02	In the existing masonry open duct as required.	10	Mtrs	454	Mtr	4540.00
26.03	On surface as required.	20	Mtrs	487	Mtr	9740.00
27.00	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.					
27.01	4x16sqmm	4	Each	366	Each	1464.00
28.00	Providing, laying and fixing following dia G.I. pipe (medium class) in ground complete with G.I. fittings including trenching (75 cm deep)and re-filling etc. as required					
28.01	40 mm dia	20	Metre	617.05	Metre	12341
	Electrical Component TOTAL					218545.00
	GRAND TOTAL (CIVIL- 7,75,280/-+ ELECTRICAL 2,18,545/-) = 9,93,825/-					

Signature Not Verified

Digitally signed by G NEELAKANTAM
Date: 2026.05.12 19:44:58 IST
Location: eProcure-EPROC